3rd WVPA AFRICA - MIDDLE EAST Meeting

2-4 SEPTEMBER 2026

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"Sustainable Poultry Production from East to West"

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IDEXX

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3rd WVPA AFRICA - MIDDLE EAST Meeting
2-4 SEPTEMBER 2026 ISTANBUL
"Sustainable Poultry Production from East to West"

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08:30- 09:10	**Opening Ceremony**	
09:10-10:20	**Keynote Session 1** Moderator: **Sjaak De Wit**	
09:10-09:50	**Status of high and low pathogenicity avian influenza in Africa and Middle East and solutions for prevention and control** **David Swayne**	
09:50-10:20	**From indigenous resilience to genomic innovation: Advancing poultry health systems in Africa through integrated field epidemiology, breeding, and biotechnology "Bridging traditional knowledge and cutting-edge science for resilient poultry systems"** **Christian Tiambo**	
10:20-10:40	**Coffee Break**	BREAK
10:40-11:40	**Phibro Satellite Symposium** Moderator: **Ali İhsan Barış Işık**	
	Sustainable approaches for controlling the global spread of Infectious Bronchitis virus Varyant 2 (GI 23) strain **Antonio Ricci**	Phibro ANIMAL HEALTH CORPORATION
11:45-12:45	**MSD Satelite Symposium**	
11:45-12:15	**Respiratory disease complexity in poultry: What we need to know** **Sjaak de Wit**	MSD Animal Health
12:15-12:45	**Breathing easier – Effective MSD solutions for CRD** **Barrie Fleming**	
12:45-14:00	**Lunch**	LUNCH
14:00-15:00	**Oral Presentation Session 1** Moderators: **David Swayne, Kareem E. Hassan**	HALL A
OP-22	Emergence of a Reassortant H9N2 Avian Influenza Virus with H5N1 (clade 2.3. 4.4b) Polymerase Segments and Increased Pathogenicity in Egyptian Poultry Wael Elfeil, Amany Adel, Amro Hashish, Shaimaa Talaat, Ahmed Sedeek, Ibrahim Elsalmoney, Hesham Sultan, Magdy Elkady	
OP-02	Whole-Genome Sequencing of H5N1 and H5N8 Avian Influenza (Clade 2.3.4. 4b) in Egypt: Antigenic Drift, Co-Circulation, and Surveillance Implications Mohamed Abaza, Amany Adel, Mohamed Zain El Abideen, Ahmed Sedeek, Amro Hashish, Magdy Elkady, Wael Elfeil	
OP-03	Protective Efficacy of a Multivalent Inactivated H5 Avian Influenza Vaccine in Pekin and Muscovy Ducks under Single-Dose and Prime–Boost Regimens Hesham Sultan, Mohamed Zain El Abideen, Sherif Gaber, Wael Kamel, Amany Adel, Walid Kilany, Wael Elfeil, Shaimaa Talaat	
OP-04	Impact of antigen selection on serological monitoring of H5 Avian Influenza vaccination: a comparison of homologous and heterologous antigens Abdallah Mohammad Makahleh, Marcel Willemsen, Wei Shen Tong	
OP-25	Co-infection of HPAI-H5Nx and LPAI-H9N2 in chickens poses a high risk Ahmed R Elbestawy, Ahmed S. Sayed Ahmed, Mohamed S. Diab, Ehab M. El Nahas, Samir A. Nassif, Mohamed F. Khalil, Eslam S. Al Qaluoby, Esraa Fouad, Nada A. Elfayoumy, Mai M. Safaan, Elsayed M. Abdelwhab	

02 SEPTEMBER

DAY 1

FUJI BALLROOM

3rd WVPA AFRICA - MIDDLE EAST Meeting
2-4 SEPTEMBER 2026 ISTANBUL
"Sustainable Poultry Production from East to West"

15:00-15:20	**Coffee Break**	BREAK
15:20-16:20	**Oral Presentation Session 2** Moderators: **Tayfun Çarlı, Emdadul Haque Chowdhury**	HALL A
OP-67	Epidemiological Surveillance of Poultry Infectious Diseases Challenging the MENA Region Husam Bakri, Raghad Amro, Rana Ayoub, Saja Khader	
OP-12	Reliable and specific ELISA test to detect and monitor inclusion body hepatitis-causing FAdV serotypes Stephanie Lescue, Philippe Pourquier, C. Redal, J. Gaborit, Tarik Sulejmanovic	
OP-13	Development and Validation of a Universal Real-Time PCR Assay Using Serum as an Alternative Matrix for the Molecular Diagnosis of Fowl Adenovirus Infections Kardoudi Amina, Kichou Faouzi, Fellahi Sihame, Benani Abdelouaheb	
OP-65	Molecular and Functional Characterization of the MDV meq Oncogene in Egyptian Poultry Field Strains Karim Selim, Soumendu Chakravarti, Leonardo Uriel González Garza, Steven Fiddaman, Ali Zanaty, Naglaa Hagag, Heba Salem, Shaimaa Talaat, Mohamed Abd Alfattah, Ahmed Samy, Susan Baigent, Samah Eid, Hesham Sultan, Yongxiu Yao	
OP-35	Immunogenicity and Protective Efficacy of a Multigenotype Inactivated Avian Orthoreovirus Vaccine Against GC4 and GC5 Variants in SPF Chickens Mohamed Zain El Abideen, Hanan Abdien, Mona Abdallah, Amro Hashish, Eslam Arafa, Wael Elfei	
16:20-16:30	**Break**	
16:30-17:40	**Oral Presentation Session 3** Moderators: **Clara Marin Orenga, Sibel Kızıl**	HALL A
OP-54	Field Evaluation of a Broiler Vaccination Program Using Performance Indicators and Multi Pathogen Seromonitoring Ahmed Orbano, Sing Rong, Angela Hartman, Karim Selim	
OP-45	Newcastle Disease prevalence in Egypt's Broiler Chicken Farms and the superior clinical protection of Vectormune® ND against Velogenic NDV Genotype VII Kareem Eid Hassan, Waleed Ahmed Ibrahim, Aly Elhefnawy, Gyorgy Banhidi, Mustafa S Sandikli, Jessica Lee, Christophe Cazaban	
OP-23	Emergence of a More Virulent Newcastle Disease Virus Genotype VII virus with antigenic drift, and its reflection on its Antigenicity Ahmed Sedeek, Samier Nassef, Dalia Omar, Nermin Monir, Lamiaa Omar, Mohamed Rady, Ahmed Elkady, Wael Elfeil	
OP-24	First Integrated Epidemiological Investigation of Avian Metapneumovirus Circulation in Moroccan Broiler Farms Amine Mernizi, Salma Bouziane, Oumaima Kadiri, Hicham Fathi, Mohammed Mouahid, Abdeljelil Ghram, Mohammed Bouslikhane, Elena Catelli, Saadia Nassik	
OP-26	Emergence of Variant IBD and Epidemiological Dynamics of Poultry Viral Diseases in Egyptian Broiler Farms (2024–2025) Kareem Eid Hassan, Waleed Ahmed Ibrahim, Aly Elhefnawy, Taha Alkariony, Gyorgy Banhidi, Christophe Cazaban	
18:00	**Welcome Cocktail • ROOF 16**	SOCIAL PROGRAM

08:30-10:20	**Keynote Session 2** Moderator: **Pınar Saçaklı**	
08:30-09:10	**Emerging and re-emerging diseases: Astrovirus, adenovirus** **Sjaak De Wit**	
09:10-09:50	**New challenges from coccidiosis and controls to improve performance and gut health** **Damer Blake**	
09:50-10:20	**Gut health and performance: Microbiome modulation, nutrition and intestinal integrity** **Richard Ducattelle**	
10:20-10:40	**Coffee Break**	BREAK
	EW Nutrition Satellite Symposium	
10:40-11:40	**Revisiting coccidiosis: From conventional control to integrated strategies** **Madalina Diaconu**	ew | nutrition
	Zoetis Satellite Symposium **Optimizing Early Protection: Zoetis Hatchery Vaccines and Inovo® (EMBREX®) Vaccination**	
11:45-12:45	**Welcome & Opening Remarks** **Aykan Bora Şen**	zoetis
11:50 - 12:25	**IBD and vaccination strategies with a focus on variant IBDV control** **Kalen Cookson**	
12:25 - 12:40	**In-ovo vaccination: Driving productivity and protection** **Nicky Love**	
12:40 - 12:45	**Closing Remarks & Key Takeaways** **Aykan Bora Şen**	
12:45-14:00	**Lunch**	LUNCH
14:00-15:00	**Oral Presentation Session 4** Moderators: **Munir Iqbal, G. Ayça Kurtbeyoğlu**	HALL A
OP-33	Innovation in the defence against Mycoplasmosis: vaccination of day-old chicks with a live Mycoplasma gallisepticum vaccine, Vaxsafe MG304 Greg Underwood, Awol Assen, Hanneke Bataille	
OP-34	Efficacy comparison of three commercially available attenuated live IBV QX type vaccines Lovorka Spiric, Lana Ljuma Skupnjak, Katarina Huic Babic, Davor Jankovic, Nikol Ocurccak	
OP-47	Comparative Analysis of Humoral Immune Responses to NDV and IBV Vaccinations in Five Distinct Pure Broiler Lines Nurdan Urvaylioglu, Mehmet Akan, Ozlem Kardogan, Metin Gulec, I. Safa Gurcan, Ismail Ozkan, Kursat Tetik	
OP-36	Comparative field evaluation of in ovo HVT ND IBD vector vaccination and conventional Gumboro vaccination in broiler chickens under high IBDV pressure in France Audrey Bigot, Ahmed Gheziel, Etienne Le Bail, Grégoire Bianchetti	
OP-37	Evaluation of the effect of broiler breeders Salmonella vaccination and coccidiosis treatment on Salmonella Infantis replication in broilers Elisa Russo, Maria Giovanna Tampieri, Alberto Marco Volorio, Guglielmo Gallina	
OP-28	Practical aspects of the application of a live bivalent Salmonella vaccine via drinking water to laying hens during the production period Doris Mueller Doblies, Pia Muenster, Dmytro Radko, Adam Goddard, Robert Harrrison	

15:00-15:20	**Coffee Break**	BREAK
15:20-16:20	**Oral Presentation Session 5** Moderators: **Richard Ducatelle, Barış Sareyyüpoğlu**	HALL A
OP-59	Composition of gastrointestinal microbiota in broiler chickens based on growth performance Akın Unal, Seyyide Saricam Ince, Mehmet Akan	
OP-60	Effects of Yeast-Derived Components on Growth Performance, Cecal Microbiota, and Intestinal Integrity in Broiler Manel Ben Larbi, Ameni Askri, Mariem Saidani, Zied Maalaoui, Theresia Lavergne, Charlie Elrode	
OP-61	Enhancing Broiler Resilience to Heat Stress through Modulation of Gut Microbiota with a Triple-Strain Bacillus-Based Probiotic Antoine Meuter, Christophe Bostvironnois, Tarek Khamis, Mohammed Metwally, Roba Husni Abuasour, Raife Danisman	
OP-50	Phenotypic and genotypic characterization of biofilm Formation in chicken originated Salmonella enterica serovars Seyyide Saricam Ince, Mehmet Akan	
OP-40	An update on Enterococcus cecorum in broilers and inhibitory potential of a three-strain Bacillus-based probiotic Ayman Tolba, Dawn Reinhoudt, Kirsty Gibbs	
OP-48	Bioluminescent imaging reveals novel insights into avian pathogenic Escherichia coli pathogenesis in chickens Mohamed Kamal Abdelhamid, Hammad Ur Rehman, Surya Paudel, Michael Hess	
16:20-16:30	**Break**	
16:30-17:40	**Oral Presentation Session 6** Moderators: **Damer Blake, Seyyide Sarıçam İnce**	HALL A
OP-53	Prime Boost H5 Vaccination Enhances Protection Against Early HPAI H5N1 (Clade 2.3.4.4b) Challenge in Broilers with Maternal Immunity Wael Elfeil, Samier Nassef, Ahmed Sedeek, Dalia Omar, Nermin Monir, Lamiaa Omar, Mohamed Zain, Mohamed Rady	
OP-55	Comparative Evaluation of Immune complex vaccine-Induced Protection in SPF and Commercial Broiler Chickens against nvIBD Hesham Sultan, Shaimaa Talaat, Hend Mahmoud, Laila Tantawy, Karim Selim	
OP-56	Effectiveness of various vaccination protocols using the intermediate-plus IBDV vaccine (Irwin Moulthrop strain) against different IBDV pathotypes in broiler chickens with high levels of maternal antibodies Ola Adel Hassanin, Aya Ashraf Hassanein, Tamer Mahmoud Abdullatif, Manar Abdelmageed, Teguh Y Prajitno, Abdel Kareem Mansour, Moemen Abdel Azeem Mohamed, Mostafa Saif Edin	
OP-57	Field Evaluation of an Inactivated H5 Multivalent Vaccine in Duck Breeders under Commercial Conditions Wei Shen Tong, Abdallah Makahleh, Egor Nesterov	
OP-58	Controlling Avian Influenza in Poultry: From Antigenic Determinants to Next-Generation Multivalent Vaccines Munir Iqbal	
20:00	**Gala Dinner • Swissotel Sultan Park**	SOCIAL PROGRAM

08:30-10:20	**Keynote Session 3** Moderator: **Okan Elibol**	
08:30-09:10	**Molecular evolution of infectious bursal disease virus and challenges in their prevention** **Rafiqul Islam**	
09:10-09:50	**Effects of hatchery practices on chick quality and broiler performance** **Okan Elibol**	
09:50-10:20	**Holistic nutritional approaches to alleviate the heat stress in poultry** **Necmettin Ceylan**	
10:20-10:40	**Coffee Break**	BREAK
10:40-11:40	**Adisseo Satellite Symposium** Moderator: **Yavuz Erten**	
	What to expect from short - medium chain fatty acids in tackling bacterial and viral challenges **Tim Goossens**	ADISSEO A Bluestar Company
11:45-12:45	**Oral Presentation Session 7** Moderators: **Necmettin Ceylan, Derya Yeşilbağ**	HALL A
OP-64	Can Enzyme-Driven Feed Formulation Reduce Feed Cost and Carbon Footprint Without Compromising Performance? Artun Reman Temiz, Lode Nollet, Rob Serwata	
OP-75	Effects of xylanase, β-glucanase, and mannanase on performance and nutrient digestibility in laying hens fed corn- or wheat-based diets Muhammad Shazaib Ramay, Ali Calik, Emre Sunay Gebes, Yusuf Yüksel, Ehab Aboelsaadat, Peter Ader, Fernando Bravo De Laguna, Pinar Saçakli	
OP-49	Guanidinoacetic acid as an energy-sparing agent: implications for sustainable and cost-efficient poultry nutrition Vivienne Inhuber, Insa Bensmann, Khail Kotzenberg	
OP-76	Response of Broiler Chickens in The Finisher and Withdrawal Phases to Different Levels of Energy and Lysine Timothée Guillou, Edith Crenn, Bijie Yang, Olivier Gestin, Pauline Quero, Claire Et Launay	
OP-62	Understanding Muramidase Activity: Linking Peptidoglycan Hydrolysis to Immunity and Performance of broilers Antoine Meuter, Christophe Bostvironnois, Irene Eising, Philip Van Immerseel, Raife Danisman, Borrel Kuate	
12:45-14:00	**Lunch**	LUNCH
14:00-15:00	**Oral Presentation Session 8** Moderators: **Rafiqul Islam, Serdar Ertaş**	HALL A
OP-70	Efficacy of Inactivated nvIBDV A2B1 vaccine and Live IBD Vaccination Strategies in Broilers Lacking Maternal Immunity Against Emerging nvIBDV A2B1 Shaimaa Talaat, Mohamed Abaza, Sherif Gaber, Wael Elfeil, Hesham Sultan	
OP-71	Three-Dose Bivalent IBD Vaccination in Breeder Hens Extends Maternal Immunity and Early Protection Against Challenge with Variant A2B1 in Commercial Broiler Ahmed Sedeek, Mohamed Hamoud, Sherif Gaber, Shaimaa Talaat, Hesham Sultan, Wael Elfeil	
OP-72	Comparative In Vivo Evaluation of Egg-Yolk IgY- and Hyperimmune-Serum-Based Immune-Complex Vaccines against Infectious Bursal Disease Virus in SPF Chicks Wael Kamel, Mohamed Abaza, Ahmed Qandil, Mohamed Zain El Abiden, Ibrahim Ali, Walid Kilany, Wael Elfeil	
OP-74	Evaluation of Dose-Dependent Immunogenicity of a Recombinant HVT-VP2 Vaccine for Dual Control of Marek's Disease and Infectious Bursal Disease in SPF Chickens Wael Elfeil, Walid Kilany, Amro Hashish, Mohamed Ali, Hesham Khaled, Mohamed Basiouny, Mohamed Mansour, Islam Arafa, Ahmed Elkady, Yassien Badr	
OP-46	Monovalent FAdV-4 Vaccine Exhibits Limited Cross-Serotype Immunity Compared to a Tetravalent Vaccine in Breeder Chickens Mohamed Zain El Abideen, Magdy Elkady, Manal Afifi, Ahmed Elkady, Ahmed Sedeek, Wael Elfeil	
15:00-15:20	**Closing Ceremony**	

POSTER PRESENTATIONS

3rd WVPA AFRICA - MIDDLE EAST 2-4 SEPTEMBER 2026 ISTANBUL Meeting
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PP-01 Evaluating Current Natural Xanthophyll Formulations for Yolk Pigmentation Compared to a C30-Ester Market Reference
Pinar Sacakli, Ali Calik, Muhammed Shazaib Ramay, Wolf Pelletier, Yauheni Shastak

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PP-02 Field evaluation of a recombinant genotype vii.1.1 Newcastle disease virus vaccine in commercial layer chickens
Wei Shen Tong, Abdallah Makahleh, Virayos Vajirabhoga, Egor Nesterov

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PP-03 Transfer and Decline of Maternal Antibody specific to Newcastle Disease virus in Asian Houbara Bustard
Julia Alvarenga Carvalho Peçanha, Janaina Torres Carreira, Mar Carrasco Muñoz, Ana Perez De Vargas, Helena Lage Ferreira

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PP-04 Assessment of Seroconversion and Viral Replication Following Combined Administration of rHVT-IBD-H5 and rMDV-1-RN1250 Vaccines
Jose Luis Losada Torres

PP-07 Epidemiological Surveillance and Genetic Diversity of Infectious Bronchitis Virus Field Strains in France (2021–2025)
Audrey Bigot, Anne Laure Ledoux

PP-08 Dose-response effects of xylanase and β-glucanase on the performance and nutrient digestibility of laying hens fed corn- or wheat-based diets
Muhammad Shazaib Ramay, Ali Calik, Emre Sunay Gebes, Yusuf Yüksel, Gamzenur Berber, Esra Türel, Ehab Aboelsaadat, Peter Ader, Fernando Bravo De Laguna, Pinar Saçakli

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PP-10 The Transition Process from Organic Acids to Monoglycerides and The Effectiveness of Monoglycerides in Poultry Gut Health
Derya Yesilbag, Eylem Akkaya, Fulya Odabaşı Erbay

PP-11 Co-Circulation of HPAI H5N1 and H5N8 Clade 2.3.4.4b in Domestic Poultry and Wild Birds in Egypt (2025)
Hesham Sultan, Karim Selim, Shaimaa Talaat, Mahmoud Moawad, Asmaa Shaaban, Ahmed Maher, Magdy El Kady

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PP-12 Maternal Antibody Dynamics Against IBDV in Day Old Chicks: A Multicenter in Egypt Survey Comparing Breeder Vaccination Programs
Mohamed Fawzy, Ibrahim Radi, Ahmed Waly, Ahmed El Kady, Islam Hassan, Karim Selim

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PP-13 Co-infection Dynamics in Egyptian Broiler Respiratory Outbreaks: Surveillance of IBV, NDV, and AIV (H9/H5)
Karim Selim, Muhammed Soudy, Hassan Madian, Mohamed Eldesouki, Ibrahim Abdelhamid, Mohamed Fawzy

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PP-14 Field evidence of compatibility and early intake of co-administered live infectious bronchitis virus vaccines (H120 + D274 with QX or 793B) following day-old hatchery spray vaccination in broilers
Besher Sameh Abed Rabbo, Mohammad Ibrahim Alshorman, Khaled Mohamed Mahgoub, Hussein Mohamed Galal

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PP-15 Stronger Together: Field Evidence for the Associated Use of Poulvac IB Primer (H120 + D274) and Poulvac IB QX in Delivering Dual Protection Against IBV QX and Variant 02 Challenges and Enhancing Broiler Performance
Besher Sameh Abed Rabbo, Mohammad Ibrahim Alshorman, Khaled Mohamed Mahgoub, Hussein Mohamed Galal

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PP-16 Field Comparison of IBDV and Reovirus ELISA Titers in Broiler Breeders: Added Value of Maternavac IBD–Reo on IBDV and Reovirus ELISA Titers Versus a Competitor Program
Besher Sameh Abed Rabbo, Mohamed Abdalla Hatimi, Khaled Mohamed Mahgoub, Mohammad Ibrahim Alshorman, Hussein Mohamed Galal

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PP-17 Economic evaluation of Innovax® ND-IBD vaccine introduction in a commercial broiler operation in Kazakhstan
Sergey Bartasinsky, Anton Karpenko

PP-18 Comparative field evaluation of Innovax® ND-IBD and rHVT-ND vaccination protocols in a commercial broiler farm
Sergey Bartasinsky, Sergey Minkov

POSTER PRESENTATIONS

PP-19 Co-Circulating Vaccine-Like and Field IBV Genotypes Across the Middle East: A Multicountry Genotype Surveillance in Broiler Flocks (2025-Q1 2026)
Khaled Mohamed Mahgoub, Karim Mohamed Selim, Sameh Mohamed El Shorbagy, Tomeh Emil Al Kufouf, Besher Sameh Abed Rabbo, Hussein Mohamed Galal

PP-20 Molecular Surveillance of Infectious Bursal Disease Virus in the Middle East (2025–Q1 2026) Reveals Predominance of Genogroup A2B1 and Co-circulating Genotypes
Khaled Mohamed Mahgoub, Besher Sameh Abed Rabbo, Sameh Mohamed El Shorbagy, Tomeh Emil Al Kufouf, Karim Mohamed Selim, Hussein Mohamed Galal

PP-21 Alarming Antimicrobial Resistance in Poultry-Associated with Escherichia coli Isolates: A Call for Vaccination-Integrated Control Strategies
Khaled Mohamed Mahgoub, Besher Sameh Abed Rabbo, Karim Mohamed Selim, Alaa Riyad Al Najjar, Tomeh Emil Al Kufouf, Sameh Mohamed El Shorbagy, Mohammad Ibrahim Al Shorman, Hussein Mohamed Galal

PP-22 Development and evaluation of an inactivated chitosan nanoparticle-based vaccine from a recent velogenic pigeon paramyxovirus-1 field isolate in domestic pigeons in Egypt
Muhammadtaher Abdulrazaq Abdulrasol, Wafaa A. Abd El Ghany, Harith Abdulla Najem

PP-23 Cross protective efficacy of a combined CR88 and H120 live vaccines applied at day old against Infectious Bronchitis Virus variants Var2, Q1 and D388/Qx
Jose Luis Losada Torres, Hosameldin Abdelhafez

PP-24 Field Evaluation of a Multivalent Fowl Adenovirus Vaccine in Commercial Broiler Breeder Hens
Wei Shen Tong, Abdallah Makahleh, Virayos Vajirabhoga, Egor Nesterov

PP-25 Beyond rock phosphate: Is super-dose phytase the answer for laying hens in late production?
Emre Sunay Gebes, Muhammad Shazaib Ramay

PP-26 Comparative Evaluation of Three Commercially Available ELISA Kits for Detecting Avian Metapneumovirus Antibodies in Moroccan Broiler Chickens
Amine Mernizi, Mohammed Mouahid, Hicham Fathi, Dolors Giralt, Marina Sole, Abdeljelil Ghram, Mohammed Bouslikhane, Elena Catelli, Saadia Nassik

PP-27 Field Evaluation of the Safety and Performance of a Fully Attenuated and Adjuvanted Coccidiosis Vaccine Administered by Spray at Hatchery in Commercial Broilers in Egypt
Amine Mernizi, Mohammed Bekhit, Mohammed Hegazy, Hicham Fathi

PP-29 Evaluation of innovative emulsion and polymer adjuvants for inactivated H5N8 HPAI virus vaccine
Vinod Gyanba Patil, Sarah Kharief, Juliette Ben Arous, Nicolas Versillé, Kairat Tabynov

PP-30 Field evaluation of a multivalent vaccine formulated with a new water-in oil-adjuvant MONTANIDE™ ISA 78 VG in layers
Vinod Gyanba Patil, Sarah Kharief, Nicolas Versillé, Juliette Ben Arous

PP-31 Comparative evaluation of three Infectious Bursal Disease vaccination strategies against UK2019 challenge in broilers
Hicham Fathi, Silvia Ramirez, Michelle Woodward, Marta Busquet, Martina Dardi

PP-32 Safety assessment of IBD Vaccines when applied in laying hens during the rearing period under field conditions
Hicham Fathi, Albertus Stokvis, Marcel Boereboom, Pieter Kuhne, Massimiliano Baratelli, Martina Dardi

PP-33 Efficacy of vaccination with live and inactivated NDV vaccines against an experimental challenge with genotype XIII Newcastle disease virus in broiler-type chickens
Hicham Fathi, Nitin Kurkure, P. M. Sonkusale, M. P. Kaore, Deepak Koli, Massimiliano Baratelli, Eduard Carceller, Ester Taberner

PP-34 Effectiveness of Enhanced Hatchery Biosecurity Measures in Reducing Aspergillus Contamination and Hatchery Aspergillosis
Annisa Rofiqoh Syafikriatillah, Nicky Wulan Pinesty, Erry Setyawan

POSTER PRESENTATIONS

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PP-35 First field monitoring efficacy and production impact of a turkey herpesvirus double construct vaccine (Innovax®-ILT-IBD) within native broiler flocks in different governorates in Egypt
Mohamed El Zayat, Hossam Gado, Ibrahim Elemary, Mostafa Nayel, Hazem Ibrahim Darwish

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PP-36 Quantitative monitoring of the efficacy of immune complex vaccine in laying hens
Melissa Akal, Ozgur Ozturk, Betul Kucuk, Murat Pat, Akin Unal

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PP-37 Broader Early Humoral Immunity with a Multi-Clade H5Nx Vaccine Compared to a Mono-Clade H5N8 Formulation
Ibrahim Ali, Hanan Abbdien, Walid Kilany, Mohamed Ali, Ahmed Qandil, Wael Elfeil

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PP-40 Field evaluation of production and economic outcomes of three IBV vaccination strategies in commercial broilers
Davor Jankovic, Lovorka Špiric, Katarina Huic Babic, Lana Ljuma Skupnjak, Marina Gabric Dragovic

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PP-41 Integrated Evaluation of Compatibility of Two- and Three-Strain Live Attenuated IBV Vaccination Regimens in Day-Old Chickens
Davor Jankovic, Lovorka Špiric, Lana Ljuma Skupnjak, Marina Gabric Dragovic, Katarina Huic Babic, Nikol Ocuršcak, Gert Jan Boelm, Olga Zorman Rojs

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PP-42 Post-challenge supplementation with a phytogenic additive improves recovery and performance of broilers under experimental Eimeria challenge
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ORAL PRESENTATIONS

OP-02

Whole-Genome Sequencing of H5N1 and H5N8 Avian Influenza (Clade 2.3.4.4b) in Egypt: Antigenic Drift, Co-Circulation, and Surveillance Implications

Mohamed Abaza[1], Amany Adel[2], Mohamed Zain El Abideen[2], Ahmed Sedeek[2], Amro Hashish[3], Magdy Elkady[4], Wael Elfeil[5]

[1]*Poultry and Rabbit Diseases Department, Faculty of Veterinary Medicine, Benha University, Tukh, Egypt*
[2]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt*
[3]*MEVAC for Vaccines*
[4]*Poultry Diseases Department, Faculty of Veterinary Medicine, Beni-Suef University, Beni-Suef, Egypt*
[5]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*

Introduction: Avian influenza viruses remain endemic in Egypt, posing persistent threats to poultry production and public health. Surveillance has predominantly relied on partial viral gene sequencing (hemagglutinin and neuraminidase genes), providing limited insight into the full evolution of viruses and the dynamics of internal gene reassortment.

Objectives: To address this gap, we conducted whole-genome sequencing (WGS) on avian influenza H5-positive field samples collected from January to May 2026. This approach aimed to characterize circulating viruses and detect mutations in the hemagglutinin antigenic site with potential impacts on vaccine efficacy, given Egypt's broad H5 vaccination program in poultry.

Results: We sequenced the complete genomes of 37 avian influenza H5 field isolates from diseased poultry using an Oxford Nanopore platform, achieving near-complete recovery of all eight gene segments. Subtype analysis revealed co-circulation of H5N8 (n=13) and H5N1 (n=24) viruses in Egyptian poultry, all belonging to clade 2.3.4.4b. Whole-genome analysis revealed substantial genetic variability within internal genes, indicating ongoing viral evolution and potential undetectable reassortment events, as detected by HA/NA-only surveillance. Hemagglutinin sequence analysis identified four amino acid substitutions in H5N1 isolates (two in antigenic site A: I114T, L115Q; two in site B: D155N, K189R), which may undermine current vaccine effectiveness, whereas H5N8 isolates harbored one site A substitution (P136S). The concurrent circulation of H5N1, H5N8 (clade 2.3.4.4b), and endemic H9N2 viruses, combined with ongoing antigenic drift, internal gene diversity, and intermingling of duck and chicken flocks with suboptimal vaccination, heightens the risk of emergent reassortant influenza strains.

Conclusion: These findings underscore the urgency of strengthened active surveillance across commercial farms, backyard flocks, and live bird markets to inform effective control strategies.

Keywords: Avian influenza, H5N1, H5N8, Clade 2.3.4.4b Whole-genome sequencing, Antigenic drift, Surveillance

OP-03

Protective Efficacy of a Multivalent Inactivated H5 Avian Influenza Vaccine in Pekin and Muscovy Ducks under Single-Dose and Prime–Boost Regimens

Hesham Sultan[1], Mohamed Zain El Abideen[2], Sherif Gaber[3], Wael Kamel[4], Amany Adel[2], Walid Kilany[2], Wael Elfeil[1], Shaimaa Talaat[1]

[1]*Birds and Rabbits Medicine department, Faculty of veterinary Medicine University of Sadat city, Menoufia, Egypt*
[2]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt*
[3]*MEVAC for Vaccines*
[4]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*

Introduction: Ducks play a central role in the epidemiology and transmission of highly pathogenic avian influenza (HPAI) H5 viruses, underscoring the need for effective vaccination strategies.

Objectives: This study evaluated the protective efficacy of a trivalent multiclade inactivated H5 vaccine against H5N1 clade 2.3.4.4b in Pekin (Anas platyrhynchos domesticus) and Muscovy (Cairina moschata) ducks

Experimental Design and Methodology: Two vaccination regimens were investigated: a single dose administered at 10 days of age followed by challenge at 31 days, and a prime–boost regimen (10 and 24 days of age) followed by challenge at 45 days using H5N1 clade 2.3.4.4b. Protection was assessed based on clinical signs, survival, gross and histopathologic lesions, hemagglutination inhibition (HI) antibody titers, and tracheal virus shedding

Results: Vaccinated ducks developed higher antibody responses (HI ~5.5 $\log_2$ in single-dose and ~7.7 $\log_2$ in prime–boost) compared to unvaccinated controls, where maternally derived antibodies declined below 3 $\log_2$. Single-dose vaccination resulted in 90% and 95% survival in Muscovy and Pekin ducks, respectively, compared with 30% and 50% in controls, whereas prime–boost vaccination achieved 100% survival in both species. Muscovy ducks exhibited more severe clinical signs and lesions than Pekin ducks. Virus shedding was reduced following single-dose vaccination and ceased by 10 days post-challenge, whereas prime–boost vaccination completely prevented detectable shedding at all time points; in contrast, 100% shedding was observed in unvaccinated ducks

Conclusion: The multiclade H5 vaccine, particularly in a prime–boost regimen, provides robust protection against H5N1 infection, preventing mortality and eliminating virus shedding, supporting its application as an effective strategy for avian influenza control in duck populations.

Keywords: Avian influenza, H5N1, multiclade vaccine, ducks, prime–boost vaccination, virus shedding, HPAI control

OP-04

Impact of antigen selection on serological monitoring of H5 Avian Influenza vaccination: a comparison of homologous and heterologous antigens

Abdallah Mohammad Makahleh[1], Marcel Willemsen[2], Weishen Tong[3]
[1]*Abdallah Makahleh, Marketing, Kemin Biologics, 1900 Scott Avenue, Des Moines, Iowa, 50317, USA*
[2]*Marcel Willemsen, Marketing, Kemin, 1900 Scott Avenue, Des Moines, Iowa, 50317, USA*
[3]*Weishen Tong Regional Technical Services Manager, Malaysia*

Introduction: The Hemagglutination Inhibition (HI) assay serves as a fundamental method for assessing the effectiveness of poultry vaccines targeting H5 High Pathogenicity Avian Influenza (HPAI). Although using homologous antigens is widely recognized as the most accurate approach for detecting antibodies, diagnostic laboratories frequently turn to commercially available antigen substitutes when exact matches are not accessible.

Objectives: This research aimed to compare the effectiveness of different H5 antigens in identifying immune responses in chickens vaccinated with the MEFLUVAC™ H5+H9+ND7 vaccine.

Experimental Design and Methodology: Twenty specific pathogen-free (SPF) chickens were immunized at 21 days old. Blood samples were taken at 13, 21, and 28 days after vaccination and analyzed using a homologous MEVAC™ antigen (H5N8, clade 2.3.4.4b) alongside four commercial Royal GD antigens: VLDIA097 (H5N2), VLDIA330 (H5N1), VLDIA353 (H5N1, clade 2.3.4.4b), and VLDIA354 (H5N8, clade 2.3.4.4c).

Results: The homologous antigen produced the highest HI titers, reaching an average of 8.95Log2 at 21 days post-vaccination. Among the commercial antigens, VLDIA353, which matched the clade of the vaccine, showed the closest linear correlation with the homologous reference, with a correlation coefficient of 89.6%. Both VLDIA353 and VLDIA354 detected titers above the 5.0Log2 threshold considered protective. Conversely, antigens from different clades or older strains (H5N2 and non-matching H5N1) consistently resulted in lower average titers (≈3.0Log2) and weak statistical correlation, failing to accurately represent vaccine-induced immunity.

Conclusion: This study underscores the importance of clade matching in serological surveillance. Homologous antigens remain the benchmark for precision, but clade-matched commercial antigens are reliable alternatives. In contrast, using mismatched antigens may significantly underestimate the level of flock immunity.

Keywords: Based on the provided study documents, here are five suggested keywords for your submission:, *Hemagglutination Inhibition (HI) assay,* ***H5 Avian Influenza****,* , Vaccine Efficacy, Homologous Antigens

OP-12

Reliable and specific ELISA test to detect and monitor inclusion body hepatitis-causing FAdV serotypes

Stephanie Lescue, Philippe Pourquier, C. Redal, J. Gaborit, Tarik Sulejmanovic
Innovative Diagnostics, 310 rue Louis Pasteur, 34790 Grabels – FRANCE

Introduction: Fowl adenoviruses (FAdVs) have lately emerged as a global threat to poultry industry worldwide. Three different disease aetiologies have been related to specific species and serotypes of FAdVs, namely gizzard erosion caused by serotype 1, hepatitis-hydropericardium syndrome (HPS) caused by serotype 4, and inclusion body hepatitis (IBH) caused by serotypes 2, 8a, 8b, and 11. The latter two are distributed globally and are most severe causing 10 – 30% mortality in diseased chickens.

Objectives: Serology is one of the primary, efficient means of disease diagnosis and measuring response to vaccination. Whereas neutralization assay is serotype-specific, the current ELISA tests based on whole virus lysates have a broad spectrum of detection, meaning they can cross-react with closely related genera of Atadenovirus and Siadenovirus with their distinct pathologies

Experimental Design and Methodology: Consequently, a new format of indirect ELISA based on four specific recombinant proteins was developed with a high specificity to antibodies against HPS and IBH-causing FAdVs. Its specificity was evaluated with a panel of monospecific chicken sera vaccinated with serotypes 8a, 8b, 2/11, 4 whereby all samples were found positive. On the contrary, testing the monosera from birds vaccinated with serotypes 1 and 5 yielded negative results. Cross-reaction was observed among sera from chickens infected with serotypes 2 and 11, indicating a close relatedness of these serotypes

Results: Successful monitoring of vaccination was observed in pooled sera obtained at 14, 21, and 28 days post-vaccination, consistent with decrease of measured antibodies. The test was further applied in testing 80 field samples from an outbreak in Asia, revealing involvement of 8b and 11 serotypes in monocoated plates with respective recombinant proteins.

Conclusion: In conclusion, the developed ELISA kit showed very promising results in detecting the IBH and HPS challenge and vaccination. The high specificity of each recombinant protein provides a prospect for serotyping in the near future.

Keywords: chickens, diagnostics, ELISA, fowl adenoviruses, sera, serotype

OP-13

Development and Validation of a Universal Real-Time PCR Assay Using Serum as an Alternative Matrix for the Molecular Diagnosis of Fowl Adenovirus Infections

Kardoudi Amina[1], Kichou Faouzi[1], Fellahi Sihame[1], Benani Abdelouaheb[2]
[1]*Department of Veterinary Pathology and Public Health, Hassan Institut Agronomique et Vétérinaire Hassan II*
[2]*Medical Biology Department, Molecular Biology Laboratory, Pasteur Institute of Morocco, 11 20360, Casablanca, Morocco.*

Introduction: Fowl adenoviruses (FAdVs) are important poultry pathogens associated with economically significant diseases, creating a need for reliable molecular diagnostic tools and practical sample matrices for routine diagnosis and large-scale surveillance.

Objectives: This study aimed to develop a universal real-time PCR assay targeting a conserved region of the FAdV penton gene and to evaluate serum as an alternative matrix for molecular diagnosis.

Experimental Design and Methodology: The analytical performance of the penton-based real-time PCR assay was assessed using serial dilutions to determine linearity, amplification efficiency, and limit of detection. Analytical specificity was evaluated against AIV, NDV, IBV, and ILTV. Clinical performance was assessed by comparison with a reference universal real-time PCR assay using 56 field samples representing four circulating FAdV serotypes. To evaluate serum as a diagnostic matrix, 320 experimental samples were collected from chickens experimentally inoculated with FAdV-1 and FAdV-8a over a 30-day period. Serum, gizzard, liver, and cloacal swab samples were collected longitudinally, and viral loads were quantified in each matrix.

Results: The penton-based assay showed strong linearity over a dynamic range of 10^2–10^6 copies/µL, an amplification efficiency of 97%, and a limit of detection of 5 copies/µL. No cross-reactivity was observed with AIV, NDV, IBV, or ILTV. Clinical comparison with the 52K-based assay showed excellent agreement, with an R^2 value of 0.9762. Correlation analyses revealed serotype-dependent patterns. In FAdV-1-infected groups, serum viral loads strongly correlated with gizzard samples, whereas FAdV-8a infection showed high viral loads in both liver and gizzard, indicating dual hepatic and gastrointestinal tropism. Temporal analyses showed decreasing hepatic viral loads and increased detection in serum and cloacal swabs at later stages.

Conclusion: These findings support serum as a practical alternative matrix for molecular diagnosis, routine surveillance, and longitudinal monitoring of FAdV infections.

Keywords: Fowl adenovirus, Real-time PCR, Penton gene, Serum, Gizzard, Liver, and Cloacal Swab

OP-22

Emergence of a Reassortant H9N2 Avian Influenza Virus with H5N1 (clade 2.3.4.4b) Polymerase Segments and Increased Pathogenicity in Egyptian Poultry

Wael Elfeil[1], Amany Adel[2], Amro Hashish[3], Shaimaa Talaat[4], Ahmed Sedeek[2], Ibrahim Elsalmoney[1], Hesham Sultan[4], Magdy Elkady[5]

[1]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*
[2]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt*
[3]*Mevac For Vaccines*
[4]*Birds and Rabbits Medicine Department, Faculty of veterinary medicine, University of Sadat city, Menoufia, Egypt*
[5]*Poultry Diseases Department, Faculty of Veterinary Medicine, Beni-Suef University, Beni-Suef, Egypt*

Introduction: Low pathogenic avian influenza (LPAI) H9N2 has been endemic in the Middle East since the late 1990s, causing substantial economic losses in poultry and providing a genetic backbone for reassortment with co-circulating highly pathogenic avian influenza (HPAI) H5 viruses. Recent field observations indicate increased disease severity associated with H9N2 infections, raising concerns about viral evolution and transboundary risk.

Objectives: This study aimed to investigate the epidemiology, genomic characteristics, and pathogenicity of contemporary H9N2 viruses circulating in Egypt and to assess their regional and global relevance.

Experimental Design and Methodology: Between January 2024 and April 2026, samples from 278 poultry flocks experiencing elevated mortality or production losses were screened for H9N2 using RT-PCR. Positive samples (n = 28) were subjected to hemagglutinin (HA) gene sequencing by Sanger technology, while 16 representative isolates underwent full-genome sequencing using the Oxford Nanopore platform to obtain near-complete sequences of all eight gene segments. Viral pathogenicity was evaluated by determining mean death time (MDT) and assessing lesion severity in major organs

Results: Genomic analysis identified a novel reassortant H9N2 virus circulating during 2025–2026 that retained H9N2-derived HA, NA, NP, M, and NS segments but acquired the polymerase genes PB1, PB2, and PA from HPAI H5N1 clade 2.3.4.4b, a genotype not previously recorded in Egypt. HA sequence analysis revealed amino acid substitutions in key antigenic sites (V153I in site I; D135N and T103I in site II), suggesting antigenic drift with potential implications for vaccine efficacy. Pathogenicity assessment demonstrated increased virulence, with a reduced MDT of approximately 92 hours compared with more than 120 hours for H9N2 isolates from 2021, alongside significantly higher lesion scores in the bursa, thymus, pancreas, and kidneys.

Conclusion: The emergence of a reassortant H9N2 incorporating H5N1 polymerase genes highlights the risk posed by the co-circulation of LPAI and HPAI viruses in poultry-dense regions.

Keywords: LPAI H9N2, HPAI H5N1, Reassortant, Pathogenicity, Mean death time, Lesion severity, Surveillance

OP-23

Emergence of a More Virulent Newcastle Disease Virus Genotype VII virus with antigenic drift, and its reflection on its Antigenicity

Ahmed Sedeek[1], Samier Nassef[2], Dalia Omar[2], Nermin Monir[2], Lamiaa Omar[2], Mohamed Rady[1], Ahmed Elkady[3], Wael Elfeil[4]

[1]*Animal Health Research Institute (AHRI), Agriculture Research Center (ARC), Giza, Egypt*
[2]*Central Laboratory for Evaluation of Veterinary Biologics (CLEVB), Abbassia, Cairo, Egypt*
[3]*MEVAC for Vaccines*
[4]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, 41522, Egypt*

Introduction: Newcastle disease virus (NDV) genotype VII continues to evolve antigenically and pathogenically, posing challenges to control efforts in poultry

Objectives: This study assessed changes in NDV genotype VII viruses circulating in Egypt after 2024 compared with earlier strains, focusing on alterations in virulence and antigenicity.

Experimental Design and Methodology: Samples from 61 poultry flocks with ND-like lesions were confirmed as NDV genotype VII by reverse-transcription PCR. A representative 2024 NDV genotype VII isolate (NDV-24) was sequenced, revealing mutations in key antigenic sites of the fusion (F) and hemagglutinin–neuraminidase (HN) genes compared to a pre-2023 genotype VII virus (NDV-22). Pathogenicity was evaluated via mean death time (MDT) in embryonated eggs, intracerebral pathogenicity index (ICPI) in 28-day-old specific pathogen-free (SPF) chicks, and experimental infection of SPF chickens to monitor clinical disease progression.

Results: NDV-24 exhibited increased virulence, with a shorter MDT, higher ICPI (1.85 vs 1.75 for NDV-22), earlier onset of mortality (~48 vs 96 hours post-infection [hpi]), and accelerated time to 100% mortality (6 vs 8 days post-infection [dpi]). Cross-hemagglutination inhibition assays indicated a fourfold (2 $\log_2$) reduction in cross-reactivity between NDV-24 and NDV-22, confirming significant antigenic divergence. Sequence analysis suggests that NDV-24's heightened virulence may be linked to prior circulation in duck flocks (NDV-24 is closely related to a duck-derived strain associated with a 7% egg production drop), possibly contributing to its increased pathogenicity in chickens.

Conclusion: The new emergent NDV genotype VII variant (NDV-24) exhibits significantly enhanced pathogenicity and antigenic drift compared with earlier genotype VII strains, underscoring the need to re-evaluate current vaccines against evolving NDV strains.

Keywords: NDV genotype VII, Pathogenicity, antigenic variation, Cross-HI, Vaccine efficacy

OP-24

First Integrated Epidemiological Investigation of Avian Metapneumovirus Circulation in Moroccan Broiler Farms

Amine Mernizi[1], Salma Bouziane[2], Oumaima Kadiri[2], Hicham Fathi[1], Mohammed Mouahid[3], Abdeljelil Ghram[4], Mohammed Bouslikhane[2], Elena Catelli[5], Saadia Nassik[2]

[1]*HIPRA S.A., 17170 Av. Selva, Amer – Spain*
[2]*IAV Hassan II, Madinat Al Irfane, PO Box 6202, Rabat – Morocco*
[3]*Cabinet Vétérinaire Mouahid, bd Hassan I, lot. 20, appt.1, Hay Abbadi, Témara - Morocco*
[4]*Institut Pasteur de Tunis, 13, place Pasteur, B.P. 74, 1002 Tunis – Tunisia*
[5]*University of Bologna, Dipartimento di Scienze Mediche Veterinarie - Via Tolara di Sopra, 50 Ozzano Emilia, Bologna – Italy*

Introduction: Avian metapneumovirus (aMPV) is an important respiratory pathogen affecting poultry production worldwide. Despite repeated suspicions of circulation in Morocco, epidemiological data regarding aMPV in broiler farms locally remain limited.

Objectives: This study aimed to investigate the seroprevalence, associated risk factors, and molecular circulation of aMPV in Moroccan broiler farms.

Experimental Design and Methodology: A longitudinal serological investigation was conducted between December 2020 and November 2021 in non-vaccinated Moroccan broiler flocks located in different bioclimatic regions. Two successive seasonal investigations covering winter–spring and summer–autumn production periods were performed. A total of 96 broiler flocks and 1997 serum samples were included using a stratified random sampling approach. Sera collected from birds older than five weeks were analyzed using a commercial indirect ELISA detecting antibodies against aMPV subtypes A and B. Epidemiological data were analyzed using multivariable logistic regression models to identify risk factors associated with virus circulation. Between March and June 2022, molecular detection was performed on respiratory samples collected during flock monitoring and from field cases suspected of respiratory disease.

Results: The investigation demonstrated widespread and persistent circulation of aMPV in Moroccan broiler farms throughout the study period. Seroprevalence reached 79.86% during winter–spring and 93.45% during summer–autumn. Bioclimate, season, stocking density, and poor hygiene conditions were identified as significant risk factors associated with virus circulation. Molecular analyses confirmed field circulation of aMPV and identified subtype B as the predominant circulating subtype in the investigated broiler flocks.

Conclusion: This study provides the first large-scale combined serological, epidemiological, and molecular evidence of widespread aMPV circulation in Moroccan broiler farms. The findings highlight the influence of environmental and management-related factors on virus persistence and support the need for strengthened surveillance and adapted control strategies in broiler production systems.

Keywords: avian metapneumovirus, broiler chicken, detection, epidemiology, PCR, risk factors, seroprevalence

OP-25

Co-infection of HPAI-H5Nx and LPAI-H9N2 in chickens poses a high risk

Ahmed R Elbestawy[1], Ahmed S. Sayed Ahmed[2], Mohamed S. Diab[3], Ehab M. El Nahas[4], Samir A. Nassif[5], Mohamed F. Khalil[1], Eslam S. Al Qaluoby[6], Esraa Fouad[5], Nada A. Elfayoumy[1], Mai M. Safaan[6], Elsayed M. Abdelwhab[7]

[1]Department of Bird and Rabbit Diseases, Faculty of Veterinary Medicine, Menoufia University, Shebeen Elkom 32511, Egypt
[2]Department of Anatomy and Embryology, Faculty of Veterinary Medicine, Menoufia University, Shebeen Elkom 32511, Egypt
[3]Department of Animal Hygiene and Zoonoses, Faculty of Veterinary Medicine, New Valley University, Kharga, New Valley 1062001, Egypt
[4]Department of Virology, Faculty of Veterinary Medicine, Benha University, Moshtohor 13736, Qalyuobia, Egypt
[5]CLEVB - The Central Laboratory for Evaluation of Veterinary Biologics, ARC, Abbasia Cairo 11381 Egypt
[6]Department of Virology, Faculty of Veterinary Medicine, Menoufia University, Shebeen Elkom 32511, Egypt
[7]Institute of Molecular Virology and Cell Biology, Federal Research Institute for Animal Health, Friedrich-Loeffler-Institute, 17493 Greifswald-Insel Riems, Germany

Since their introduction to Egypt in 2006 and 2011, respectively, several ongoing evolutions driven by mutations and reassortment events have been recorded in the high-pathogenic avian influenza (HPAI) subtype H5Nx, and the low-pathogenic avian influenza (LPAI) subtype H9N2, with marked evidence over the last decade. This study provides molecular detection of HPAI-H5Nx and LPAI-H9N2 circulating in Egypt between 2023 and 2025. A total of 90 samples were collected from commercial poultry flocks across seven Egyptian governorates. The prevalence of HPAI-H5Nx increased markedly, reaching 41.66% in 2025 (20/48), compared to 20% in 2023 (3/15) and 7.4% in 2024 (2/27). Both HPAI-H5Nx and LPAI-H9N2 were detected in 14.44% of samples, while HPAI-H5Nx co-infections with other respiratory viruses were detected in 8.88% of samples.

Whole-genome sequencing was successfully completed for six representative H5Nx samples, the phylogenetic analysis of which revealed that they belonged to clade 2.3.4.4b. Three of the samples demonstrated close genetic relationships with recently detected Egyptian H5N2 reassortants, while the other three were genetically matched to the H5N1 subtype, closely related to contemporary viruses identified in Europe and neighboring regions. Cross-HI assays revealed significant heterogeneity among Egyptian clade 2.3.4.4b viruses. A/chicken/Egypt/BPC-7CS/2023 (H5N1) exhibited broad recognition across reference and vaccine-derived antisera, indicating preserved antigenic similarity with vaccine strains. In contrast, several 2025 isolates showed markedly reduced recognition by reference antisera, particularly those representing older vaccine lineages. This suggests progressive antigenic drift and incomplete preservation of vaccine-targeted epitopes, despite phylogenetic clustering within the same clade.

Finally, continuous genetic and antigenic characterization of HPAI-H5Nx is recommended to track viral evolution and identify emerging variants and reassortant strains, such as H5N2. Enhanced biosecurity measures and updated, strictly applied vaccination strategies for both HPAI-H5 and LPAI-H9N2 are also essential to mitigate their economic and public health impacts, as well as minimizing the risk of reassortment.

Keywords: Avian Influenza, HPAI-H5Nx, LPAI-H9N2, Co-infections, mutation reassortments, Poultry

OP-26

Emergence of Variant IBD and Epidemiological Dynamics of Poultry Viral Diseases in Egyptian Broiler Farms (2024–2025)

Kareem Eid Hassan[1], Waleed Ahmed Ibrahim[2], Aly Elhefnawy[1], Taha Alkariony[1], Gyorgy Banhidi[3], Christophe Cazaban[3]

[1]*Ceva Animal Health, Unit 56-C1, 6th Floor, Building No.5 - Polygon, Beverly Hills Sheikh Zayed City - 6th October, Giza – Egypt.*
[2]*Reference Laboratory for Veterinary Quality Control on Poultry Production, Animal Health Research Institute, Agricultural Research Center. Dokki, Giza, Egypt.*
[3]*Ceva Santé Animale, Libourne, France.*

An epidemiological investigation was conducted to assess the health status and disease dynamics in broiler farms in Egypt during 2024 and 2025, based on active surveillance performed across 186 farms in 2024 and 269 farms in 2025. A total of approximately 23.5 million birds in 2024 and 36.0 million birds in 2025 were included. The study focused on major viral diseases affecting poultry, including avian influenza viruses (H5, H9), Newcastle disease virus (NDV), infectious bronchitis virus (IBV), and infectious bursal disease (IBD), alongside molecular sequencing for strain characterization.

Overall mortality rates averaged 11% in 2024 and slightly increased to 11.25% in 2025, with notable seasonal peaks observed during winter months and early summer. The average age of infection was around 24 days, with evidence of earlier onset in 2025, particularly in January. IBV variant 2 emerged as the predominant pathogen in both years, maintaining the highest detection rate. H9 subtype showed a noticeable increase in prevalence in 2025 compared to 2024, while H5 remained relatively low and under control.

Co-infection patterns were a significant feature, with IBV and H9 co-infection representing the most frequent combination in both years. Importantly, the data revealed a growing role of variant infectious bursal disease (vIBD), indicating its emergence as a significant and evolving threat in broiler production systems. vIBD detection, often in combination with IBV and H9, highlights its contribution to immunosuppression and increased susceptibility to secondary infections.

The findings highlight the persistent circulation of multiple viral pathogens within Egyptian poultry farms, emphasizing the importance of continuous surveillance, improved biosecurity, and optimized vaccination strategies. The increasing role of H9 and ongoing dominance of IBV variants underscore the need for updated control programs to mitigate economic losses and enhance poultry health sustainability.

Keywords: Avian influenza (H9, H5), Co-infection dynamics, broiler farms, Egypt, Variant IBD

OP-28

Practical aspects of the application of a live bivalent Salmonella vaccine via drinking water to laying hens during the production period

Doris Mueller Doblies[1], Pia Muenster[2], Dmytro Radko[2], Adam Goddard[3], Robert Harrrison[4]
[1]*Elanco Austria GmbH, Vienna, Austria*
[2]*Elanco Deutschland GmbH, Monheim, Germany*
[3]*Elanco Animal Health Ltd., Hook, UK*
[4]*RHConsultancy, Oswestry, UK*

Introduction: Salmonellosis is one of the most important zoonoses worldwide, with S. Enteritidis and S. Typhimurium being the major serovars with public health impact. Poultry products are one of the main sources for human infection, and live Salmonella vaccines have contributed significantly to a reduction in prevalence in poultry and among the human population. The bivalent vaccine AviProTM SALMONELLA DUO, administered via the drinking water line, provides protection against those two serovars and was granted registration for use during the laying period recently.

Objectives: As successful vaccination depends on drinking water quality, the impact of water parameters on vaccine survival was assessed during in vitro trials. Furthermore, it now became necessary to evaluate whether or not anthelmintic and anti-mite treatments applied during the laying period may have a negative impact on vaccine efficacy.

Experimental Design and Methodology: Drinking water was adjusted with different levels of fluoride, nitrate, sulphate, aluminium, arsenic, iron, manganese or chloride, and the survival of the vaccine was assessed for a period of up to 24 hrs. The impact of free chlorine, hydrogen peroxide, fenbendazole, flubendazole or fluralaner was also tested.

Results: Fluoride, nitrate, sulphate levels, and hardness had little impact on vaccine survival, while aluminium, arsenic, iron, and manganese levels had a pronounced, dose-dependent effect. pH value, conductivity, and chloride levels impacted the vaccine stability only at high levels. Free chlorine, chlorine dioxide, and hydrogen peroxide strongly reduced the viability of the vaccine, even though a water stabilizer offered protection from chlorine and chlorine dioxide but not from hydrogen peroxide. All antiparasitic substances had a negative impact on the vaccine strains, although differences between substances were seen.

Conclusion: These findings highlight the importance of drinking water quality for effective vaccination. Furthermore, customers are advised not to apply anthelmintic or anti-mite treatments on the same day as live Salmonella vaccines.

Keywords: Salmonella, vaccination, water quality, dewormers, anti-mite treatment

OP-33

Innovation in the defence against Mycoplasmosis: vaccination of day-old chicks with a live Mycoplasma gallisepticum vaccine, Vaxsafe MG304

Greg Underwood[1], Awol Assen[2], Hanneke Bataille[3]
[1]*Bioproperties Pty Limited, Ringwood Victoria Australia*
[2]*University of New England, Armidale NSW Australia*
[3]*Royal GD, Deventer, Netherlands*

Early-life control of Mycoplasma gallisepticum (MG) remains a key challenge in long-lived birds, especially where infection prior to vaccination can result in persistent respiratory disease and production losses. Vaccination of day-old chicks offers an innovative strategy to advance the onset of protective immunity and build a biosecurity barrier prior to wild-type exposure, however, there are currently no MG vaccines registered or applied at day-old. Recent studies demonstrated that vaccination of day-old chicks by eyedrop induces protective immunity comparable to vaccination at 3-weeks of age. However, groups vaccinated by spray-based delivery methods were only protective at higher doses. Recent studies have also demonstrated that vaccine colonisation could be achieved using a novel intra-nasal delivery machine. This study programme evaluated the safety, colonisation, and protective efficacy of a live attenuated MG vaccine (Vaxsafe MG304) when administered to day-old chicks using individual and mass-application routes.

To support registration of Vaxsafe MG304 in day-old chicks, GLP-safety studies were conducted and confirmed vaccine safety following oculonasal administration at elevated titres. There were no clinical signs or horizontal transmission detected, and the study confirmed localisation of the temperature-sensitive vaccine to the upper respiratory tract only. Efficacy studies were also conducted after oculonasal and spray vaccination of day-old chicks which confirmed significant protection from challenge with R-strain (low) and an Australian field strain delivered by nebulisation and intra-tracheal challenge models.

Collectively, these findings support that Vaxsafe MG304 is safe and can induce protective immunity when administered to day-old chicks. This work supports the feasibility of hatchery-based MG vaccination programmes and highlights key considerations for translating experimental outcomes into commercial practice.

Keywords: Mycoplasmosis control, live MG vaccine, day-old chicks, vaccination, immunity

OP-34

Efficacy comparison of three commercially available attenuated live IBV QX type vaccines

Lovorka Spiric, Lana Ljuma Skupnjak, Katarina Huic Babic, Davor Jankovic, Nikol Ocurccak
Vaxxinova Zagreb d.o.o. (part of Vaxxinova Group), Zagreb, Croatia

Introduction: Because IBV GI 19 (QX type) strains have predominated in Europe and Asia for the past two decades, a new QX type vaccine was recently developed and authorized under EU regulatory standards.

Objectives: This study compared efficacy of three commercially available attenuated live IBV QX type vaccines in broiler chickens, focusing on homologous protection against virulent GI 19 challenge, serology, vaccine uptake, and viral load.

Experimental Design and Methodology: Broilers were allocated into three vaccinated groups (G1 - strain QX 1285, G2 - competitor 1, G3 – competitor 2) and unvaccinated control (G4). At hatch, chicks had IBV MDA mean titer of 5671 (BioChek ELISA). All vaccinated groups received a single spray dose of their respective QX vaccine on day 1.

Results: Four days post vaccination, oropharyngeal swabs confirmed 100% vaccine uptake by PCR in all vaccinated groups. Cloacal detection varied, with positivity rates of 76% (G1), 44% (G2), and 40% (G3), while no virus was detected in controls. Mean antibody levels increased in all vaccinated groups, reaching 1749 (G1), 514 (G2), and 1834 (G3) by day 35.

At 21 days of age, all groups were challenged with virulent IBV GI 19. Six days later, ciliary activity and tissue viral loads were assessed. Protection, defined as preservation of ciliary activity after challenge, differed among vaccines: G1 achieved 88% protection, G2 reached 81%, and G3 provided 64%, whereas the unvaccinated control group showed 0% protection. Viral RNA was detected in 40% (G1), 60% (G2), 73% (G3) and 100% (G4) organ samples after challenge, with vaccinated groups exhibiting significantly lower viral loads compared to control group.

Conclusion: Overall, all three evaluated IBV QX-type vaccines resulted in reliable protection and vaccine uptake. The new vaccine based on QX 1285 strain achieved highest protection level, vaccine uptake and viral load reduction in organs.

Keywords: challenge, infectious bronchitis, protection, vaccination, QX vaccines

OP-35

Immunogenicity and Protective Efficacy of a Multigenotype Inactivated Avian Orthoreovirus Vaccine Against GC4 and GC5 Variants in SPF Chickens

Mohamed Zain El Abideen[1], Hanan Abdien[2], Mona Abdallah[2], Amro Hashish[3], Eslam Arafa[4], Wael Elfeil[2]
[1]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute(AHRI), Agricultural Research Center (ARC), Giza, Egypt*
[2]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*
[3]*Department of Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA 50011, USA*
[4]*MEVAC for Vaccines*

Introduction: Emerging avian orthoreovirus (ARV) variants have reduced the effectiveness of conventional vaccines, highlighting the need for updated formulations that better match circulating strains.

Objectives: evaluated the immunogenicity and protective efficacy of a novel multigenotype inactivated ARV vaccine containing the classical S1133 strain and two emerging variant genotypes, GC4 and GC5, in specific pathogen-free (SPF) chickens.

Experimental Design and Methodology: Birds were vaccinated using a prime–boost regimen at 2 and 6 weeks of age, while unvaccinated birds served as controls. Humoral responses were assessed by a commercial enzyme-linked immunosorbent assay (ELISA) and a homologous serum neutralization test (SNT).

Results: ELISA geometric mean titers increased from 1,758 after primary vaccination to 2,973 after booster vaccination. Post-booster SNT titers ranged from 7 to 11 $\log_2$ against S1133, GC4, and GC5. At 10 weeks of age, vaccinated and unvaccinated birds (four groups, n = 18/group) were challenged by right footpad inoculation with 4.5 $\log_{10}$ $TCID_{50}$/bird of GC4 or GC5. Unvaccinated challenged controls developed severe clinical disease, including marked footpad swelling, hemorrhage, and tendon rupture, and showed viral RNA detection by RT-qPCR in 100% of tendon samples, with frequent liver dissemination at 3 and 10 days post-challenge (DPC). In contrast, vaccinated birds showed no clinical signs following GC4 challenge and only mild transient footpad swelling at 3-DPC after GC5 challenge, which resolved by 10-DPC. No viral RNA was detected in tendons or liver after GC4 challenge, whereas limited transient tendon detection was observed at 3-DPC after GC5 challenge (66.6%, mean Ct 31.5), with no detection at 10-DPC and no liver involvement.

Conclusion: These findings demonstrate that the multigenotype ARV vaccine is highly immunogenic and provides effective protection against variant challenge by reducing clinical disease, viral replication, and systemic dissemination.

Keywords: Avian orthoreovirus (ARV), multigenotype vaccine, inactivated vaccine, SPF chickens, GC4 genotype, GC5 genotype, Mutant Reovirus

OP-36

Comparative field evaluation of *in ovo* HVT ND IBD vector vaccination and conventional Gumboro vaccination in broiler chickens under high IBDV pressure in France

Audrey Bigot[1], Ahmed Gheziel[3], Etienne Le Bail[1], Grégoire Bianchetti[2]
[1]*MSD Santé animale, France*
[2]*ESA Angers France*
[3]*Atlantic-vétérinaire, France*

In France, control of infectious bursal disease (IBD) has traditionally relied on live attenuated vaccines administered in the field via drinking water, a strategy frequently affected by maternally derived antibodies and variability in vaccination quality while i*n ovo* vaccination using HVT vector vaccines remains limited in standard broiler production.

This large scale field study compared the serological efficacy and performance outcomes of an in ovo HVT ND IBD vector vaccine with conventional field applied IBD vaccination, and evaluated exposure to field IBD virus (IBDV) and Newcastle disease virus (NDV).

From November 2024 to June 2025, 23.5 million broilers, from a single production organization were monitored, including 9 million vaccinated in ovo with a HVT ND IBD vector vaccine (Innovax® ND IBD, MSD Animal Health). Sixty in ovo vaccinated flocks and sixty control flocks, vaccinated against IBD in the field using intermediate plus vaccines without ND vaccination, were sampled at slaughter between 33 and 47 days of age. Twenty sera per flock were analyzed by ELISA using insert specific VP2 and ND F protein kits, and ND nucleoprotein kits for DIVA purposes; conventional ELISA kits were used in control flocks. Four bursae of Fabricius per flock were analyzed by IBDV PCR with VP1/VP2 sequencing. Statistical analyses were conducted using R.

In ovo vaccinated flocks showed strong and homogeneous VP2 antibody responses and clear ND vector induced immunity, with no evidence of wild type NDV circulation. Reassortant IBDV strains (A3B1) were detected in 35% of all flocks. In ovo vaccinated flocks exposed to field IBDV demonstrated significantly higher VP2 antibody levels without negative impact on performance, whereas control flocks challenged with A3B1 strains showed significantly increased condemnation rates.

Under high IBDV pressure, in ovo HVT ND IBD vaccination provided robust immunity and improved resilience to field challenge compared with conventional field vaccination.

Keywords: Broiler, HVT vector vaccine, Infectious bursal disease, *in ovo* vaccination, Newcastle disease

OP-37

Evaluation of the effect of broiler breeders Salmonella vaccination and coccidiosis treatment on Salmonella Infantis replication in broilers

Elisa Russo[1], Maria Giovanna Tampieri[1], Alberto Marco Volorio[1], Guglielmo Gallina[2]
[1]*MSD Animal Health, Milano, Italy*
[2]*Vetspin Srl, Bologna, Italy*

Introduction: Salmonella enterica Serovar Infantis (SI) is a foodborne zoonotic pathogen, increasingly present in broiler farms, and difficult to eradicate. Many studies reported that Salmonella spp replication in broilers is influenced by specific maternal antibodies and coccidiosis control, but no studies have been conducted on SI.

Objectives: This study represents a preliminary evaluation on the effect of broiler breeders vaccination with an inactivated vaccine containing Salmonella Enteritidis, Typhimurium and Infantis (ETI) compared with an inactivated vaccination against only Salmonella Enteritidis and Typhimurium (ET), on progeny SI gut colonization, and the effect of coccidiostats (C) or cocci vaccination (CV) of broilers on SI gut colonization.

Experimental Design and Methodology: 150 day-old broiler chicks were randomly distributed in 5 groups (G1: ET, no cocci treatment; G2: ETI, C; G3: ET, C; G4: ETI, CV; G5: ET, CV). At day 3, 6 birds per group were challenged via oral gavage with SI, the others were exposed to SI infection by shedding from infected birds.

Individual cloacal swabs were collected for SI detection from 7 to 12 days of age. After birds were sacrificed and ceca, liver and spleen were collected for SI detection. Logistic regression stepwise analyses were applied on the results of each day swab samples, and tissues.

Results: The number of positives swabs increased from day 7 to 12 in all groups, and the logistic regression analyses showed a statistically significant effect of ETI in decreasing the number of positives. Tissue colonization was very high in ceca, quite absent in spleen, and around 50% in livers again with a statistically significant effect of ETI.

Conclusion: In this study, with a very precocious challenge, the ETI vaccination of breeders seemed to decrease the positivity to SI (swabs and livers), while coccidiosis treatment seemed to have no effect.
Keywords: Salmonella enterica Serovar Infantis, Salmonella inactivated vaccine, coccidiosis vaccine, Salmonella shedding, broiler, maternally derived antibodies

OP-40

An update on Enterococcus cecorum in broilers and inhibitory potential of a three-strain Bacillus-based probiotic

Ayman Tolba, Dawn Reinhoudt, Kirsty Gibbs
Danisco Animal Nutrition And Health

Enterococcus spp., particularly Enterococcus cecorum, have emerged as significant opportunistic pathogens in poultry, causing lameness, increased morbidity, and mortality in intensive production systems. Since initial reports in 2002, outbreaks have been described worldwide, and control has become increasingly challenging due to the high prevalence of antimicrobial resistance (AMR) among Enterococci. This highlights the need for effective antibiotic-independent interventions.

Bacillus-based Probiotics may provide a useful tool in managing Enterococcus-associated disease in poultry. In a study published in 2019, Fernandez et al. described an in vitro assay to evaluate the inhibitory potential of probiotic Bacillus-strains on the growth of pathogenic E. cecorum isolates. In this assay, the inhibitory effect of the individual Bacillus-strains in Enviva® PRO was also evaluated. Enviva® PRO is a commercially available, three-strain Bacillus velezensis probiotic used in broilers to support gut health and strengthen the gut barrier. Results from the study by Fernandez et al. show that the level of inhibition varies strongly among pathogen isolates and Bacillus-strains.

These findings demonstrate that selected probiotic Bacillus velezensis strains exhibit robust and inhibitory activity against pathogenic E. cecorum and support their potential as a practical, antibiotic-independent strategy for mitigating enterococcal challenges. Recently, an update on the inhibition of new Enterococcus-isolates by the Bacillus-strains in Enviva® PRO, including pathogenic Enterococcus cecorum isolates recently collected from broilers across North America, Europe, and the Middle East.

Keywords: Enterococcus cecorum, different regions, broilers, inhibitory potential, Bacillus-based probiotic

OP-45

Newcastle Disease prevalence in Egypt's Broiler Chicken Farms and t he superior clinical protection of Vectormune® ND against Velogenic NDV Genotype VII

Kareem Eid Hassan[1], Waleed Ahmed Ibrahim[2], Aly Elhefnawy[1], Gyorgy Banhidi[3], Mustafa S Sandikli[3], Jessica Lee[3], Christophe Cazaban[3]

[1]*Ceva Animal Health, Unit 56-C1, 6th Floor, Building No.5 - Polygon, Beverly Hills Sheikh Zayed City - 6th October, Giza – Egypt.*
[2]*Reference Laboratory for Veterinary Quality Control on Poultry Production, Animal Health Research Institute, Agricultural Research Center. Dokki, Giza, Egypt.*
[3]*Ceva Santé Animale, Libourne, France.*

Newcastle disease (ND) continues to pose one of the most significant global threats to poultry health due to its severe economic impact. In Egypt, ND was first detected in 1950, and genotype VII (GVII) emerged in 2011, becoming one of the predominant circulating strains.

An epidemiological survey conducted between 2024 and 2025 examined 455 commercial broiler farms experiencing respiratory manifestations. Velogenic(v) NDV GVII was detected in 17% of tested samples in 2024 and 15% in 2025, confirming ongoing field circulation.

Vectormune® ND (rHVT-ND), an HVT vector vaccine expressing the NDV F (fusion)protein, has long demonstrated strong field efficacy in ND prevention programs. In this study, a large commercial broiler enterprise comprising 10 houses and approximately 300,000 birds per cycle was monitored over three successive cycles. During the first two cycles, birds received at day old; an rHVT IBD vaccine combined with a fowl pox-vector ND (rFP-ND) vaccine and a live ND vaccine and at day 8 inactivated H9ND vaccine. In the third cycle, at day old; rHVT-ND combined with immune complex IBD (Gumboro) vaccine with live ND and at day 8 inactivated H9ND vaccine.

Zootechnical performance parameters were recorded across all cycles, and weekly tracheal swabs were collected. Significant improvements were observed in the rHVT-ND cycle, including reduced mortality (4.04% vs. 15.10% and 27.22%), better feed conversion ratio (FCR) (1.47 vs. 1.47 and 1.51), increased average body weight at 34 days (2.129 kg vs. 1.638 and 1.656 kg at 33 days), and a markedly higher European Production Efficiency Factor (EPEF) (409 vs. 366 and 240). Field challenge with vNDV GVII was detected in all cycles between 22-26 days of age.

Overall, Vectormune® ND (rHVT-ND) markedly enhanced flock performance and conferred superior clinical protection compared with previous vaccination programs, demonstrating its strong efficacy against circulating vNDV GVII under field conditions.

Keywords: Egypt, Vectormune ND, Velogenic ND, rHVT-ND, ND GVII, respiratory disease

OP-46

Monovalent FAdV-4 Vaccine Exhibits Limited Cross-Serotype Immunity Compared to a Tetravalent Vaccine in Breeder Chickens

Mohamed Zain El Abideen[1], Magdy Elkady[2], Manal Afifi[3], Ahmed Elkady[4], Ahmed Sedeek[1], Wael Elfeil[5]
[1]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute(AHRI), Agricultural Research Center (ARC), Giza, Egypt*
[2]*Poultry Diseases Department, Faculty of Veterinary Medicine, Beni-Suef University, Beni-Suef, Egypt*
[3]*Faculty of Veterinary Medicine, King Salman International University, Ras Sudr, Egypt*
[4]*MEVAC for Vaccines*
[5]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*

Introduction: Fowl adenovirus (FAdV) serotype diversity complicates vaccination efforts in poultry, and in recent years, there has been an emerging need for several serotypes worldwide, especially serotypes 2, 8a/b, and 11, while available commercial vaccines are mainly serotype 4.

Objectives: This study compared immune responses to a monovalent FAdV serotype 4 (FAdV-4) inactivated vaccine versus a tetravalent inactivated vaccine (containing FAdV serotypes 4, 8a, 8b, 11) in two commercial breeder flocks. Each flock was vaccinated with a three-Dose regimen at 8, 15, and 20 weeks of age. Serum samples were collected at 8, 10, 15, 20, 25, 30, 35, and 40 weeks, and from 4-day-old progeny of 30-week breeders. Antibodies were measured by commercial ELISA and serum neutralization tests (SNT) against serotypes 2, 4, 8a, 8b, and 11.

Results: Both vaccines induced strong neutralizing antibody titers to serotype 4 (mean ~9 $\log_2$; positivity threshold 4 $\log_2$) with no significant difference between groups. However, the monovalent vaccine elicited significantly lower ELISA titers than the tetravalent vaccine at key post-vaccination time points (15 and 25 weeks) and generated only minimal cross-neutralizing antibodies against heterologous serotypes 2, 8a, 8b, and 11 (mean SNT 4–5 $\log_2$ in monovalent-vaccinated breeders vs 9–10 $\log_2$ in tetravalent-vaccinated breeders). Similarly, day-old progeny from monovalent-vaccinated breeders had significantly lower ELISA and neutralizing titers to serotypes 2, 8a, 8b, and 11 than progeny from tetravalent-vaccinated breeders, whereas serotype 4 maternal titers were comparable.

Conclusion: the monovalent FAdV-4 vaccine provided robust homologous immunity but failed to induce substantial cross-immunity to other serotypes, whereas the tetravalent vaccine elicited broader serotype coverage and superior maternal antibody transfer. These findings underscore the importance of multivalent vaccination strategies for comprehensive FAdV control in breeder flocks.

Keywords: Fowl adenovirus (FAdV), serotype diversity, monovalent vaccine, tetravalent vaccine, cross-protection, breeder chickens, maternal antibodies

OP-47

Comparative Analysis of Humoral Immune Responses to NDV and IBV Vaccinations in Five Distinct Pure Broiler Lines

Nurdan Urvaylioglu[1], Mehmet Akan[2], Ozlem Kardogan[3], Metin Gulec[3], I. Safa Gurcan[4], Ismail Ozkan[5], Kursat Tetik[3]
[1]*Bursa Uludag University, Faculty of Veterinary Medicine, Department of Microbiology, Turkiye*
[2]*Ankara University, Faculty of Veterinary Medicine, Department of Microbiology, Turkiye*
[3]*Central Veterinary Control Research Institute, Etlik, Ankara, Turkiye*
[4]*Ankara University, Faculty of Veterinary Medicine, Department of Biostatistics, Ankara, Turkiye*
[5]*District Directorate of Agriculture and Forestry, Izmir, Turkiye.*

Introduction: Newcastle Disease (ND) and Infectious Bronchitis (IB) remain critical viral threats causing severe economic losses in the poultry industry worldwide. Optimizing protective humoral immunity through strategic vaccination protocols is essential for safeguarding commercial flocks.

Objectives: This study aimed to investigate and compare the antibody kinetics following Newcastle Disease Virus (NDV) and Infectious Bronchitis Virus (IBV) vaccinations in five distinct pure broiler parent lines (A1, A2, A3, B1, B2). The core objective was to evaluate the direct influence of genetic diversity on immune competence under a highly standardized vaccination regime.

Experimental Design and Methodology: All five pure broiler lines received a uniform initial spray vaccination at hatch, followed by combined (ND+IB) booster doses administered via drinking water according to routine flock schedules. Long-term serological monitoring was systematically conducted using commercial ELISA kits and Hemagglutination Inhibition (HI) tests throughout a complete 95-day production cycle.

Results: At hatch, maternal NDV antibody levels (HI log2) ranged from 4.56 to 5.44, demonstrating a statistically homogeneous distribution across all five genetic lines ($p>0.05$). Following the natural decline of passive immunity, subsequent active antibody responses exhibited statistically significant differences among the lines ($p<0.05$). The mean NDV HI titers progressively increased from 4.22 log2 on day 21 to a peak of 8.67 log2 on day 95. Highly significant variations were recorded during the early stages of active immunization; for instance, at day 21, titers ranged from a minimum of 1.85 log2 in line A3 to a maximum of 5.92 log2 in line B1.

Conclusion: The experimental data demonstrate that while maternal immunity transfer remains remarkably consistent across different genetics, the magnitude and overall kinetics of the subsequent active humoral response are significantly modulated by the genetic background. The strong correlation validated between ELISA and HI results confirms the reliability of this serological monitoring tool.

Keywords: Broiler parent, ELISA, Hemaglutination Inhibition, Infectious Bronchitis Virus, Newcastle Disease

OP-48

Bioluminescent imaging reveals novel insights into avian pathogenic Escherichia coli pathogenesis in chickens

Mohamed Kamal Abdelhamid[1], Hammad Ur Rehman[2], Surya Paudel[3], Michael Hess[4]
[1]*Unit for Poultry Medicine, Clinical Department for Farm Animals and Food System Science, University of Veterinary Medicine, Vienna, Austria; Department of Pathology, Faculty of Veterinary Medicine, Beni-Suef University, Beni-Suef, 62511 Egypt*
[2]*Unit for Poultry Medicine, Clinical Department for Farm Animals and Food System Science, University of Veterinary Medicine, Vienna, Austria*
[3]*Department of Infectious Diseases and Public Health, Jockey Club College of Veterinary Medicine and Life Sciences, City University of Hong Kong, Hong Kong SAR China*
[4]*Unit for Poultry Medicine, Clinical Department for Farm Animals and Food System Science, University of Veterinary Medicine, Vienna, Austria; Current address: Histovac GmbH, Magdeburggasse 10, Klosterneuburg, Austria*

Avian pathogenic Escherichia coli (APEC) causes avian colibacillosis, a common bacterial disease in poultry industry with economic and potential zoonotic significance. Distinguishing inoculated strains from native E. coli in vivo trials is challenging. To address this, the bioluminescence locus ilux2 was integrated into the chromosome of an APEC strain, enabling constitutive light emission and real-time tracking of colonization and dissemination. Two separated in vivo trials were conducted. In the first trial, 48 laying hens were assigned to three groups and intratracheally inoculated with ilux2-E. coli PA14/17480/5-ovary, E. coli PA14/17480/5-ovary, or PBS (1). In the second trial, 64 two-week-old SPF chicks (32 broilers, 32 layers), were split into control and infected groups per type and exposed to aerosolized ilux2-E. coli PA14/17480/5-ovary, or PBS (2). Clinical signs, lesions severity, immunohistochemistry, bacterial load, and tissue colonization using bioluminescence imaging were assessed. Data were analyzed using ANOVA with Tukey's post-hoc test or Mann–Whitney U tests (P <= 0.05). In hens, colisepticaemia was categorized into four lung histopathology stages, progressing from heterophilic inflammation to mixed-cell infiltration, pyogranuloma formation, and convalescence. As disease advanced, bacterial burden decreased, as shown consistently by bioluminescence imaging, culture, and quantitative immunohistochemistry. Additionally, confirmed colonization of the reproductive tract with contamination of egg contents. In the comparative analyses of SPF chicks, broilers were more susceptible than layers, exhibiting higher clinical scores, more severe macroscopic and microscopic lesions, and broader systemic dissemination to respiratory tissues, blood, femoral head, heart, liver, and spleen. Interestingly, bioluminescent imaging revealed persistent colonization of the bursa of Fabricius in both types. In conclusion, ilux2-based imaging provides integrated longitudinal insights into APEC pathogenesis, disease progression, tissue tropism. Ongoing studies are testing whether susceptibility is lung microbiota-dependent and tracing bursal colonization pathways

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Keywords: Escherichia coli, in vivo, laying hens, broilers, bioluminescence, bursa of Fabricius, egg contamination

OP-49

Guanidinoacetic acid as an energy-sparing agent: implications for sustainable and cost-efficient poultry nutrition

Vivienne Inhuber, Insa Bensmann, Khail Kotzenberg
Alzchem Trostberg GmbH, Trostberg, Germany

Efficient broiler and turkey growth relies on the tight coupling of nutrient catabolism with energy-demanding anabolic processes such as muscle protein synthesis. While catabolic pathways generate ATP, anabolic processes consume it, making cellular energy availability a key determinant of growth efficiency. In this context, guanidinoacetic acid (GAA) plays a key role as an energy-sparing feed additive.

Guandinoacetic acid is the sole precursor of creatine, which in its phosphorylated form (phosphocreatine, PCrea) acts as a rapid energy buffer for ATP regeneration during periods of high energy demand. Through the creatine–phosphocreatine system, ATP/ADP homeostasis is maintained in both cytosolic and mitochondrial compartments. Dietary GAA supplementation increases PCrea availability, thereby improving cellular energy status and overall nutrient utilization efficiency.

This improved energy balance enables more efficient nutrient allocation toward growth. Accordingly, GAA supplementation has been associated with increased body weight gain and improved feed conversion. Rivera et al. (2022) reported that 0.06% GAA (Creamino®) improved body weight by 2.6% and reduced feed conversion ratio by four points in broilers. Similarly, Butolo et al. (2022) demonstrated that dietary metabolizable energy can be reduced by up to 100 kcal/kg without impairing performance, confirming the energy-sparing potential of GAA.

In addition, GAA exerts an arginine-sparing effect by reducing the need for endogenous creatine synthesis, allowing arginine to be redirected toward protein deposition.

From a practical poultry feeding perspective, these effects translate into clear economic advantages. By improving cellular ATP availability, GAA reduces the bird's dependence on high dietary energy supply, enabling the partial replacement of costly energy-dense ingredients such as fats and oils. This allows formulation of lower-energy, more cost-efficient diets while maintaining performance, contributing to both profitability and sustainability.

In conclusion, GAA represents an effective nutritional strategy to enhance energy efficiency and reduce reliance on expensive dietary energy sources in both broiler and turkey production.

Keywords: broiler, turkey, guanidinoacetic acid, energy, sustainability, production efficiency

OP-50

Phenotypic and genotypic characterization of biofilm Formation in chicken originated Salmonella enterica serovars

Seyyide Saricam Ince, Mehmet Akan
Department of Microbiology, Faculty of Veterinary Medicine, Ankara University, Ankara, Türkiye

Introduction: Biofilm is an extracellular matrix that promotes chronic infections and bacterial colonization on biotic and abiotic surfaces. It functions as a protective barrier against environmental stress, disinfectants, and antimicrobials, enabling bacterial persistence on poultry environments. Biofilm-forming bacteria are associated with nearly 60% of foodborne outbreaks worldwide. Salmonella is the second most common bacterium responsible for foodborne infections. Evaluating the biofilm-forming capacity of poultry-originated Salmonella isolates is essential for preventing contamination throughout the food chain. According to EFSA, Salmonella Infantis, Kentucky, Enteritidis, and Typhimurium are among the predominant serovars detected in broiler flocks, while serovars such as Senftenberg, Liverpool, Agona, and Anatum are also reported. Objectives: This study investigated the biofilm formation capacities of chicken-originated Salmonella serovars. Experimental Design and Methodology: Totally 100 isolates were analyzed, including twenty isolates each of serovars Infantis, Kentucky, Enteritidis, and Typhimurium, and five isolates each of serovars Senftenberg, Liverpool, Agona, and Anatum. Biofilm formation was evaluated using the crystal violet microtiter plate method. The isolates were categorized by biofilm-forming capacities. The presence of csgA, csgB, csgD, ompR, adrA, rpoS, and fimH biofilm formation genes was screened.

Results: All isolates were identified as biofilm producers; 91.0% were weak and 9.0% were moderate biofilm producers. Notably, all moderate biofilm producers belonged to serovars Enteritidis and Typhimurium. The stronger biofilm-forming abilities of S. Enteritidis and S. Typhimurium, the two most frequently reported serovars in human salmonellosis, may contribute to their persistence and transmission through the poultry production chain. Molecular analyses showed that all isolates carried the tested genes except one S. Senftenberg isolate lacking the rpoS gene. Conclusion: This study indicated the substantial biofilm-forming potential of chicken originated Salmonella serovars, which may facilitate persistence in poultry systems, increase tolerance to sanitation, and contribute to contamination, emphasizing the importance of monitoring for effective control strategies and food safety.

Keywords: Biofilm, chicken, foodborne, microtiter plate method, Salmonella, Salmonella Enteritidis, serovar

OP-53

Prime Boost H5 Vaccination Enhances Protection Against Early HPAI H5N1 (Clade 2.3.4.4b) Challenge in Broilers with Maternal Immunity

Wael Elfeil[1], Samier Nassef[2], Ahmed Sedeek[3], Dalia Omar[2], Nermin Monir[3], Lamiaa Omar[2], Mohamed Zain[3], Mohamed Rady[3]

[1]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*
[2]*Central Laboratory for Evaluation of Veterinary Biologics (CLEVB), Abbassia, Cairo, Egypt*
[3]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt*

Introduction: The world's current biggest concern is highly pathogenic avian influenza viruses, particularly the recently discovered H5N1 clade-2.3.4.4b.

Objectives: This study considers a field investigation to evaluate various vaccination schedules using the H5 inactivated vaccine against the HPAI-H5N1 clade-2.3.4.4b virus, with early challenge in commercial broilers that had maternal immunity, since the broiler breeders had been vaccinated

Experimental Design and Methodology: Three vaccination regimens were devised and administered to three commercial broiler chick flocks kept under field conditions at 25-days of age. Twenty chickens from each flock were transported to the Central Laboratory for Evaluation of Veterinary Biologics, and each group was housed in a BSL-3 chicken isolator just before challenge, along with a control, non-vaccinated broiler chicken group. The vaccination regimes are as follows: a two-dose (prime-boost) regime at days 1 and 9 in broilers of group-1 (G1); a single dose on day 1 in commercial broilers of group-2 (G2); and a single dose on the 8th day in commercial broilers of group-3 (G3). The antibody titers against AI-H5 were checked weekly. On day-28, both the vaccinated and unvaccinated control groups were challenged with HPAI-H5N1 virus clade-2.3.4.4b. The survival rate, virus shedding rates, and clinical pathology were tracked for 10 days after the challenge

Results: At three weeks after vaccination (WPV), antibody titers in the prime-boost regimen were considerably higher than those in the single-dose groups. G2 and G3 showed very moderate survival rates (60% and 87%, respectively) and a notably high shedding rate following the virus early challenge (3-WPV), whereas G1 achieved complete (100%) survival with negligible viral shedding.

Conclusion: Prime-boost vaccination increased protection against the HPAI H5N8 virus in the H5N1 early challenge paradigm. These results demonstrate the vital role that optimal vaccination programs play in reducing the risks posed by HPAI-viruses in the highly intensive commercial chicken production industry

Keywords: Highly Pathogenic Avian Influenza (HPAI), H5N1 clade 2.3.4.4b, Broiler chickens, H5 inactivated vaccine, Prime-boost vaccination, Maternal immunity (MDA), Vaccination Regimens

OP-54

Field Evaluation of a Broiler Vaccination Program Using Performance Indicators and Multi Pathogen Seromonitoring

Ahmed Orbano[1], Sing Rong[2], Angela Hartman[2], Karim Selim[3]
[1]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Egypt*
[2]*Zoetis Inc. Vet Med R&D, Kalamazoo Michigan USA*
[3]*Zoetis Middle East operation*

Introduction: Integrating field performance indicators with serological surveillance provides a pragmatic, farm-level assessment of vaccination program effectiveness and early warning of health or management risks in broiler production.

Objective: To evaluate the performance of two different vector HVT-IBD-ND hatchery vaccines in a broiler farms.

Materials-Methods: Two consecutive broiler production cycles (December 2025–March 2026) were followed. Each cycle included >1 million chicks distributed across three farms, each with six houses. All farms received a recombinant HVT–IBD–ND vector vaccine from two different manufacturers (Vaccine A vs Vaccine B), followed by two live ND vaccines and one inactivated ND vaccine, and an intermediate IBD vaccine at 7–9 days of age. Flock performance was assessed using mortality, feed conversion ratio (FCR), body weight, and production number. Serology included HI &Elisa. titers.

Results: Vaccine B flocks showed approximately three-fold higher mortality than Vaccine A (12.1% vs 4.0%). Feed efficiency favored Vaccine A (average FCR 1.449; best 1.413) compared with Vaccine B (average 1.550). Vaccine A flocks achieved consistent harvest weights >1,980 g at 33–34 days (mean 2,087 g; peak 2,170 g). Serological monitoring of Vaccine A showed 100% seropositivity for NDV (means 6,593 and 5,476), and strongly protective ND-GVII titers (8.3 and 7.7 $\log_2$).IBD titers measured by IDEXX showed low seroconversion (33%) in one house compared to 93-100% seroconversion in all other houses suggesting that vaccination timing of the intermediate IBD vaccine should be monitored closely or that low classical field IBD challenge may have been present within that house. However, titers via the ProFLOK ELISA IBD showed titers on average of 18000 at marketing age.

Conclusion: HVT-IBD-ND vaccine A showed protective serological titers for Newcastle disease and IBD and resulted in lower mortality and strong flock performance.

Keywords: HI, ELISA.FCR, HVT-IBD-ND vaccine, broiler, ND challenge, IBD

OP-55

Comparative Evaluation of Immune complex vaccine-Induced Protection in SPF and Commercial Broiler Chickens against nvIBD

Hesham Sultan[1], Shaimaa Talaat[1], Hend Mahmoud[1], Laila Tantawy[2], Karim Selim[3]
[1]*Department of Birds and Rabbits Medicine, Faculty of Veterinary Medicine, University of Sadat City, Menoufia 32958, Egypt*
[2]*Department of Poultry Disease, Animal Health Research Institute, Agriculture Research Center, Giza 12618, Egypt*
[3]*Zoetis Middle East operation*

Introduction: Infectious bursal disease virus (IBDV) is a major threat to the Egyptian poultry industry, causing bursal damage and immunosuppression immune. In this study we evaluate Immune complex vaccines should be in both SPF and commercial broiler chicks.

Material-Methods: Day-old SPF and commercial broilers were randomly allocated into six groups (15 birds/group): Group 1 (G1) received an immune complex (ICX) vaccine on day 1, Group 2 (G2) was a negative control (non-vaccinated, non-challenged), and Group 3 (G3) was a positive control (non-vaccinated, challenged). Birds in G1 and G3 were challenged on day 15 with a novel Egyptian variant isolate (nvIBDV/Egypt/2023/Giza 4). Protection was assessed at 4 and 7 days post-challenge (dpc) using mortality, bursa-to-body indices (BBR/BI; B/BI), microscopic lesion score (MSI), and IBDV ELISA titers; bursal atrophy was defined as a bursa-to-body weight index <0.7.

Results: At 4 dpc, mortality was 0/20 in all SPF and broiler groups. In challenged non-vaccinated birds (G3), challenge was associated with reduced B/BI ratio, MSI, and ELISA titers: in SPF chicks, B/BI was 0.63, MSI 2.5, and titer 4226; in commercial broilers, B/BI was 0.76, MSI 2.0, and titer 2168. ICX-vaccinated challenged birds (G1) showed an intermediate pattern, with lower lesion severity than G3 in both models but not reaching the profile of G2. At 7 dpc, differences persisted: SPF chicks showed BBR/BI 0.42, MSI 3.0, and titer 9618, while commercial broilers showed 0.50, 3.0, and 5360, respectively.Histopathology corroborated these findings, showing more severe bursal lesions in challenged non-vaccinated birds than in ICX-vaccinated and challenged birds.

Conclusion: Overall, ICX vaccination on day 1 followed by challenge on day 15 provided measurable protection in SPF and commercial broilers by mitigating bursal lesions and improving bursal indices, while maintaining zero mortality at both time points.

Keywords: Spf chicks, commercial broiler, Immune complex, BBI, MSI

OP-56

Effectiveness of various vaccination protocols using the intermediate-plus IBDV vaccine (Irwin Moulthrop strain) against different IBDV pathotypes in broiler chickens with high levels of maternal antibodies

Ola Adel Hassanin[1], Aya Ashraf Hassanein[2], Tamer Mahmoud Abdullatif[1], Manar Abdelmageed[3], Teguh Y Prajitno[4], Abdel Kareem Mansour[5], Moemen Abdel Azeem Mohamed[2], Mostafa Saif Edin[2]

[1]*Department of Avian and Rabbit Medicine, Faculty of Veterinary Medicine, Zagazig University, Zagazig, Al-sharqyia, 44511, Egypt*

[2]*Department of Avian and Rabbit Medicine, Faculty of Veterinary Medicine, Assiut University, Assiut, Egypt*

[3]*Department of Pathology and Clinical pathology, Faculty of Veterinary Medicine, Badr University in Cairo (BUC), Badr City, Cairo, 11829, Egypt*

[4]*Japfa Comfeed Indonesia Tbk, Indonesia*

[5]*Department of Animal Medicine, Faculty of Veterinary Medicine, Zagazig University, Zagazig, Al-sharqyia, 44511, Egypt*

Various types and strains of infectious bursal disease virus (IBDV) vaccines are currently available; however, recent studies have demonstrated that these vaccines provide limited protection against newly emerging variant and very virulent IBDV strains. Moreover, maternally derived antibodies (MDAs) are considered a major factor that may interfere with vaccine efficacy. This study evaluated the effectiveness of vaccination using the classical Irwin Moulthrop intermediate-plus vaccine administered at different ages in broiler chickens and its ability to protect against infection with either the Egyptian novel variant or very virulent IBDV strains. A total of 180 commercial broiler chickens possessing high levels of MDAs were vaccinated with the classical Irwin Moulthrop intermediate-plus vaccine at 1, 5, 8, or 11 days of age. The intermediate-plus vaccine was able to breakthrough the MDAs at 8 and 11 days of age, exhibiting serological responsiveness characterized by a high MDA breakthrough, with a geometric mean titer (GMT) of 1200. Independent vaccinated groups were challenged with either the Egyptian G3 novel variant IBDV or the very virulent Egyptian G14 IBDV at 14 or 21 days of age, respectively. Compared with sham-infected control birds, vaccination at 8 and 11 days of age significantly alleviated clinical signs, improved bird performance, and reduced viral genome presence in the bursa of Fabricius, as well as bursal lesions induced by the novel variant IBDV pathotype. Following challenge at 21 days of age, vaccination at 11 days provided complete protection against the Egyptian G14 very virulent IBDV strain, as evidenced by normal clinical conditions, maintained bursa-to-body weight ratio, preserved histopathological architecture, and absence of detectable viral genome in the bursa of Fabricius. These findings indicate that effective vaccine performance can be achieved through successful breakthrough of high MDA levels, which may be accomplished using intermediate-plus IBDV vaccines with appropriate vaccination timing.

Keywords: Chickens, Infectious bursal disease, Irwin Moulthrop, Maternal derived antibodies, Novel variant, Very virulent

OP-57

Field Evaluation of an Inactivated H5 Multivalent Vaccine in Duck Breeders under Commercial Conditions

Wei Shen Tong, Abdallah Makahleh, Egor Nesterov
Kemin Biologics, 1900 Scott Ave. Des Moines, IA 50317-0070 USA

Introduction: Highly Pathogenic Avian Influenza (HPAI) continues to pose a significant risk to duck production systems, particularly in breeder flocks that may contribute to virus persistence and spread. Effective vaccination strategies capable of inducing broad and sustained antibody responses are essential for HPAI control under commercial field conditions.

Objectives: The objective of this study was to assess the humoral immune response induced by an inactivated H5 multivalent vaccine administered to duck breeders under commercial farming conditions

Experimental Design and Methodology: A field vaccination study was conducted in a commercial duck breeder farm involving 5,600 birds. Ducks were vaccinated subcutaneously with an inactivated H5 multivalent vaccine containing H5 antigens representative of H5N1 and H5N8 lineages, at 2, 6, 12, and 18 weeks of age. Birds were managed following standard commercial practices for housing, feeding, and biosecurity. Serum samples were collected at 2, 6, 10, 19, and 23 weeks of age. Antibody responses were evaluated using the hemagglutination inhibition (HI) test against representative H5 antigenic clades, including H5N8 clade 2.3.4.4b and H5N1 clades 2.2.1.1 and 2.2.1.2.

Results: Progressive increases in HI antibody titers were observed following successive vaccinations. Mean HI titers against H5N8 clade 2.3.4.4b increased from 5.2 $\log_2$ at 2 weeks of age to 9.0 $\log_2$ at 23 weeks of age. Antibody responses against H5N1 clades 2.2.1.1 and 2.2.1.2 reached peak mean titers of 8.8 $\log_2$ and 9.9 $\log_2$, respectively. Coefficients of variation generally decreased after repeated vaccinations, indicating improved immune uniformity within the flock.

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Conclusion: Under commercial field conditions, the evaluated inactivated H5 multivalent vaccine induced sustained and broadly reactive antibody responses against multiple H5 clades in duck breeders. These findings support the role of strategic vaccination as a component of HPAI control programs in duck breeder production systems.

Keywords: Avian influenza, Duck breeders, Field study, H5 vaccine, HI antibody response

OP-58

Controlling Avian Influenza in Poultry: From Antigenic Determinants to Next-Generation Multivalent Vaccines

Munir Iqbal
Avian Influenza and Newcastle Disease Group, The Pirbright Institute, Woking, GU24 0NF, UK.

Introduction: Controlling avian influenza H9N2 and highly pathogenic H5 viruses remains a persistent global challenge due to rapid viral evolution, antigenic diversity, and complex epidemiology. Although vaccination is the primary control strategy, its effectiveness is often compromised by antigenic drift, co-circulation of variants, and the use of mismatched vaccines that induce suboptimal immunity. This facilitates the emergence of immune escape variants and continued virus circulation in vaccinated flocks. Additional factors, including maternally derived antibodies, further reduce vaccine performance, underscoring the need for highly immunogenic and broadly cross-protective vaccines.

Objectives: To investigate the molecular basis of immune escape and identify key antigenic determinants that inform the development of broadly protective and multivalent avian influenza vaccines.

Experimental Design and Methodology: We identified key residues in the haemagglutinin (HA) glycoprotein that modulate antigenicity using complementary predictive and experimental approaches. Critical antigenic sites were mapped and used for the rational selection and incorporation of broadly cross-reactive epitopes into candidate vaccine strains. In parallel, targeted antigen delivery vaccines (TADV) were developed to engage chicken antigen-presenting cells essential for inducing protective immunity. Viral vector platforms, including Newcastle disease virus (NDV) expressing H5 and H9 HA, were used to enable multivalent vaccine design.

Results: Mapping of antigenic sites enabled the design of vaccine candidates with improved cross-protection against emerging variants. TADV platforms induced robust immune responses, including in birds with high levels of maternally derived antibodies. NDV-vectored vaccines expressing H5 and H9 HA supported multivalent protection. Production in cultured cells demonstrated scalability and cost-effectiveness, enhancing vaccine breadth, potency, and multivalency.

Conclusion: Integrating antigenic mapping with targeted antigen delivery and multivalent viral vector platforms provides a strategy for next-generation avian influenza vaccines, enabling more effective and sustainable control while reducing economic losses and safeguarding animal and public health.

Keywords: Avian Influenza, H9N2, H5Nx, Haemagglutinin (HA), Targeted Antigen Delivery Vaccine (TADV), Multivalent Vaccines, Cross-protective Immunity

OP-59

Composition of gastrointestinal microbiota in broiler chickens based on growth performance

Akın Unal, Seyyide Saricam Ince, Mehmet Akan
Department of Microbiology, Faculty of Veterinary Medicine, Ankara University, Ankara, Türkiye

Introduction: The gastrointestinal microbiota in chickens plays a crucial role in growth performance, health, and immunity. Objectives: This study investigated the effects of gastrointestinal microbiota on broiler growth performance.

Experimental Design andMethodology: Different broiler chicken flocks fed similar diet were grouped based on the European Production Efficiency Factor (EPEF) values obtained from the previous six production cycles. The flocks were divided into three groups: low growth performance flocks (LGPF), medium growth performance flocks (MGPF), and high growth performance flocks (HGPF). Ten fresh fecal samples were randomly collected from each flock. The samples were pooled to represent a total of 18 flocks, including 6 flocks from each group. Fecal microbiota was analyzed by next-generation sequencing (NGS) targeting the V3 region of the 16S rRNA gene. Mean relative abundance (%) of microbiota at phylum, genus, and species taxonomies was determined by groups.

Results: Significant differences were observed among the groups for gastrointestinal microbiota composition. Firmicutes was the dominant phylum in HGPF (44.78%) and MGPF (38.02%), whereas Proteobacteria predominated in the LGPF (45.42%). At the genus level, Lactobacillus was dominant in HGPF (18.38%), while Escherichia (22.86%), Clostridium (18.33%), and Pseudomonas (14.71%) were prominent in LGPF. In addition, Faecalibacterium and Bifidobacterium (13.57% and 5.57%) were more abundant in HGPF compared to LGPF (5.10% and 1.28%). At the species level, L. acidophilus and F. prausnitzii were detected at lower levels in LGPF (5.94% and 5.09%) than in HGPF (17.29% and 12.90%). Conversely, E. coli, C. perfringens, and P. aeruginosa were predominant in LGPF.

Conclusion: Consequently, beneficial bacteria, such as L. acidophilus and F. prausnitzii may improve broiler growth performance by enhancing nutrient absorption, producing short-chain fatty acids, inhibitting inflammation, and competitive exclusion. Additionally, opportunistic pathojens including E. coli, C. perfringens and P. aeruginosa negatively affects growth performance by reducing nutrient absorption and feed utilization.

Keywords: broiler, growth performance, Lactobacillus, metagenomic analysis, microbiota, next generation sequencing, 16S rRNA

OP-60

Effects of Yeast-Derived Components on Growth Performance, Cecal Microbiota, and Intestinal Integrity in Broiler

Manel Ben Larbi[1], Ameni Askri[2], Mariem Saidani[3], Zied Maalaoui[4], Theresia Lavergne[5], Charlie Elrode[6]
[1]*Manel Ben Larbi, high school of agriculture of mateur, Carthage university Tunisia*
[2]*Ameni Askri, high school of agriculture of mateur, Carthage university Tunisia*
[3]*Mariem Saidani, high school of agriculture of mateur, Carthage university Tunisia*
[4]*Zied Maalaoui, Natural Biologics, Inc., Newfield, NY*
[5]*Theresia Lavergne, Natural Biologics, Inc., Newfield, NY*
[6]*Charlie Elrode, Natural Biologics, Inc., Newfield, NY*

Proverde Liquid is an all-natural blend of autolyzed yeast and concentrated yeast cell wall, containing complex carbohydrates, nucleotides, and peptides purported to reduce enteric pathogen challenge, improve digestive efficiency, support immune function, and lower gut inflammation. This study evaluated the effects of Proverde on growth performance, cecal microbiota, and intestinal integrity in broilers from 0 to 33 days of age. A total of 68,000 day-of-hatch, straight-run Arbor Acres broilers were reared in two commercial houses (34,000 birds/house) on the same farm under identical nutritional and environmental conditions. One house served as the Control, while the other received Proverde Liquid in the drinking water at 0.50 mL/L from d 1 to 3, 0.25 mL/L from d 21 to 23, and 0.50 mL/L from d 30 to 33. All broilers received the same corn-soybean meal-based starter, grower, and finisher diets. Body weights of 150 randomly selected birds per house were recorded weekly (d 1, until d33), and ADG, feed intake, and FCR were determined for each phase. Mortality was recorded daily. At trial end, intestinal samples from 30 birds per house were used to assess villus height-to-crypt depth ratio and cecal Lactobacillus spp., Enterobacteriaceae, and Clostridium spp. counts.

Broilers receiving Proverde tended to have heavier BW ($P = 0.10$) and significantly higher ADG ($P < 0.05$) from d 22 to 33, along with lower mortality during d 1 to 7 and overall ($P < 0.05$), compared with Controls. Cecal Lactobacillus spp. counts were higher ($P < 0.01$), while Enterobacteriaceae and Clostridium spp. counts were lower ($P < 0.01$), in the Proverde group. Villus height-to-crypt depth ratio was numerically increased in the duodenum and ileum of treated birds. These results suggest that Proverde supplementation, particularly during periods of stress or challenge, can improve late-phase growth performance, microbiome balance, and intestinal health in broilers.

Keywords: Autolyzed yeast, yeast cell wall, broilers, growth performance, microbiota

OP-61

Enhancing Broiler Resilience to Heat Stress through Modulation of Gut Microbiota with a Triple-Strain Bacillus-Based Probiotic

Antoine Meuter[1], Christophe Bostvironnois[2], Tarek Khamis[2], Mohammed Metwally[2], Roba Husni Abuasour[3], Raife Danisman[4]
[1]*Novonesis, Lyngby, Denmark*
[2]*Zagazig University, Cairo, Egypt*
[3]*Novonesis, Dubai, UAE*
[4]*Novonesis, Istanbul, Turkey*

Heat stress disrupts the poultry gut microbiota, reducing beneficial bacteria, increasing pathogenic populations, and impairing intestinal barrier function and performance. Probiotics may mitigate these effects through microbiome modulation.

A total of 720 day-old male broilers were assigned to thermoneutral conditions (NS, <24°C) or heat stress (HS; 32°C for 8-10 h/day from day 21 to 35). Birds received one of three diets: Negative Control (NC), Probiotic (PRO; triple-strain Bacillus at 1.6×10^6 CFU/g), or Positive Control (PC; lincomycin). Microbiota composition (16S rRNA), performance, and physiological parameters were assessed. Data were analyzed using Statsmodels with Tukey's test ($P < 0.05$).

At day 35, NS birds showed higher microbial diversity and better performance than HS birds. Under heat stress, PRO supplementation increased alpha-diversity (trend) and enhanced butyrate-producing genera (e.g: Faecalibacterium) versus HS NC. PRO birds under HS achieved higher final body weight (2.304 vs. 2.228 kg) and improved breast yield compared to NC and PC.

Performance improvements were associated with enhanced physiological responses, including increased serotonin levels in serum and intestine, elevated hepatic expression of superoxide dismutase, and improved gut integrity as indicated by upregulation of MUC2. Additionally, breast muscle development was supported by increased MyoD expression.

In conclusion, a triple-strain Bacillus-based probiotic mitigates heat stress effects by modulating gut microbiota, improving intestinal function, and enhancing oxidative and hormonal balance, resulting in better performance and welfare in broilers.

Keywords: Heat Stress, Gut Microbiome, Broilers, Probiotic, Performance, Welfare, Biomarkers

OP-62

Understanding Muramidase Activity: Linking Peptidoglycan Hydrolysis to Immunity and Performance of broilers

Antoine Meuter[1], Christophe Bostvironnois[1], Irene Eising[1], Philip Van Immerseel[2], Raife Danisman[3], Borrel Kuate[1]

[1]Novonesis, Lyngby, Denmark
[2]Ghent University, Merelbeke, Belgium
[3]Novonesis, Istanbul, Turkey

Peptidoglycan (PGN) accumulation in the poultry gastrointestinal tract, resulting from bacterial cell wall turnover, is associated with chronic immune stimulation and inflammation, leading to inefficient nutrient utilization and reduced performance. Muramidase, an exogenous enzyme, hydrolyzes PGN into smaller bioactive fragments, including muramyl dipeptide (MDP), which is known to regulate immune responses via NOD2 signaling.

This study synthesized data from multiple in vitro and in vivo experiments, including PGN challenge models, to evaluate muramidase efficacy. Key parameters assessed included PGN hydrolysis, soluble-to-total PGN ratios, MDP release, immune cell populations (CD3+, CD45+), and gut barrier indicators such as goblet cell density.

Muramidase significantly increased PGN solubilization in the jejunum, with improvements of 38% and 46% on days 14 and 21, respectively ($P < 0.05$). MDP release was detected exclusively in muramidase-treated samples, leading to significant NOD2 activation ($P < 0.001$) and attenuation of inflammatory signaling. Immunological modulation was further evidenced by normalization of intraepithelial lymphocytes ($P<0.001$). Additionally, muramidase enhanced gut barrier integrity, as demonstrated by increased goblet cell density ($P < 0.001$).

Performance outcomes were validated through a meta-analysis of over 80 broiler trials, showing a significant reduction in feed conversion ratio (-4 points) and an increase in body weight of 43 g at day 35 ($P < 0.05$).

In conclusion, muramidase reduces PGN-induced inflammation and promotes immune homeostasis through MDP-mediated signaling pathways. These effects improve gut functionality and nutrient efficiency, translating into enhanced growth performance. Muramidase supplementation represents a promising nutritional strategy to optimize poultry productivity. Further research is required to elucidate systemic effects of PGN metabolism.

Keywords: Muramidase, Peptidoglycan, Broilers, Immunity, Productivity, Mechanisms

OP-64

Can Enzyme-Driven Feed Formulation Reduce Feed Cost and Carbon Footprint Without Compromising Performance?

Artun Reman Temiz[1], Lode Nollet[2], Rob Serwata[2]
[1]*Huvepharma TR, İstanbul, Türkiye*
[2]*Huvepharma NV, Uitbreidingstraat 80, 2600 Antwerp, Belgium*

Feed production is the primary contributor to both the economic and environmental impact of broiler production, with soybean meal and inorganic phosphorus sources accounting for a substantial share of dietary carbon emissions. Improving nutrient utilization through precision nutrition has become an important strategy for reducing feed costs while supporting more sustainable poultry production. Phytase and xylanase enhance nutrient availability, allowing dietary nutrient specifications to be reduced without compromising productive performance. This study evaluated the effectiveness of phytase and xylanase supplementation in reducing dietary nutrient density, feed cost, and the potential carbon footprint while maintaining broiler performance. A total of 630 one-day-old male Ross 308 broilers were randomly assigned to seven dietary treatments, each comprising 10 replicate pens with nine birds per pen. Birds were reared for 35 days using a three-phase feeding program (starter, grower, and finisher). Body weight, feed intake, feed conversion ratio, and mortality were recorded. Data were analyzed by one-way ANOVA. Supplementation with phytase and xylanase enabled reductions of 1.5% in dietary crude protein and 95 kcal/kg in metabolizable energy while maintaining growth performance and feed efficiency. Improved nutrient utilization supported the formulation of lower-cost diets with reduced dependence on high-carbon-footprint feed ingredients. Phytase and xylanase provide nutritional benefits beyond conventional matrix values, enabling greater flexibility in feed formulation while sustaining broiler performance. Given their negligible contribution to the dietary carbon footprint (<0.008%) and their ability to facilitate the use of lower-input diets, these enzymes represent an effective nutritional strategy for improving both the economic and environmental sustainability of broiler production.

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Keywords: Carbon footprint, phytase, performance, sustainability, xylanase

OP-65

Molecular and Functional Characterization of the MDV meq Oncogene in Egyptian Poultry Field Strains

Karim Selim[1], Soumendu Chakravarti[2], Leonardo Uriel González Garza[2], Steven Fiddaman[2], Ali Zanaty[3], Naglaa Hagag[3], Heba Salem[4], Shaimaa Talaat[5], Mohamed Abd Alfattah[6], Ahmed Samy[2], Susan Baigent[2], Samah Eid[3], Hesham Sultan[5], Yongxiu Yao[2]

[1]*Zoetis Middle East Operation*

[2]*The Pirbright Institute, Surrey,GU24 0NF, UK.*

[3]*Reference Laboratory for Veterinary Quality Control on Poultry Production, Animal Health Research Institute, Agricultural Research Center, Giza, 12619, Egypt*

[4]*Department of Poultry Diseases, Faculty of Veterinary Medicine, Cairo University, Giza 12211, Egypt*

[5]*Department of Birds and Rabbits Medicine, Faculty of Veterinary Medicine, University of Sadat City,Menoufia 32958, Egypt.*

[6]*Unaffiliated Poultry Consultant, Giza, Egypt.*

Introduction: Marek's disease (MD) is a highly contagious neoplastic disease of poultry caused by Marek's disease virus (MDV), leading to major economic losses. Because the MDV oncogene meq is a key virulence determinant, characterizing its sequence diversity and functional activity is important for understanding circulating strains.

Materials-Methods: Eight field samples positive by real-time PCR were amplified for the full coding region of the meq gene using in-house primers. Amplicons were gel-purified and bi-directionally Sanger sequenced (BigDye™ Terminator v3.1; 3500xL Genetic Analyzer). Reads were annotated, trimmed, assembled, and analyzed in Geneious Prime®, including amino acid deduction to identify polymorphisms. Representative meq variants were synthesized, FLAG-tagged, and cloned into a mammalian expression vector. DF-1 chicken cells were co-transfected with the Meq constructs, an AP-1-site mCherry reporter plasmid, and a chicken-Jun expression plasmid. Transactivation was quantified by live-cell imaging (IncuCyte-S3) via mCherry expression. RB-1B (vvMDV) Meq served as a positive control; empty vector and cells-only served as controls.

Results: All sequenced samples encoded a standard Meq length of 339 amino acids. Seven of eight Egyptian strains clustered closest (BLASTn) to a Nigerian strain characterized by three proline repeat motifs (PPPP), while one strain (EG-2) matched the European "Polen" strain containing four PPPP repeats. Functionally, both identified Meq types induced mCherry expression at levels comparable to RB-1B, and significantly higher than empty-vector and cells-only controls.

Conclusion: Egyptian MDV strains showed limited Meq length variation but differed in proline-repeat patterns, including detection of a Polen-like Meq. Despite sequence differences, the tested Meq types retained strong AP-1–dependent transactivation similar to a vvMDV reference, supporting their potential association with virulent phenotypes

Keywords: Marek's disease, meq gene, variants, Nigerian strain, proline repeat motifs

OP-67

Epidemiological Surveillance of Poultry Infectious Diseases Challenging the MENA Region

Husam Bakri, Raghad Amro, Rana Ayoub, Saja Khader
Vaxxinova International B.V.

The poultry industry in the Middle East and North Africa (MENA) region has faced significant health and production challenges, with reports of increased mortality rates in broilers reaching up to 10%, 20%, and in some cases 40%- particularly after 21 days of age. In layers and breeders, a marked decline in production has been observed, accompanied by respiratory signs and poor egg quality. Postmortem examination revealed consistent pathological findings, including proventricular hemorrhage, pericardial edema and effusion, yellow intestinal casts (suggestive of mixed infections), and severe obstruction of the trachea and upper respiratory tract and blockage accompanied with yellow cheesy material.

To investigate the underlying causative agents, our lab (Vaxxinova Jordan Service Lab) conducted a regional disease surveillance study between 2023 and 2024. Blood and serum samples were systematically collected for serological testing using ELISA and HI assays. Additionally, organ swabs and FTA card samples were taken from affected birds for PCR testing.

Major causative agents identified in the area included Newcastle disease virus (NDV), avian influenza virus H9 (AIV-H9), avian influenza virus H5 (AIV-H5), infectious bronchitis virus (IBV) and sub-serotypes, and fowl adenovirus (FAdV). Mycoplasma gallisepticum (Mg) and mycoplasma synoviae (MS) were also detected. Sequencing and further phylogenetic analysis of FAdVs showed that serotype 8b of FAdV-E was the most prevalent across several countries in the MENA area. Other detected serotypes included FAdV-C (serotype 4), FAdV-D (serotype 2, 11), and FAdV-A (serotype 1), this analysis eventually led to the development and successful implementation of an autogenous vaccine. Field monitoring post-vaccination showed promising protective outcomes of the vaccine. Other present diseases in the area included, MDV, coryza and others.

Laboratory diagnostics played a vital role in identifying the causative agents circulating in the area, guiding targeted vaccination strategies, and improving disease management practices across the region.

Keywords: MENA, Diagnostics, Vaccination, ELISA, HI, PCR, FAdV

OP-70

Efficacy of Inactivated nvIBDV A2B1 vaccine and Live IBD Vaccination Strategies in Broilers Lacking Maternal Immunity Against Emerging nvIBDV A2B1

Shaimaa Talaat[1], Mohamed Abaza[2], Sherif Gaber[3], Wael Elfeil[4], Hesham Sultan[1]
[1]*Birds and Rabbits Medicine Department, Faculty of Veterinary Medicine, University of Sadat City, Menofia, Egypt*
[2]*Poultry and Rabbit Diseases Department, Faculty of Veterinary Medicine, Benha University, Tukh, Egypt*
[3]*MEVAC for Vaccines*
[4]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, 41522, Egypt*

Introduction: Since 2023, the Noval variant of IBD has emerged in North Africa and the Middle East, causing severe losses.

Objectives: Many countries in this region import day-old broilers from abroad, and these broilers have maternal-derived antibodies (MDA) against the emerging infectious bursal disease virus (IBDV) variant A2B1 (nvIBDV).

Experimental Design and Methodology: This study evaluated the protective efficacy of inactivated and live vaccination strategies in broiler chickens at 21-days of age. A total of 410-day-old broiler chicks, originating from breeder flocks vaccinated with classical IBD but lacking detectable nvIBDV-specific MDA as confirmed by serum neutralization test (SNT), were allocated into four groups. Three groups (n=120 each) were vaccinated as follows: G1 received an inactivated nvIBDV vaccine at day-1, G2 received an inactivated nvIBDV vaccine at day-1 followed by a live attenuated vaccine at day-11, and G3 received a live attenuated classical IBD vaccine at day 11; G4 served as a non-vaccinated control. At 21-days of age, each group was subdivided into challenged and non-challenged subsets using nvIBDV A2B1. Antibody responses were monitored weekly using SNT for nvIBDV and ELISA for total antibody levels. Bursal and splenic integrity were evaluated using bursal index (BI), bursal weight ratio (BWR), and spleen body weight ratio (SBR), and protection was further assessed using the mean severity index (MSI) at 7-days post-challenge.

Results: Results demonstrated that chicks in G1 and G2 developed detectable neutralizing antibody titers ($6\log_2$) by 21-days, whereas G3 and G4 remained undetectable until post-challenge. Vaccinated groups G1 and G2 showed significantly higher BI values and lower MSI after challenge, indicating effective protection. Birds vaccinated with live classical IBD alone did not confer significant protection against an nvIBDV challenge.

Conclusion: Inactivated nvIBDV vaccination provides effective protection in broilers, highlighting its importance as a control strategy in endemic regions

Keywords: Infectious bursal disease virus (IBDV), nvIBDV A2B1, Maternal-derived antibodies (MDA), Broiler vaccination, Inactivated IBD vaccine, Vaccine efficacy, Early-life protection

OP-71

Three-Dose Bivalent IBD Vaccination in Breeder Hens Extends Maternal Immunity and Early Protection Against Challenge with Variant A2B1 in Commercial Broiler

Ahmed Sedeek[1], Mohamed Hamoud[2], Sherif Gaber[3], Shaimaa Talaat[5], Hesham Sultan[5], Wael Elfeil[4]
[1]*Animal Health Research Institute (AHRI), Agriculture Research Center (ARC), Giza, Egypt*
[2]*Poultry and Rabbit Diseases department, Faculty of Veterinary Medicine, Cairo University*
[3]*MEVAC for Vaccines*
[4]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, 41522, Egypt*
[5]*Faculty of Veterinary Medicine, University of Sadat City, Egypt*

Introduction: In 2023, widespread outbreaks of an emerging novel variant of infectious bursal disease virus (nvIBDV-A2B1) in North Africa and the Middle East caused severe immunosuppression and economic losses in poultry.

Objectives: This study evaluated whether adding a third immunization to the standard two-dose regimen of a bivalent inactivated IBD vaccine (containing classical and variant strains) in broiler breeder hens would enhance immune responses and extend protective maternal immunity in their broiler progeny against early challenge by nvIBDV-A2B1.

Experimental Design and Methodology: Two breeder flocks (~60,000 hens each) of the same grandparent stock were vaccinated either at 10 and 18 weeks of age (two-dose regimen) or at 10, 16, and 21 weeks (three-dose regimen). Breeder serum samples collected from 16 through 40 weeks of age (seven timepoints) were tested by ELISA for IBDV-specific antibody titers. Maternal-derived antibody (MDA) levels in four-day-old broiler chicks (from 30-week breeders) were measured by ELISA and serum neutralization (SNT). Chicks were then challenged with IBDV variant A2B1 at 7, 10, and 14 days of age to evaluate maternal immunity-based protection.

Results: By 16 weeks post-vaccination, ELISA titers were similar between groups; however, from 20 through 40 weeks, breeders on the three-dose regimen exhibited significantly higher antibody titers. Correspondingly, progeny from three-dose breeders had significantly higher MDA titers by both ELISA and SNT and maintained protective antibody levels (>=4 $\log_2$) up to ~14 days of age, whereas those from the two-dose group fell below this threshold by ~10 days. The three-dose regimen conferred protection in progeny at 7, 10, and 14 days of age, whereas the two-dose regimen provided protection only up to 10 days of age following challenge by nvIBDV-A2B1.

Conclusion: adding a third vaccine dose from nvIBDV-A2B1 in breeders elicits a more robust, sustained maternal antibody response and prolongs early-life protection against nvIBDV-A2B1 IBDV in broiler chicks.

Keywords: Infectious bursal disease virus (IBDV), variant IBDV (A2B1), bivalent inactivated vaccine, vaccination regimen, broiler breeders, maternal immunity

OP-72

Comparative In Vivo Evaluation of Egg-Yolk IgY- and Hyperimmune-Serum-Based Immune-Complex Vaccines against Infectious Bursal Disease Virus in SPF Chicks

Wael Kamel[1], Mohamed Abaza[2], Ahmed Qandil[3], Mohamed Zain El Abiden[4], Ibrahim Ali[1], Walid Kilany[4], Wael Elfeil[1]
[1]Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt
[2]Department of Avian and Rabbit Diseases, Faculty of Veterinary Medicine, Benha University, Benha, Egypt
[3]MEVAC for Vaccines
[4]Reference Laboratory for Veterinary Quality control on Poultry production (RLQP), Animal Health Research Institute (AHRI), Agriculture Research center (ARC), Ministry of Agriculture, Egypt.

Introduction: Infectious bursal disease virus (IBDV) is a major immunosuppressive disease in chickens that targets immature B lymphocytes in the bursa of Fabricius, impairing flock health and vaccination response. Immune-complex vaccines consist of live IBDV, which are given with specific antibodies to enable early vaccination. So, the field virus replicates only after maternal antibodies wane, reducing the immunity gap in young chicks.

Objectives: This study compared two immune-complex IBDV vaccines prepared from either egg-yolk-derived IgY or chicken hyperimmune serum, with an emphasis on clinical safety, vaccine-virus release kinetics, and early biological responses in specific-pathogen-free (SPF) chicks.

Experimental Design and Methodology: Anti-IBDV IgY was extracted from eggs of repeatedly immunized SPF hens by polyethylene glycol precipitation, dialysis, protein quantification, SNT, and ELISA. Hyperimmune serum was collected from vaccinated and boosted SPF chickens and evaluated by ELISA, virus neutralization, sterility testing, and safety assessment. Four-hundred-and-fifty-day-old SPF chicks were assigned to three groups: an IgY-based immune-complex vaccine, a hyperimmune-serum-based immune-complex vaccine, and an unvaccinated control. Vaccinated birds received 0.2 mL of each newly formulated vaccine subcutaneously at 1 day old. They were monitored for 30 days for signs, organ-to-body weight, bursa-to-body weight ratio, and bursal IBDV RNA by PCR.

Results: Both formulations were clinically well tolerated, with only sporadic mild depression or feathers ruffling between days 9 and 14 and no injection-site reactions. Vaccinated chicks showed mild, transient reductions in the bursa/body-weight ratio, whereas spleen and thymus indices remained broadly equivalent with controls. Real-time PCR detected bursal IBDV RNA from days 7–10, with peak levels on days 10–14 in both vaccinated groups, consistent with delayed immune-complex release.

Conclusion: egg-yolk IgY- and hyperimmune-serum-based formulations supported moderate replication of Winterfield 2512 IBDV with acceptable early clinical safety.

Keywords: Infectious bursal disease virus (IBDV), immune-complex vaccine, egg-yolk IgY, hyperimmune serum, maternal immunity

OP-74

Evaluation of Dose-Dependent Immunogenicity of a Recombinant HVT-VP2 Vaccine for Dual Control of Marek's Disease and Infectious Bursal Disease in SPF Chickens

Wael Elfeil[1], Walid Kilany[2], Amro Hashish[3], Mohamed Ali[3], Hesham Khaled[3], Mohamed Basiouny[3], Mohamed Mansour[3], Islam Arafa[3], Ahmed Elkady[3], Yassien Badr[4]

[1]Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt
[2]Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt
[3]Mevac For Vaccines
[4]Department of Infectious Diseases and Epidemics, Faculty of Veterinary Medicine, Damanhour University, Damanhour, Egypt

Introduction: Recombinant herpesvirus of turkey (rHVT) vaccines expressing infectious bursal disease virus (IBDV) VP2 protein provide a promising approach for simultaneous control of Marek's disease (MD) and infectious bursal disease (IBD).

Objectives: This study evaluated the potency and dose-dependent immunogenicity of a newly developed MEVAC rHVT-VP2 vaccine under controlled experimental conditions.

Experimental Design and Methodology: Specific pathogen-free (SPF) chickens (n=70/group) were assigned to seven groups: one negative control, five groups vaccinated with increasing doses of the rHVT-VP2 vaccine, and one group receiving a commercial reference vaccine. Birds were monitored for 8 weeks, with longitudinal serum sampling to assess humoral immune responses. Antibody responses were measured using three commercial ELISA kits (IDEXX IBD-XR, IDEXX IBD, and IDvet rVP2) to enable comparative evaluation of assay performance and sensitivity.

Results: The rHVT-VP2 vaccine induced measurable antibody responses across all tested doses, demonstrating a clear dose-dependent immunogenic profile. Among the evaluated assays, the IDvet rVP2 ELISA showed higher sensitivity for detecting vaccine-induced antibodies than IDEXX-based assays. Serological data indicated progressive seroconversion over time, with variations in antibody detection influenced by both vaccine dose and assay type.

Conclusion: The evaluated rHVT-VP2 vaccine demonstrates consistent immunogenicity and a dose-responsive profile, supporting its potential as an effective tool for integrated control of MD and IBD. Additionally, the findings highlight the critical role of assay selection in accurately assessing vaccine-induced immune responses. These results provide a scientific basis for dose optimization and field application of this dual-protection recombinant vaccine.

Keywords: Recombinant HVT vaccine, Infectious bursal disease (IBD), Marek's disease, rHVT-VP2, Dose-dependent immunogenicity, ELISA assay sensitivity

OP-75

Effects of xylanase, β-glucanase, and mannanase on performance and nutrient digestibility in laying hens fed corn- or wheat-based diets

Muhammad Shazaib Ramay[1], Ali Calik[1], Emre Sunay Gebes[1], Yusuf Yüksel[2], Ehab Aboelsaadat[3], Peter Ader[4], Fernando Bravo De Laguna[5], Pinar Saçakli[1]

[1]*Department of Animal Nutrition and Nutritional Diseases, Faculty of Veterinary Medicine, Ankara University, Ankara, 06110, Turkey*

[2]*Department of Plant and Animal Production, Bala Vocational School, Ankara University, Ankara, Turkey*

[3]*BASF FZE, Dubai, United Arab Emirates*

[4]*BASF SE, Ludwigshafen, Germany*

[5]*BASF Española SLU, Barcelona, Spain*

Introduction: Non-starch polysaccharides (NSP) in cereals can impair nutrient utilization and performance in laying hens, particularly under reduced-nutrient formulations. Enzyme supplementation targeting NSP improve digestibility and feed efficiency, although responses can depend on cereal type.

Objectives: To evaluate the effects of cereal source (Corn vs Wheat), enzyme supplementation (CON, xylanase/β-glucanase (Natugrain (NG), BASF SE, Germany), and xylanase/β-glucanase+mannanase (Natupulse (NPu), BASF SE, Germany), and their interaction on laying hen performance and nutrient utilization in a 2 × 3 factorial design.

Experimental Design and Methodology: 720 Lohmann Brown hens were allocated to a 2×3 factorial arrangement with two cereal types (Corn or Wheat) and three enzyme treatments (CON, CON+100 g/ton NG, CON+100 g/ton+100 g/ton NPu), with 10 replicates per treatment. All diets included 300 FTU/kg (Natuphos, BASF SE, Germany). The trial was conducted from 23 to 40 weeks of age. Performance (feed intake (FI) and feed conversion ratio (FCR)) and apparent total tract digestibility (ATTD) of nutrients in weeks 3-4 of trial were determined using TiO_2 as an indigestible marker. Statistical analysis was conducted using SPSS according to a factorial analysis of variance with cereal, treatment, and their interaction as main effects.

Results: No significant cereal × enzyme interactions were detected for performance or digestibility parameters. Wheat-based diets resulted in higher FI ($P<0.001$). Enzyme supplementation reduced FI and FCR ($P<0.001$). Egg weight and egg mass tended to be higher with enzymes ($P<0.05$). Enzymes increased ATTD of DM, OM and N ($P<0.001$), and energy utilization (AMEn) of the diet ($P<0.01$). ATTD of OM and DM were further improved with NPu supplementation on top of NG ($P<0.001$). Fiber (NDF) digestibility was higher in the NG+NPu treatment compared to CON ($P<0.05$).

Conclusion: Enzymes supplementation improved nutrient digestibility and performance independently of cereal type, with the combination of enzymes showing the greatest response, supporting a complementary mode of action.

Keywords: Laying hens, mannanase, nutrient digestibility, performance, xylanase

OP-76

Response of Broiler Chickens in The Finisher and Withdrawal Phases to Different Levels of Energy and Lysine

Timothée Guillou[1], Edith Crenn[2], Bijie Yang[2], Olivier Gestin[2], Pauline Quero[1], Claire Et Launay[1]
[1]*ADM, Rue de l'Église 02400 CHIERRY*
[2]*ADM, Route de Talhouët 56250 SAINT-NOLFF*

Feed represents 60-70% of the production cost in broiler chicken. With the volatility of raw material prices, feed efficiency remains a key element for the profitability. In addition, with the limited resources of our planet, the improvement of the feed conversion ratio (FCR) also appears as a crucial factor for sustainability. This work aims to evaluate the interests of different nutritional approaches during the finishing-withdrawal period on the FCR of broiler chickens. A total of 1440 male Ross 308 chicks were allotted to 60 floor pens. All birds received a common feeding program until 21 days of age. At 22 d, 6 treatments with 10 repetitions of 24 animals were assigned to a 2 x 3 factorial design, including 2 levels of metabolizable energy (ME; standard, high) and 3 levels of digestible lysine (dig Lys; low, standard, high). In the finisher phase (22-28 days), ME and dig Lys levels tested were 3020, 3160 kcal/kg and 0.93, 1.00 and 1.07%, respectively; then 3080, 3220 kcal/kg and 0.90, 0.97 and 1.04%, respectively, in the withdrawal phase (29-35 days).

All diets were formulated to get similar dig (Met+Cys):dig Lys and dig Thr:dig Lys ratios. During 22 to 35 d period, increasing ME significantly reduced feed intake (176.6 vs. 173.8 g/d; $P < 0.05$). A significant interaction between levels of ME and dig Lys was observed for weight gain and FCR ($P < 0.05$). At the standard ME level, a 3% decrease in FCR (1.52 vs. 1.57) was observed as the dig Lys density of the diet was increased from the low to the high level; the reduction reached 4% (1.49 vs. 1.55) for the high ME content. Increasing the level of dig Lys allowed a better FCR, and this improvement was more pronounced at high ME level. These results show that it is essential to consider the interaction between ME and dig Lys in order to control the FCR and therefore the feed cost.

Keywords: Broiler chicken, feed conversion rate, metabolizable energy, digestable lysine, poultry nutrition

POSTER PRESENTATIONS

PP-01

Evaluating Current Natural Xanthophyll Formulations for Yolk Pigmentation Compared to a C30-Ester Market Reference

Pinar Sacakli[1], Ali Calik[1], Muhammed Shazaib Ramay[1], Wolf Pelletier[2], Yauheni Shastak[2]
[1]*Department of Animal Nutrition & Nutritional Diseases, Ankara University, Ankara, Turkey*
[2]*BASF SE, Nutrition & Health, Ludwigshafen am Rhein, Germany*

Objectives: This study evaluated the effectiveness of current natural xanthophyll-based product formulations in yolk pigmentation relative to a C30-ester (beta-apo-8'-carotenoic acid ethyl ester; C30) market reference.

Experimental Design and Methodology: C30 was supplemented to a wheat–barley–soybean meal basal diet at 1.25 and 2.50 mg/kg, while two natural xanthophyll products (Product A and Product B) were included to provide 3.75 and 7.50 mg/kg total natural xanthophylls (TNX). The basal diet contained no additional carotenoid sources. A total of 756 Lohmann Brown Classic hens (36 weeks old), housed in cages, received seven dietary treatments with nine replicates per treatment for three weeks. Yolk concentrations of C30 and TNX were quantified by HPLC, and yolk color was assessed using a yolk color fan (YCF). Linear regression analyses were used to compare the dietary inclusion levels of C30 and TNX with their deposition in egg yolks, enabling estimation of their relative deposition rates. Coloring efficacy, measured using YCF scores, was analyzed with GraphPad Prism 9.0. Regression slopes were compared to determine the effective substitution ratio of natural xanthophylls to C30.

Results: C30 deposition in yolks was approximately 8-fold higher than TNX from Product A and 10-fold higher than TNX from Product B. These higher deposition rates corresponded to significantly greater coloring efficacy of C30, which was 6.1 times higher than Product A and 5.3 times higher than Product B based on YCF values.

Conclusion: The relative coloring efficacy of natural xanthophyll products compared with C30 may exceed the commonly cited 3:1 substitution ratio. The superior performance of C30 observed here appears linked to its markedly higher deposition rate compared with TNX. Additionally, TNX deposition differed between natural products, highlighting the importance of evaluating both natural and synthetic carotenoid sources when formulating yolk pigmentation strategies.

Keywords: C-30 ester, xanthophylls, laying hen, yolk coloring, deposition

PP-02

Field evaluation of a recombinant genotype vii.1.1 Newcastle disease virus vaccine in commercial layer chickens

Wei Shen Tong, Abdallah Makahleh, Virayos Vajirabhoga, Egor Nesterov
Kemin Biologics, 1900 Scott Ave. Des Moines, IA 50317-0070 USA

Introduction: Newcastle disease (ND) remains a major threat to poultry production, particularly in regions where virulent genotype VII strains predominate. Despite extensive vaccination programs using genotype II vaccines, disease outbreaks continue to occur, indicating an antigenic mismatch between circulating field strains and traditional vaccines. Recombinant genotype-matched vaccines have been developed to improve protective immunity under field conditions.

Objectives: This field study aimed to evaluate the immunogenicity and production performance of a recombinant genotype VII.1.1 Newcastle disease virus (NDV) vaccine when incorporated into a commercial layer vaccination program.

Experimental Design and Methodology: The study was conducted on a commercial layer farm in Asia. Birds were vaccinated at 19 weeks of age via drinking water with a live freeze-dried recombinant NDV genotype VII.1.1 vaccine (rNDV:VG/GA-F7; rgNDV1/ME.G7/2017). Blood samples were collected from randomly selected birds at 24 and 46 weeks of age. Serological responses were assessed using the hemagglutination inhibition (HI) test. Egg production performance was monitored until 48 weeks of age.

Results: Vaccinated birds demonstrated a sustained increase in HI antibody titers over time, indicating a strong and persistent humoral immune response following vaccination. Throughout the monitoring period, the flock maintained stable and high egg production levels, with no adverse impact of the recombinant NDV genotype VII.1.1 vaccine observed on production performance.

Conclusion: Under commercial field conditions, the recombinant genotype VII.1.1 NDV vaccine induced a robust serological response and supported consistent egg production in layer chickens. These findings indicate that genotype-matched recombinant ND vaccines can be an effective component of integrated ND control strategies in regions where genotype VII viruses are prevalent.

Keywords: Newcastle disease, genotype VII, recombinant vaccine, layer chickens, egg production

PP-03

Transfer and Decline of Maternal Antibody specific to Newcastle Disease virus in Asian Houbara Bustard

Julia Alvarenga Carvalho Peçanha[1], Janaina Torres Carreira[1], Mar Carrasco Muñoz[1], Ana Perez De Vargas[1], Helena Lage Ferreira[2]
[1]Reneco International Wildlife Consultants LTD
[2]University of São Paulo

Immunization is central to ex situ conservation. Yet, vaccination guidance for the Asian Houbara (*Chlamydotis macqueenii*; Vulnerable, according to IUCN) relies on data from African houbara research and domestic poultry guidelines. Because maternally derived antibodies can both protect hatchlings and interfere with early vaccination, we characterised the decline of Newcastle disease (ND) maternal antibodies in houbaras and tested whether vaccinated mother titer predicts those of their chicks. Sera from 18 females (22 pre-clutch samples) and their offspring (n=39) at 10, 21, and 30 days of age (DOA) were collected and tested by hemagglutination inhibition (HI). Nineteen out of 22 pre-clutch tested mothers (86,4%) were seropositive, with a mean antibody titer of 5.53±2.04 $\log_2$. There was a progressive reduction in chick antibody titer as age increased, and the proportion of seropositive chicks (HI >= 4 $\log_2$) decreased from 15 chicks (38.5%) at 10 DOA to 7 (17.9%) at 21 DOA, and to 3 (7.7%) at 30 DOA. Mixed models were used to account for repeated measurements from the same mothers and for the ordered nature of the antibody titer. Models showed a consistent trend that higher maternal antibody titer was associated with higher chick antibody titer, and a significant decrease in antibody titer was observed in chicks as age increased. Additionally, a later egg-laying order was associated with a minor increase in predicted chick antibody titer. Overall, the results suggest that high maternal antibody titer were strongly associated with seropositive offspring, indicating efficient transfer of maternal antibodies to chicks, whose maternally derived immunity declined markedly within the first 30 days of postnatal life.

Keywords: Maternal-derived antibody, Newcastle disease, Conservation breeding, Avian immunology, Immune status, Wildlife health

PP-04

Assessment of Seroconversion and Viral Replication Following Combined Administration of rHVT-IBD-H5 and rMDV-1-RN1250 Vaccines

Jose Luis Losada Torres
Boehringer Ingelheim Vetmedica GmbH, Ingelheim Am Rhein, Germany

This study evaluated seroconversion, vaccine replication, and compatibility of a commercially available recombinant rHVT+IBD+H5 vaccine (VAXXITEK® HVT+IBD+H5, Boehringer Ingelheim, Germany) when administered at day old subcutaneously alone or in combination with a commercially available chimeric rMDV-1-RN1250 (PREVEXXION® RN, Boehringer Ingelheim, Germany) in commercial broilers. Three hundred day-old chicks were assigned to four groups: unvaccinated control (G1), rHVT+IBD+H5 (G2), rHVT+IBD+H5 + rMDV-1-RN1250 (G3), and rMDV-1-RN1250 only (G4). Birds were monitored from 5 to 56 days of age using HVT and RN1250 PCR, ELISA (H5, IBD VP2, IBD), and IHA assays.

PCR results confirmed HVT replication in G2 and G3 in spleen and thymus at days D5 and D7 with higher positivity in G3. RN1250 PCR demonstrated replication in G3 and G4 in spleen and thymus at D5 and D7 with higher positivity in G4. No PCR positivity was detected in control birds.

H5 ELISA results demonstrated seroconversion in both vaccinated groups (G2 and G3) and reached 93% positivity in G2 and 100% in G3 by day 28 and remained high until Day 56. Higher mean titres were observed in G3; however, statistically significant differences between G2 and G3 were detected only during the early sampling period (Days 14–21) and again at Day 56 ($p < 0.05$).

IBD VP2 and IBD ELISAs demonstrated a clear distinction between vaccinated and unvaccinated birds from Day 28 onward. G2 and G3 exhibited significant increase seroconversion after Day 35 and reached 80% positivity in G2 and100% positivity in G3 at Day 56, whereas G1 and G4 showed progressive decline and remained seronegative. No statistically significant difference in IBD seroconversion was observed between G2 and G3 beyond Day 28 ($p < 0.05$).

Overall, the combined administration of rHVT+IBD+H5 and rMDV-1-RN1250 vaccines did not interfere with the seroconversion or replication of either vaccine.

Keywords: Broilers, HVT replication, RN1250, Seroconversion, Vaccine compatibility

PP-07

Epidemiological Surveillance and Genetic Diversity of Infectious Bronchitis Virus Field Strains in France (2021–2025)

Audrey Bigot, Anne Laure Ledoux
MSD Santé Animale FRANCE

Infectious bronchitis (IB), caused by infectious bronchitis virus (IBV), is a major disease of Gallus gallus production affecting broilers, layers and breeders. Due to the high mutation and recombination rates of the IBV genome, continuous monitoring of circulating field strains is essential to optimize vaccination strategies.

Between 2021 and 2025, a total of 705 samples were collected from commercial poultry flocks across multiple regions of France, including broilers, laying hens and breeders. Samples consisted of tracheal swabs (15%), cloacal swabs (77%) and other tissues (8%; caecal tonsils, kidneys, mixed organs). Detection was performed by RT-PCR targeting a conserved region of the S1 gene, followed by Sanger sequencing of selected hypervariable S1 regions.

Genotyping and differentiation between vaccine and field strains were based on sequence comparison with next-generation sequencing profiles from commercial vaccines and large datasets of vaccine recoveries in vaccinated flocks. Cycle threshold values and vaccination history were also considered. Overall, 33% of samples were classified as vaccine strains, 31% as untypeable, and 17% were negative (Ct > 35). A total of 144 field strains (20%) were identified.

Genotype GI-13 (793B) field strains were consistently dominant throughout the study period, accounting for 61–80% of detections annually. Other field strains included UKR/27/2011-like (mean 11%), Massachusetts (7%), QX-(4%), and a reassortant UKR/27/2011-Mass strain (2%).

Haplotype network analysis of QX S1 sequences using a median-joining approach demonstrated that French QX field strains were genetically distinct from the QX vaccine strain and persisted between 2021 and 2025. Recent isolates from 2025 showed increased genetic divergence. Comparative analysis indicated close genetic relationships with QX strains circulating in Belgium and Germany.

These findings support the continued use of combined Ma5 (Massachusetts) and 4/91 (793B) vaccine strain strategies, to face the most prevalent field strains and for which cross-protection against QX-like strains has been demonstrated.

Keywords: Epidemiology, France, Infectious Bronchitis, QX-strains, RT-PCR

PP-08

Dose-response effects of xylanase and β-glucanase on the performance and nutrient digestibility of laying hens fed corn- or wheat-based diets

Muhammad Shazaib Ramay[1], Ali Calik[1], Emre Sunay Gebes[1], Yusuf Yüksel[2], Gamzenur Berber[3], Esra Türel[1], Ehab Aboelsaadat[3], Peter Ader[4], Fernando Bravo De Laguna[5], Pinar Saçakli[1]

[1]*Department of Animal Nutrition and Nutritional Diseases, Faculty of Veterinary Medicine, Ankara University, Ankara, 06110, Turkey*

[2]*Department of Plant and Animal Production, Bala Vocational School, Ankara University, Ankara, Turkey*

[3]*Graduate School of Health Sciences, Ankara University, Ankara, Turkey*

[4]*BASF FZE, Dubai, United Arab Emirates*

[5]*BASF SE, Ludwigshafen, Germany*

[6]*BASF Española SLU, Barcelona, Spain*

Introduction: Non-starch polysaccharides (NSPs) in poultry impairs nutrient utilization and productivity in laying hens.

Objectives: To evaluate the effects of graded xylanase and β-glucanase (Natugrain® TS (NG), BASF, Germany) supplementation on performance and nutrient digestibility of laying hens fed low-energy, low-protein corn- or wheat-based diets.

Experimental Design and Methodology: 960 Lohmann Brown hens were assigned to eight treatments: four corn-based and four wheat-based diets, with 10 replicates of 12 hens each. Treatments consisted of basal diets supplemented with 0, 50, 100 and 200 g/ton NG all including 300 FTU/kg (Natuphos E 10000). The trial ran from 23 to 40 weeks of age. Performance was assessed across four phases, and total tract nutrient digestibility was determined in weeks 3-4 using TiO2 marker method. Data was analyzed by one-way ANOVA (Tukey HSD) with polynomial contrasts in SPSS.

Results: Enzyme supplementation significantly reduced feed intake (FI) and improved feed conversion ratio (FCR) in both cereals with no effect on egg production. Linear dose responses were observed for FI and FCR in both cereals, with additional quadratic responses in corn. DM and OM retention improved significantly in both cereals, with wheat-based diets responding significantly at the lowest enzyme dose, whereas corn-based improvements were more gradual. Nitrogen retention also improved significantly in both diets, though the dose-response pattern differed between cereals, likely attributable to the higher soybean meal inclusion in corn-based diets. NDF digestibility improvements were driven primarily by linear dose-response trends in both cereals, with wheat-based diets showing higher absolute values reflecting a greater NSP substrate pool. AMEn improved linearly in corn-based diets, while wheat-based diets showed significant improvements at all supplemented doses versus control.

Conclusion: Carbohydrase supplementation improved feed efficiency and nutrient digestibility in both cereal-based diets, with greater energetic impact in wheat-based diets, while egg production remained unaffected regardless of cereal type or enzyme dose.

Keywords: β-glucanase, xylanase, laying hens, nutrient digestibility, productive performance

PP-10

The Transition Process from Organic Acids to Monoglycerides and The Effectiveness of Monoglycerides in Poultry Gut Health

Derya Yesilbag[1], Eylem Akkaya[2], Fulya Odabaşı Erbay[1]
[1]*Bursa Uludag University Veterinary Faculty, Bursa, Türkiye*
[2]*Vimar Animal Health Products, Istanbul, Türkiye*

For decades, antibiotics were used in poultry industry to support intestinal health and provide antimicrobial effects. However, the pressure of antimicrobial resistance, and sustainable production requirements have led the sector towards safer and biologically compatible solutions. Organic acids, primarily formic, propionic, and butyric acids, and subsequently, the monoglyceride technologies were at the center of this transformation. In addition to their antimicrobial effects, organic acids also support digestive enzyme activity, intestinal epithelial integrity and digestibility. However, monoglycerides stand out due to especially absorption of organic acids in upper parts of gastrointestinal system.

Monoglycerides are esterified forms of organic acids with glycerol and can move more stably through the intestines. Due to their high thermal stability, resistance to feed production processes, low corrosive properties, and controlled release mechanisms, monoglycerides are considered as more advantageous additives. The antimicrobial effects of monoglycerides are primarily related to disrupting the permeability and lipid organization of the microbial membrane and inhibiting cellular metabolism. Current studies show that monolaurin also has significant effects on intestinal barrier integrity and immune response. Specifically, it is reported to reduce intestinal permeability by increasing tight-junction expression, improve villus height and villus/crypt ratio, and support enterocyte integrity. In addition, monolaurin reduces intestinal inflammation by suppressing the expression of pro-inflammatory cytokines, improves oxidative stress and modulate mucosal immune response. In this way, it can contribute to the maintenance of intestinal health, improves feed utilization and performance. In conclusion, monoglycerides, especially lauric acid derivatives, are promising functional feed additives in sustainable poultry production. Today, the poultry sector aims to regulate and strengthen the microbiota rather than eliminate it. Simultaneously, it aims to protect the intestinal barrier, reduce inflammation, and sustainably optimize performance. This transformation, ranging from organic acids to monoglycerides, is one of the strongest examples representing the development of antimicrobial strategies in poultry feed.

Keywords: gut health, lauric acid, monoglycerides, monolaurin, organic acids

PP-11

Co-Circulation of HPAI H5N1 and H5N8 Clade 2.3.4.4b in Domestic Poultry and Wild Birds in Egypt (2025)

Hesham Sultan[1], Karim Selim[5], Shaimaa Talaat[1], Mahmoud Moawad[2], Asmaa Shaaban[2], Ahmed Maher[3], Magdy El Kady[4]

[1]*Department of Birds and Rabbits Medicine, Faculty of Veterinary Medicine, University of Sadat City,Menoufia 32958, Egypt*
[2]*Reference Laboratory for Veterinary Quality Control on Poultry Production Animal Health Research Institute, Agriculture.*
[3]*Central Laboratory for Evaluation of Veterinary Biologics, Agriculture Research Center (ARC), Cairo, Egypt*
[4]*Poultry Diseases Department, Faculty of Veterinary Medicine, Beni-Suef University, Beni-Suef, Egypt*
[5]*Zoetis Middle East Operation*

Introduction: Highly pathogenic avian influenza viruses (AIV), particularly H5 subtypes, continue to threaten poultry production and public health, with domestic farms and wild birds playing interconnected roles in virus maintenance and spread across different governates.

Objective: To molecularly characterize recently isolated AIV strains detected in domestic chicken farms and wild birds during 2025, and to determine their subtype and genetic clustering based on genome sequencing.

Materials-Methods: A total of 54 tracheal swab samples were collected during 2025 from multiple governates, mainly from domestic chicken farms (n = 44) and to a lesser extent from wild birds (n = 10). All samples were screened by real-time RT-PCR targeting the influenza A matrix (M) gene. Matrix-positive samples were subsequently subjected to subtype-specific real-time RT-PCR assays for hemagglutinin (H) and neuraminidase (N) typing. All identified H5-positive samples were selected for full genome segment sequencing. Generated sequences from representative isolates from both wild birds and commercial domestic chickens were analyzed phylogenetically to determine subtype identity and clade assignment.

Results: Real-time RT-PCR screening detected influenza A virus in 30/54 (55.6%) samples. Subtyping identified 13/54 (24.1%) samples as H5-positive. Full genome sequencing and phylogenetic analysis of selected isolates from wild birds and domestic chicken farms confirmed circulation of H5N1 and H5N8 viruses. All sequenced strains clustered within clade 2.3.4.4b, indicating genetic relatedness of viruses detected across host types and geographic locations.

Conclusion: These findings demonstrate continued detection of clade 2.3.4.4b H5 viruses (H5N1 and H5N8) in both domestic poultry farms and wild birds across different governates during 2025. Ongoing molecular surveillance integrating poultry and wildlife sampling, combined with sequencing, is essential for early detection of emerging variants and for guiding control strategies

Keywords: Wild bird, Domestic chicken, Hemagglutinin gene, Avian influenza, Sequence

PP-12

Maternal Antibody Dynamics Against IBDV in Day Old Chicks: A Multicenter in Egypt Survey Comparing Breeder Vaccination Programs

Mohamed Fawzy, Ibrahim Radi, Ahmed Waly, Ahmed El Kady, Islam Hassan, Karim Selim
Zoetis Middle East Operation

Background: Infectious bursal disease (IBD) remains a major immunosuppressive threat to poultry production worldwide. Early protection of broilers depends on maternally derived antibodies (MDA).

Objectives: The objective of this study was to evaluate the transfer and persistence of maternally derived antibodies (MDAs) in progeny chicks from breeder flocks vaccinated with a classical IBDV inactivated vaccine alone or with a combination of classical and variant IBDV inactivated vaccines.

Methods: Between 2023 and 2025, a total of 5,000 serum samples were collected from day-old chicks originating from breeder flocks in Egypt. Of these, 70% were obtained from progeny of breeders vaccinated with classical inactivated (killed) IBD vaccines, whereas 30% were from progeny of breeders vaccinated with both classical and variant IBDV strains, either as a combined vaccine or within the overall breeder IBD vaccination program. IBDV-specific maternally derived antibody (MDA) titers were quantified using a commercial ELISA, and group differences in ELISA titers were analyzed using ANOVA and t-tests.

Results: Classical killed-vaccine programs produced higher and more uniform MDA transfer than programs including variant strains, particularly in chicks from older breeders (>45 weeks of age). The overall mean MDA titer was 3,947, with a mean of 4,127 in the classical group versus 3,542 in the classical+variant group. The overall coefficient of variation (CV%) was 30% (classical: 28%; classical+variant: 35%). Recorded titers ranged from 714 to 7,467. In general, protective ELISA titer reported in the literature is most often validated for classical/vvIBDV challenge under a specific ELISA kit and challenge model, and it may not translate directly to variant IBDV challenge.

Conclusions: These findings support using a classical killed vaccine as a priming dose in breeders to improve persistence and progeny titers, followed by incorporation of variant strains where variants are endemic (e.g., Egypt) to increase level of protection.

Keywords: classic and Variant IBD vaccines, IBD Elisa, Variant IBD, MDA, Titer

PP-13

Co-infection Dynamics in Egyptian Broiler Respiratory Outbreaks: Surveillance of IBV, NDV, and AIV (H9/H5)

Karim Selim, Muhammed Soudy, Hassan Madian, Mohamed Eldesouki, Ibrahim Abdelhamid, Mohamed Fawzy
Zoetis Middle East Operation

Introduction: Avian respiratory diseases remain a significant constraint on poultry production in Egypt. Infectious bronchitis virus (IBV), Newcastle disease virus (NDV), and avian influenza viruses (AIV), low-pathogenic H9 and highly pathogenic H5 are frequently implicated. Despite routine vaccination, IBV continues to cause respiratory and renal disease, and in older birds, reproductive/urogenital involvement, driven by ongoing circulation of diverse variants. NDV outbreaks also persist in vaccinated flocks, particularly involving genotype VII.

Methods: We investigated 206 broiler flocks (21–35 days old) presenting with respiratory signs, nephropathy, elevated mortality, and poor performance. Trachea, kidney, and cecal tonsils were sampled and either submitted to a local laboratory or applied to FTA™ cards. Vaccination records and clinical histories were reviewed to help differentiate vaccine-derived from field strains. Molecular detection (RT-PCR) targeted IBV, NDV, H9, and H5. Sequencing was subsequently attempted on RT-PCR–positive samples, and resulting sequences were compared with Egyptian reference strains.

Results: RT-PCR detected IBV in 83 of 97 samples tested for IBV (85%), NDV in 16 of 39 samples tested for NDV (41%), H9 avian influenza in 39 of 65 samples tested (60%), and H5 in 3 of 37 examined samples (8%). Co-detections were frequent NDV+IBV (10%), H9+IBV (70%), NDV+H9 (10%), and NDV+H9+IBV (2%) indicating concurrent circulation of multiple respiratory viruses within the tested production systems. Among PCR-positive samples, IBV sequencing identified Mass-type (27.9%) and Variant 2 (72.7%).

Conclusions: The high prevalence of Variant 2 IBV, together with continued circulation of NDV and H9, highlights the need to optimize vaccination strategies, including the use of strategically selected heterologous strains to enhance cross-protection and limit field virus circulation. Ongoing molecular surveillance (RT-PCR with targeted sequencing) remains critical to detect emerging variants, inform timely vaccine updates, and refine control strategies for improvement of flock health and performance.

Keywords: Avian influenza, Infectious bronchitis, NDV, Respiratory infection, Epidemiology

PP-14

Field evidence of compatibility and early intake of co-administered live infectious bronchitis virus vaccines (H120 + D274 with QX or 793B) following day-old hatchery spray vaccination in broilers

Besher Sameh Abed Rabbo, Mohammad Ibrahim Alshorman, Khaled Mohamed Mahgoub, Hussein Mohamed Galal
Zoetis Middle East Operation

Introduction: Co-administration of heterologous live attenuated infectious bronchitis virus (IBV) vaccines is used to broaden protection ("protectotype" approach) and has been shown experimentally to permit concurrent replication/detection of multiple vaccine strains after day-old vaccination. Strain-specific real-time RT-PCR studies further support that different IBV vaccine types can co-circulate with measurable replication kinetics.

Objectives: This field study evaluated early vaccine intake and molecular compatibility after simultaneous day-old hatchery spray administration of multiple IBV vaccine strains in commercial broilers.

Experimental Design and Methodology: Three farm groups were vaccinated at hatch: Group 1 received Poulvac IB Primer (H120 + D274) plus a 793B vaccine; Groups 2 and 3 received Poulvac IB Primer (H120 + D274) plus Poulvac IB QX. Choanal cleft swabs were collected at 5 days of age for IBV screening real-time RT-PCR and strain typing on pooled samples.

Results: All birds were IBV-screening positive with low Ct values (Group 1: 12/12, Ct 18.5–22.6; Group 2: 10/10, Ct 19.5–25.0; Group 3: 12/12, Ct 18.3–20.9). Typing confirmed concurrent detection of all administered strains in each group (Mass/H120 + D274 + 793B in Group 1 pools; Mass/H120 + D274 + QX in Groups 2 and 3 pools), with non-administered targets not detected.

Conclusion: These data support compatibility of multi-strain live IBV vaccination when co-administered at day old by Hatchery spray and provide field evidence of early intake of each component, consistent with protectotype-based strategies intended to widen IBV protection.

Keywords: Co-administration, Hatchery spray vaccination, Infectious bronchitis virus (IBV), Poulvac IB Primer, Poulvac IB QX, Protectotype, Real-time RT-PCR

PP-15

Stronger Together: Field Evidence for the Associated Use of Poulvac IB Primer (H120 + D274) and Poulvac IB QX in Delivering Dual Protection Against IBV QX and Variant 02 Challenges and Enhancing Broiler Performance

Besher Sameh Abed Rabbo, Mohammad Ibrahim Alshorman, Khaled Mohamed Mahgoub, Hussein Mohamed Galal
Zoetis Middle East Operation

Introduction: Infectious bronchitis virus (IBV) causes respiratory disease and major economic losses in commercial broilers, with antigenic diversity and limited cross-protection between genotypes necessitating heterologous ("protectotype") live vaccine combinations. The Summary of Product Characteristics (SPC) for Poulvac IB Primer (H120+D274) and Poulvac IB QX, supported by a controlled laboratory efficacy study, establishes that their sequential associated use confers cross-protection against IBV Variant-2 (IS-1494-like), with onset of immunity 21 days after the second vaccination, assessed by tracheal explant ciliary activity per European Pharmacopoeia criteria.

Objectives: Field Evaluation of Poulvac IB Primer and Poulvac IB QX associated use, in delivering dual protection against IBV QX and Variant-02 field challenges.

Experimental Design and Methodology: A commercial broiler farm with confirmed PCR positivity for IBV QX and IBV Var-02 implemented a single program change: replacing a 793B live IB vaccine with Poulvac IB QX while maintaining IB Primer (H120+D274) at day-old hatchery spray. Performance and RT-PCR outcomes (FTA-card organ pools; day-5 choanal swabs) were evaluated across one pre-trial and two post-change trial cycles.

Results: Day-5 choanal swabs confirmed vaccine take in both trial cycles (D274, H120, and QX), demonstrating successful hatchery spray and early mucosal replication. Following program implementation, performance improved markedly: FCR decreased from 1.69 to 1.41; EPEF increased from 249.29 to 408.10 and 361.37; total mortality decreased from 10.74% to 3.16% and 5.90%; and average live body weight increased from 1.42 to 1.66 and 1.52 kg. Critically, IBV QX field strain was not detected in either trial cycle. IBV Var-02 was only detected in Trial C2 alongside variant IBDV A2, indicating concurrent immunosuppressive pressure; performance nevertheless remained markedly superior to pre-trial.

Conclusion: These outcomes corroborate the SPC-registered cross-protection claim for Poulvac IB Primer + Poulvac IB QX associated use, supporting effective QX challenge control and Var-02 impact mitigation under commercial field conditions.

Keywords: Infectious bronchitis virus (IBV), QX genotype (GI-19), Variant-2 / Var-02 (GI-23), Protectotype vaccination, Hatchery spray vaccination, EPEF / broiler production performance, IBV cross protection

PP-16

Field Comparison of IBDV and Reovirus ELISA Titers in Broiler Breeders: Added Value of Maternavac IBD–Reo on IBDV and Reovirus ELISA Titers Versus a Competitor Program

Besher Sameh Abed Rabbo, Mohamed Abdalla Hatimi, Khaled Mohamed Mahgoub, Mohammad Ibrahim Alshorman, Hussein Mohamed Galal
Zoetis Middle East Operation

Introduction: In broiler breeder operations, maintaining high and persistent antibody titers against infectious bursal disease virus (IBDV) and avian reovirus is critical to optimize maternal antibody transfer (MDA) and support early passive protection in broiler progeny.

Objectives: Objective of this study is to compare IBDV and reovirus ELISA antibody responses between two commercial broiler breeder vaccination programs and evaluate the serological added value of incorporating Maternavac IBD–Reo (MTV) versus a competitor program.

Experimental Design and Methodology: Two commercial broiler breeder flocks were evaluated under field conditions. Flock A received MTV at 7 weeks of age followed by two competitors' 4-way inactivated vaccines at 10 and 20 weeks of age. Flock B followed the same 4-way schedule but received a competitor IBD–Reo vaccine at 7 weeks of age. At 24, 32, and 42 weeks of age, 15 birds per flock per timepoint were sampled. ELISA titers were analyzed on the $\log_{10}$ scale using planned Welch two-sample t-tests with Holm multiplicity adjustment within each virus group.

Results: Compared with the competitor program (Flock B), the MTV program (Flock A) yielded significantly higher ELISA titers at all three timepoints for both IBDV (1.23–1.73-fold; all Holm-adjusted $p < 0.01$) and reovirus (1.66–3.05-fold; all Holm-adjusted $p < 0.001$), indicating a more robust and sustained serologic response throughout the laying period.

Conclusion: Incorporation of Maternavac IBD–Reo in vaccination program was associated with consistently higher and more sustained breeder ELISA titers compared with the evaluated competitor program at all sampled timepoints through 42 weeks, supporting its use to enhance breeder humoral immunity and, MDA availability for broiler progeny protection.

Keywords: Avian reovirus, Broiler breeders, ELISA antibody titers, Geometric mean titer (GMT), Infectious bursal disease virus (IBDV), Maternal antibody transfer (MDA), Vaccination program

PP-17

Economic evaluation of Innovax® ND-IBD vaccine introduction in a commercial broiler operation in Kazakhstan

Sergey Bartasinsky, Anton Karpenko
MSD Animal Health

Introduction: The introduction of a recombinant vaccine in the hatchery requires additional upfront investment; therefore, its economic value under commercial production conditions should be quantified.

Objectives: The objective of this field trial was to evaluate the cost-effectiveness of implementing a new dual-construct recombinant HVT vaccine (INNOVAX® ND-IBD, MSD Animal Health) in a commercial broiler farm in Kazakhstan producing 3 million birds per cycle

Experimental Design and Methodology: Performance and financial indicators from one production cycle before the implementation were compared with the same parameters after the introduction of the new vaccination program. Management practices, feed formulation, and all non-vaccine interventions were maintained as per the company's standard procedures. The only protocol modifications were the introduction of INNOVAX® ND-IBD and the removal of a live IBDV vaccine from the previous vaccination program.

Results: Relative to the pre-implementation cycle, the INNOVAX® ND-IBD cycle was associated with noticeable improvements in livability (+0.5 percentage points), average daily gain (+2.5 g/day), and body weight at processing age (+40 g), resulting in an estimated 2% increase in marketable meat production. Even when considering additional vaccination costs, the intervention generated a return on investment of 179% and increased net profit by US$69,321, equivalent to US$23.1 per 1,000 birds.

Conclusion: Following the trial, the farm adopted the revised vaccination protocol and reported sustained improvements in livability and meat yield over the subsequent 12 months. These field data suggest that INNOVAX® ND-IBD, under this field trial conditions, was able to provide measurable economic benefit in a commercial broiler operation.

Keywords: rHVT-ND-IBD, broiler chickens, production performance, economic evaluation, vaccination protocols

PP-18

Comparative field evaluation of Innovax® ND-IBD and rHVT-ND vaccination protocols in a commercial broiler farm

Sergey Bartasinsky, Sergey Minkov
MSD Animal Health

Introduction: Although the cost of a broiler vaccination program accounts for less than 3% of total live production cost, its contribution to productive performance is substantial.

Objectives: This field study was conducted to compare the effects of two vaccination programs on broiler performance under commercial conditions.

Experimental Design and Methodology: A broiler farm was divided into two groups, each comprising three poultry houses and 138,000 birds. Group 1 received a recombinant rHVT-ND-IBD vaccine (Innovax® ND-IBD), whereas Group 2 received an rHVT-ND vaccine. Apart from the vaccination program, all management practices, feed formulations, and ancillary treatments were maintained according to the company's standard protocols. Performance outcomes, including feed conversion rate, total mortality, body weight, and average daily gain, were compared between groups.

Results: Broilers in Group 1 (Innovax® ND-IBD) demonstrated superior performance compared with those in Group 2, with improvements in livability (+4.48 percentage points), average daily gain (+2.3 g/day), adjusted feed conversion to 2.450Kg (-52g), and final body weight (+159 g). These differences translated into a 7% increase in marketable meat yield. In economic terms, the Innovax® ND-IBD program was associated with an estimated additional return of investment of $121.30 per 1,000 birds.

Conclusion: These findings indicate that the Innovax® ND-IBD vaccination protocol may provide measurable productive and economic advantages in commercial broiler production.

Keywords: rHVT-ND-IBD, broilers, vaccination protocol, productive performance, economic evaluation

PP-19

Co-Circulating Vaccine-Like and Field IBV Genotypes Across the Middle East: A Multicountry Genotype Surveillance in Broiler Flocks (2025-Q1 2026)

Khaled Mohamed Mahgoub, Karim Mohamed Selim, Sameh Mohamed El Shorbagy, Tomeh Emil Al Kufouf, Besher Sameh Abed Rabbo, Hussein Mohamed Galal
Zoetis Middle East Operation

Introduction: Avian infectious bronchitis virus (IBV) is a rapidly evolving pathogen that causes respiratory disease, nephropathogenicity, and reproductive tract involvement in chickens, resulting in significant economic losses.

Objective: This study aimed to characterize the regional prevalence and genotype diversity of IBV in the Middle East (ME), we performed a multicountry molecular surveillance study across Egypt, Jordan, and the Gulf region during 2025–Q1 2026.

Experimental Design and Methodology: A total of 320 broiler flocks were surveyed, including flocks with respiratory signs, suspected renal involvement, increased mortality, and reduced production performance. Flocks were sampled using FTA cards from birds aged 19–28 days. Viral RNA was detected using nested RT-PCR, and a subset of positive samples underwent genotyping.

Results: Overall, 260/320 flocks were IBV-positive. Of the 260 positive samples available for downstream analysis, 181 were successfully typed, revealing seven IBV genotypes. Vaccine like strains were detected at high frequency, with 793B, Massachusetts (Mass), D274 and QX identified in 34.25%, 16.02%, 4.97% and 2.21% of typed samples, respectively, consistent with the implemented vaccination program. In addition, multiple field genotypes were detected, including Var-02 (66.85%), QX (3.87%), and Genotype II (0.55%).

Conclusion: These data demonstrate despite widespread vaccination, the continued circulation of genetically diverse field strains indicates ongoing challenges in achieving effective protection and suggests that current programs may provide insufficient cross-protection. Incorporating two additional variant strains alongside the classical strain into vaccination regimens may improve cross-protective coverage, reduce IBV circulation, and enhance broiler health outcomes in the Middle East

Keywords: IBV Epidemiological updates, IBV vaccination strategies, IBV variant strains, Infectious Bronchitis (IBV), Middle East (ME), Var2 and QX

PP-20

Molecular Surveillance of Infectious Bursal Disease Virus in the Middle East (2025–Q1 2026) Reveals Predominance of Genogroup A2B1 and Co-circulating Genotypes

Khaled Mohamed Mahgoub, Besher Sameh Abed Rabbo, Sameh Mohamed El Shorbagy, Tomeh Emil Al Kufouf, Karim Mohamed Selim, Hussein Mohamed Galal
Zoetis Middle East Operation

Introduction: Infectious bursal disease (IBD) is one of the most important immunosuppressive diseases of poultry worldwide, causing substantial economic losses. In the Middle East (ME), very virulent IBDV strains have historically predominated and are typically associated with characteristic clinical signs, gross lesions, and high mortality. In recent years, however, subclinical IBDV outbreaks characterized by bursal atrophy and marked immunosuppression have increasingly been observed in vaccinated flocks.

Objective: In this study, we conducted a regional survey of bursal samples collected from poultry flocks across the ME between 2025 and Q1 2026 to assess the current epidemiological status of circulating IBDV strains.

Experimental Design and Methodology: A total of 422 bursal samples were collected from farms in Egypt, the Levant, and the Gulf region reporting IBD outbreaks and/or signs consistent with immunosuppression. Samples were screened by RT-PCR, and positive samples were sequenced to determine IBDV genogroups.

Results: Across the surveyed region, genogroup A2B1 was the most frequently detected genotype (67.06%). Additional genogroups were detected at lower frequencies, including A4B1 (3.97%), A3B1 (0.79%), and A3B2 (3.57%). Vaccine-like genogroup A1B1 was identified in 31.35% of positive samples.

Conclusion: Overall, these findings indicate a dynamic IBDV epidemiological landscape in the Middle East. The increased prevalence and geographic spread of genogroup A2, together with the detection of A4B1 and A3B1, underscore the need for continued molecular surveillance and for evaluating the protective efficacy of currently used vaccines against the circulating IBDV genogroups.

Keywords: A2B1, A4B1, genogroup, Immunosuppression, Infectious bursal disease virus (IBDV), Middle East

PP-21

Alarming Antimicrobial Resistance in Poultry-Associated with *Escherichia coli* Isolates: A Call for Vaccination-Integrated Control Strategies

Khaled Mohamed Mahgoub[1], Besher Sameh Abed Rabbo[1], Karim Mohamed Selim[1], Alaa Riyad Al Najjar[2], Tomeh Emil Al Kufouf[1], Sameh Mohamed El Shorbagy[1], Mohammad Ibrahim Al Shorman[1], Hussein Mohamed Galal[1]

[1]*Zoetis Middle East Operation*

[2]*Najjar Vet Lab, Jordan*

Introduction: Antimicrobial resistance (AMR) in avian pathogenic *Escherichia coli* (APEC) poses a critical threat to poultry health, food safety, and public health. In the Middle East region (ME), colibacillosis and *E. coli* associated Chronic Respiratory Disease (CRD) are routinely managed with antibiotics, imposing intense selective pressure that accelerates multidrug resistance development.

Objective: This study aimed to survey antibiotic disc diffusion susceptibility results from *E. coli*-positive poultry samples to characterize AMR profiles, determine overall resistance rates, compute Multiple Antibiotic Resistance (MAR) indices, classify resistance phenotypes multidrug-resistant (MDR), extensively drug-resistant (XDR), and pan drug resistant (PDR).

Experimental Design and Methodology: During the period 2025 – 2026 Q1, fifty-two *E. coli* isolates recovered from poultry flocks suffering from colibacillosis and CRD in the ME region underwent 679 Kirby-Bauer disc diffusion tests against 11 antibiotics spanning 9 categories. MAR indices were calculated per Krumperman (1983); phenotypes strictly classified per Magiorakos et al. (2012).

Results: Overall resistance was 62.0%, with 29.0% susceptible and 9.0% intermediate. Resistance was highest in Penicillins (98.1%), Folate pathway inhibitors (86.4%), β-lactam/inhibitor combinations (82.4%), Macrolides (77.6%), and Phenicols (77.4%). MAR indices ranged from 0.167 to 1.00 (mean ± SD: 0.626 ± 0.209; median: 0.636); 98.1% exceeded the high-risk threshold (MAR > 0.2) and 71.2% exceeded MAR > 0.5. Phenotype distribution: PDR 21.2%, XDR 32.7%, MDR 42.3%; 96.2% classified MDR or above.

Conclusion: These findings reveal a critically alarming AMR burden in poultry-associated *E. coli* in the Middle East, with high-risk MAR indices and dominant XDR/PDR phenotypes indicating limited therapeutic options. While there are multiple published field studies report that Poulvac® *E. coli* live vaccination reduces antibiotic treatment frequency by 40–80% and shifts *E. coli* populations toward greater antimicrobial susceptibility. Prospective randomized controlled trials measuring MAR indices and MDR/XDR/PDR distributions pre- and post-vaccination are urgently needed as a one health priority.

Keywords: AMR, Antibiotic stewardship, APEC, Colibacillosis, E. coli, E. coli Live vaccine, MDR

PP-22

Development and evaluation of an inactivated chitosan nanoparticle-based vaccine from a recent velogenic pigeon paramyxovirus-1 field isolate in domestic pigeons in Egypt

Muhammadtaher Abdulrazaq Abdulrasol[1], Wafaa A. Abd El Ghany[2], Harith Abdulla Najem[1]
[1]*Department of Pathology and Poultry Diseases, College of Veterinary Medicine, University of Basrah, Basrah, Iraq*
[2]*Poultry Diseases Department, Faculty of Veterinary Medicine, Cairo University, Giza, Egypt*

Introduction: Pigeon paramyxovirus type 1 (PPMV-1) remains an important viral infection affecting domestic pigeons and continues to cause considerable economic and sanitary losses. Conventional genotype II vaccines may provide incomplete protection against recently circulating velogenic PPMV-1 field strains and often fail to sufficiently reduce viral shedding. Recently, chitosan nanoparticles (CS-NPs) have attracted increasing attention as promising mucosal vaccine delivery systems because of their mucoadhesive and immunostimulatory properties.

Objectives: The present study aimed to develop and preliminarily evaluate an inactivated CS-NPs-based homologous vaccine prepared from a recent velogenic Egyptian PPMV-1 field isolate.

Experimental Design and Methodology: The propagated virus was chemically inactivated with formalin and encapsulated in CS-NPs using the ionic gelation method. Eighty domestic pigeons were randomly divided into four groups (20 pigeons/group): the prepared PPMV-1-CS-NPs vaccine was administered via the oculo-nasal route in Group 1 and via the subcutaneous route in Group 2, while a commercial inactivated PPMV/NDV vaccine and sterile phosphate-buffered saline were administered to Groups 3 and 4, respectively.

Results: Homogeneous PPMV-1-CS-NPs were successfully prepared. Preliminary in vitro evaluation demonstrated acceptable sterility, safety, and physical stability of the prepared formulation. Vaccine evaluation showed a reduction of clinical signs, mortality, and viral shedding following challenge, while enhancing the protection rate and humoral immune response compared with the commercial vaccine.

Conclusion: In conclusion, the prepared PPMV-1-CS-NPs vaccine represents a promising homologous vaccine candidate against circulating velogenic PPMV-1 strains in pigeons and may contribute to improved protection and reduction of viral shedding.

Keywords: Chitosan nanoparticles, Egypt, Pigeons, PPMV-1, Vaccine, Velogenic strain

PP-23

Cross protective efficacy of a combined CR88 and H120 live vaccines applied at day old against Infectious Bronchitis Virus variants Var2, Q1 and D388/Qx

Jose Luis Losada Torres[1], Hosameldin Abdelhafez[2]
[1]*Boehringer Ingelheim Vetmedica GmbH, Ingelheim Am Rhein, Germany*
[2]*Boehringer Ingelheim RCV GmbH & Co KG, Vienna, Austria*

Infectious bronchitis virus (IBV) remains a major challenge for poultry production due to the emergence and spread of antigenically diverse variant strains, including variant 2 (Var2), Q1 and Qx. Effective vaccination strategies capable of providing broad cross protection against these variants are essential. The objective of this study was to evaluate the cross-protective efficacy of a combined day-old vaccination with commercially available live infectious bronchitis vaccines of the 793B type (CR88) and the Massachusetts type (H120), administered outside label specifications, against IBV variants Var2, Q1 and D388/Qx.

A total of seventy two specific pathogen free (SPF) layer chickens were allocated into two groups. Thirty three birds were vaccinated at day old with a combination of CR88 and H120, while thirty-five birds served as non vaccinated control groups. Vaccinated birds were challenged intraocularly with IBV Var2 at 30 days of age, Q1 at 28 days, and D388/Qx at 29 days. Protection was assessed by observation of clinical signs for five days post challenge and by evaluation of tracheal ciliostasis at day five after challenge expressed as ciliostasis protection score (CPS) and binomial protection score (BPS).

The combined day old vaccination induced protective levels of cross protection against all challenge strains. Against Var2, vaccinated birds achieved a CPS of 94% and BPS of 100%. Following Q1 challenge, protection reached CPS of 57% and BPS of 60%. For D388/Qx, CPS of 87% and BPS of 100% were observed. In contrast, non vaccinated challenged control birds showed no protection, with CPS and BPS values of 0%, confirming the robustness of the challenge model.

The combined CR88 and H120 vaccination administered at day old demonstrated effective cross protection against the epidemiologically relevant IBV variant strains Var2 and Qx, supporting its use as a broad early life vaccination strategy, whereas the protection against Q1 was fair.

Keywords: Infectious bronchitis virus, IBV variants, CR88, 793/b, cross protection, day old vaccination, ciliostasis

PP-24

Field Evaluation of a Multivalent Fowl Adenovirus Vaccine in Commercial Broiler Breeder Hens

Wei Shen Tong, Abdallah Makahleh, Virayos Vajirabhoga, Egor Nesterov
Kemin Biologics, 1900 Scott Ave. Des Moines, IA 50317-0070 USA

Introduction: Fowl adenovirus infection is a common disease affecting broiler breeder hens, caused by multiple serotypes of adenovirus. It leads to reduced egg production, decreased weight gain, and increased mortality, resulting in significant economic losses for poultry producers. Effective prevention strategies, such as vaccination, are essential to mitigate these impacts.

Objectives: To evaluate the safety and serological response of a multivalent inactivated FAdV vaccine in broiler breeder hens under commercial field conditions.

Experimental Design and Methodology: A field study was conducted in a flock of 50,000 broiler breeder hens. Birds were vaccinated twice at 12 and 18 weeks of age with a 0.5 mL dose per bird. Serological monitoring was performed weekly from 10 to 59 weeks of age using a serum neutralization test (SNT) with FAdV-8b antigen to assess antibody response dynamics following vaccination.

Results: No adverse reactions or clinical signs associated with adenovirus infection were observed during the study, indicating good vaccine safety. Following the primary and booster vaccinations, a clear seroconversion was observed in breeder hens, with a progressive increase in neutralizing antibody titers over time. Elevated antibody levels were sustained throughout the production period, demonstrating a consistent and durable humoral immune response induced by the vaccination program.

Conclusion: The multivalent FAdV vaccine demonstrated good safety and induced a strong and sustained seroconversion response in broiler breeder hens under field conditions. These findings support its application as part of vaccination strategies aimed at controlling adenovirus infections in commercial poultry production.

Keywords: Fowl Adenovirus, Broiler breeders, Seroconversion, Vaccination, Field study

PP-25

Beyond rock phosphate: Is super-dose phytase the answer for laying hens in late production?

Emre Sunay Gebes, Muhammad Shazaib Ramay
Ankara Unıversity Faculty of Veterinary Medicine, Department of Animal Nutrition and Nutritional Diseases

Phosphorus (P) is an essential nutrient in laying hen diets, supporting eggshell formation, bone integrity, and mineral metabolism. However, most P in plant-derived feed ingredients exists as phytate, primary storage form of phosphorus, which poultry poorly utilize due to limited endogenous phytase activity. Therefore, improving phytate-P utilization while reducing dependence on finite rock phosphates has emerged as a key sustainability objective with considerable economic and environmental implications. Although exogenous microbial phytases effectively replace supplemental P in younger flocks, their adequacy during the physiologically demanding late-production phase (>50 weeks) remains insufficiently characterized. As hens age, medullary bone reserves decline, intestinal mineral absorption becomes less efficient, and eggshell quality deteriorates, raising concerns about whether conventional phytase doses (300–600 FTU/kg) remain sufficient or if super-dosing strategies are required. Dietary P recommendations for laying hens are primarily based on non-phytate phosphorus (nPP), whose requirements vary with age and breed. In Lohmann, recommended nPP ranges from 0.38–0.35% with Ca:nPP ratio of 9.8–11.7 at 110 g/hen/day feed intake. In commercial practice, rock phosphate supplementation frequently elevates nPP beyond these levels to guard against deficiency, yet evidence indicates no performance, bone, or eggshell benefit above 0.22% nPP. Excess P may instead disrupt calcium homeostasis, compromise eggshell quality, while adding unnecessary economic and environmental burden. Recent evidence shows that super-dosing phytase (1,000–5,000 FTU/kg) provides dose-dependent benefits in nPP-deficient (0.10–0.15%) late-lay diets, extending beyond P release to improved energy, amino acid availability, and gut integrity. However, responses remain inconsistent, indicating that phytase efficacy is highly influenced by diet composition, hen age, and enzyme matrix assumptions. A frequently overlooked issue is aggressive nutrient reductions or poor dietary calibration particularly for nPP, disrupting Ca:nPP ratios. Therefore, super-dosed phytase is not an independent solution; it must be matched by proportionate, validated adjustments to the full enzyme matrix.

Keywords: enzyme matrix, late-lay, non-phytate-phosphorus, phytase, rock phosphate

PP-26

Comparative Evaluation of Three Commercially Available ELISA Kits for Detecting Avian Metapneumovirus Antibodies in Moroccan Broiler Chickens

Amine Mernizi[1], Mohammed Mouahid[2], Hicham Fathi[1], Dolors Giralt[1], Marina Sole[1], Abdeljelil Ghram[3], Mohammed Bouslikhane[4], Elena Catelli[5], Saadia Nassik[4]

[1]*HIPRA S.A., 17170 Av. Selva, Amer - Spain*
[2]*Cabinet Vétérinaire Mouahid, bd Hassan I, lot. 20, appt.1, Hay Abbadi, Témara - Morocco*
[3]*Institut Pasteur de Tunis, 13, place Pasteur, B.P. 74, 1002 Tunis - Tunisia*
[4]*IAV Hassan II, Madinat Al Irfane, PO Box 6202, Rabat - Morocco*
[5]*University of Bologna, Dipartimento di Scienze Mediche Veterinarie - Via Tolara di Sopra, 50 Ozzano Emilia, Bologna - Italy*

Introduction: Avian metapneumovirus (aMPV) remains an important respiratory pathogen affecting poultry production worldwide. ELISA is widely used for health monitoring and epidemiological investigations; however, variations between commercially available assays may influence the interpretation of flock serological status.

Objectives: This study aimed to compare the performance and agreement of three commercially available indirect ELISA kits for detecting aMPV antibodies in Moroccan broiler chickens.

Experimental Design and Methodology: A total of 1084 sera from 48 commercial broiler flocks sampled between January and June 2021 were analyzed. Samples originated from a previous nationwide sero-epidemiological investigation and were simultaneously tested using three commercially available indirect ELISA kits, including CIVTEST® AVI TRT and two additional assays. All tests were performed under standardized laboratory conditions and by the same operator following manufacturers' instructions. Seroprevalence, coefficients of variation (CV), pairwise agreement analyses, coefficients of determination (R^2), and Cohen's kappa statistics (K) were used to assess consistency between assays.

Results: Positivity rates varied between ELISA kits, ranging from 64.11% to 99.72%. Nevertheless, all assays consistently demonstrated high aMPV seropositivity across Moroccan broiler flocks. Differences in agreement levels, coefficients of variation, and quantitative relationships between assays suggested variability in analytical behavior and result interpretation. Pairwise comparisons and Cohen's kappa statistics revealed limited interchangeability between kits despite the overall consistent detection of widespread seropositivity.

Conclusion: Despite differences in agreement and analytical performance between ELISA kits, all assays consistently demonstrated high aMPV seropositivity in Moroccan broiler flocks. These findings support the widespread circulation of aMPV in the studied population while highlighting the importance of considering assay-related variability when interpreting serological and epidemiological data in broiler production systems.

Keywords: agreement, avian metapneumovirus, broiler chicken, ELISA, serology, surveillance

PP-27

Field Evaluation of the Safety and Performance of a Fully Attenuated and Adjuvanted Coccidiosis Vaccine Administered by Spray at Hatchery in Commercial Broilers in Egypt

Amine Mernizi[1], Mohammed Bekhit[2], Mohammed Hegazy[2], Hicham Fathi[1]
[1]*HIPRA S.A., 17170 Av. Selva, Amer – Spain*
[2]*GHANNAM, 12 El Tayaran St, Al Manteqah Al Oula, Nasr City, Cairo Governorate 11759, Cairo – Egypt*

Introduction: Avian coccidiosis remains one of the most economically important enteric diseases affecting broiler production worldwide. Concerns regarding the efficacy of anticoccidials and the reduced reliance on chemotherapeutics have increased interest in vaccination strategies under intensive production conditions.

Objectives: This study aimed to evaluate the safety and field performance of a fully attenuated and adjuvanted vaccine against coccidiosis (EVANT®) administered by spray at hatchery in commercial broiler chickens under the Egyptian field context.

Experimental Design and Methodology: Two commercial broiler farms operating under different conditions were included in the evaluation. In one farm, all birds were vaccinated, whereas in the second, three vaccinated broiler houses were compared with one non-vaccinated control house. Day-old chicks received a single administration of the fully attenuated vaccine EVANT® by coarse spray at the hatchery. Birds were monitored throughout their lifespan. Safety assessment included adverse reactions, mortality, and clinical observations. Performance and efficacy evaluation included body weight evolution, feed conversion rate (FCR), intestinal lesion scoring, and monitoring of oocyst shedding in fecal samples.

Results: Vaccinated broilers maintained satisfactory zootechnical performance throughout the rearing period. Final body weights ranged from approximately 2.1 to 2.4 kg at 37–39 days, depending on farm conditions. Final FCR values ranged from 1.30 to 1.49 in vaccinated flocks. Low intestinal lesion scores and expected post-vaccinal oocyst cycling were observed, with no evidence of clinical coccidiosis. No significant adverse reactions attributable to vaccination were reported.

Conclusion: The fully attenuated and adjuvanted coccidiosis vaccine administered by spray at hatchery demonstrated satisfactory safety and consistent field performance under commercial conditions, supporting its suitability as an effective coccidiosis control strategy compatible with favorable zootechnical performance.

Keywords: adjuvant, broiler chicken, coccidiosis, Egypt, Eimeria, performance, vaccine

PP-29

Evaluation of innovative emulsion and polymer adjuvants for inactivated H5N8 HPAI virus vaccine

Vinod Gyanba Patil[1], Sarah Kharief[2], Juliette Ben Arous[2], Nicolas Versillé[3], Kairat Tabynov[4]
[1]*Seppic - O2 Commercial Twin Tower- B/1304, Asha Nagar Road, Mulund (W), Mumbai - 400080- INDIA*
[2]*Seppic, Paris La Défense - 50 Boulevard National - 92257 La Garenne Colombes, France*
[3]*Seppic - 127 chemin de la Poudrerie - BP 90228 - 81105 Castres Cedex, France*
[4]*International Center for Vaccinology, Kazakh National Agrarian Research University, Almaty, Kazakhstan*

Introduction & Objective: Highly pathogenic avian influenza (HPAI) poses a significant threat to poultry industry, necessitating effective vaccination strategies. This study evaluated the safety, immunogenicity, and efficacy of an inactivated reverse genetics-based H5N8 vaccine, with a focus on different adjuvant technologies. The study aimed to assess the efficacy of H5N8 vaccines adjuvanted with Montanide™ ISA 78 VG, Montanide™ ISA 71R VG (innovative water in oil emulsion adjuvants) and Montanide™ GEL P PR (Polymer-based aqueous adjuvant), in comparison to a commercial vaccine (oil based adjuvant).

Methods: Four-week-old influenza antibody-negative chickens were vaccinated subcutaneously with 0.5 ml of the H5N8 vaccine adjuvanted with ISA 78, ISA 71 R, GEL P, the commercial vaccine, or the antigen alone. Safety was assessed by monitoring chickens for clinical signs and weight changes for 35 days. Immunogenicity was evaluated by measuring hemagglutination inhibition (HI) antibody titers on days 0, 7, 14, 21 and 28 after vaccination. Efficacy was determined by challenging vaccinated chickens with a H5N1 field virus isolate 35 days after vaccination, and assessing survival and viral shedding for 10 days.

Results: All adjuvanted formulations were safe, with no local or systemic reactions observed. Chickens vaccinated with ISA 78, ISA 71R, GEL P, and the commercial vaccine developed high HI antibody titers. The ISA-78 group demonstrated superior immunogenicity. Following the challenge, all vaccinated groups demonstrated better protection and reduced viral shedding compared to the control group.

Conclusion: H5N8 vaccines adjuvanted with Montanide™ ISA 78 VG, ISA 71 R VG, and GEL P PR elicited substantial humoral immune responses. Specifically, Montanide™ 78 VG induced the highest antibody titers, exhibiting superior immunogenicity and positioning it as a potent adjuvant candidate HPAI vaccines. Furthermore, these findings suggest that both oil and polymer-based adjuvants are efficacious for HPAI vaccines formulation.

Keywords: HPAI, Emulsion adjuvant, aqueous adjuvant, poultry vaccine, adjuvant technology

PP-30

Field evaluation of a multivalent vaccine formulated with a new water-in oil-adjuvant MONTANIDE™ ISA 78 VG in layers

Vinod Gyanba Patil[1], Sarah Kharief[2], Nicolas Versillé[3], Juliette Ben Arous[2]
[1]*Seppic - O2 Commercial Twin Tower- B/1304, Asha Nagar Road, Mulund (W), Mumbai - 400080- INDIA*
[2]*Seppic SA, 50 boulevard National, 92257 La Garenne Colombes Cedex, France*
[3]*Seppic, 127 chemin de la Poudrerie - BP 90228, 81105 Castres Cedex, France*

Introduction &Objectives: Water-in-oil (W/O) adjuvants are widely used for avian vaccines, providing enhanced potency and prolonged immunity. This study evaluated the safety and efficacy of a novel W/O adjuvant, MONTANIDE™ ISA 78 VG (ISA 78), in a trivalent vaccine for layers. The vaccine contained Avian Influenza virus (AI, H9N2), Newcastle Disease virus (ND, La Sota), and E. coli (O2, O78, O88).

Methods: 1000 Leghorn layers were vaccinated intramuscularly with either the trivalent vaccine formulated with ISA 78 or a standard W/O adjuvant. Safety was assessed by scoring local reaction at the injection site and evaluation of egg production rate. Efficacy was determined by measuring HI antibodies against ND and H9 AI over 90 days.

Results: The ISA 78 group showed less residual oil and inflammation at the injection site compared to the standard W/O group at both 3 and 5 weeks post-vaccination. The ISA 78 group maintained a consistent egg production rate, while the standard W/O group experienced a transient 6% decrease one week post-vaccination. Furthermore, the ISA 78-adjuvanted vaccine induced higher antibody titers against NDV and AI H9 than the standard W/O adjuvant.

Conclusion: MONTANIDE™ ISA 78 VG demonstrates improved safety with reduced local reactions and no negative impact on laying performance. Additionally, it enhances the immunogenicity of the trivalent vaccine, eliciting higher and sustained antibody titers compared to the standard W/O adjuvant. The results suggest that MONTANIDE™ ISA 78 VG is a suitable adjuvant for multivalent vaccines in layers.

Keywords: Multivalent vaccine, Newcastle disease, Avian Influenzae, Emulsion adjuvant, poultry vaccine, Layer chicken, Field Evaluation

PP-31

Comparative evaluation of three Infectious Bursal Disease vaccination strategies against UK2019 challenge in broilers

Hicham Fathi, Silvia Ramirez, Michelle Woodward, Marta Busquet, Martina Dardi
Laboratorios HIPRA S.A., Amer, Spain

Introduction: Infectious Bursal Disease (IBD) remains a major threat to poultry health, particularly with the emergence of reassortant IBD virus strains such as UK2019.

Objectives: This study compares the efficacy of three vaccination strategies against this challenge strain in broilers.

Experimental Design and Methodology: Ninety-six birds were randomized into four groups. Group A (n=30) received an immune-complex live attenuated IBD vaccine; Groups B and C (n=30 each) were vaccinated with two different recombinant vector vaccines; and Group D (n=6) was the unvaccinated control. Birds were vaccinated at one day of age and challenged at day 28. Clinical signs, serology, PCR of Bursa of Fabricius (BF), body weight, and BF histopathology were evaluated.

Results: No clinical signs or macroscopic lesions were observed. Group A reached 93% positivity at D28 and 100% at D33, with significantly higher ELISA titers than Groups B and C. Seroconversion in Groups B and C was lower, though all birds reached positivity at D33. UK2019 was not detected in the BF of Group A during the post-challenge period, whereas viral presence was confirmed in Groups B and C. Body weight gain was consistently high in Group A throughout the trial. Histopathological evaluation of the BF showed significantly reduced lesion severity in all vaccinated groups compared with controls, with Group A exhibiting the lowest acute lesion scores.

Conclusion: Overall, all vaccination strategies provided clinical protection against the UK2019 strain. However, the immune-complex live attenuated vaccine induced higher immunogenicity, better controlled viral replication in the BF, and minimized growth losses more effectively than the recombinant vector vaccines.

Keywords: Infectious Bursal disease virus (IBDV), Immune-Complex Live Attenuated Vaccine, Reassortant IBDV, Strains UK2019, Vaccination Strategy

PP-32

Safety assessment of IBDV aaccines when applied in laying hens during the rearing period under field conditions

Hicham Fathi[1], Albertus Stokvis[2], Marcel Boereboom[3], Pieter Kuhne[1], Massimiliano Baratelli[1], Martina Dardi[1]
[1]*HIPRA S.A., Amer, Spain*
[2]*Poultry Vets Ruurlo, the Netherlands*
[3]*Pluriton Netherlands BV, Lunteren, the Netherlands*

Introduction: Live attenuated vaccines have long been a cornerstone in the control of Infectious Bursal Disease Virus (IBDV), particularly for strains with high virulence. However, concerns persist regarding their safety and potential impact on poultry productivity, often linked to the degree of attenuation and vaccine formulation.

Objectives: This field study assessed the safety of a live attenuated immunocomplex IBDV vaccine (imm-IBDV: GUMBOHATCH®) administered during the rearing period to future laying hens across three commercial farms.

Experimental Design and Methodology: Each farm hosted two parallel flocks: one vaccinated with imm-IBDV and the other with a double recombinant HVT-ILT-IBD vaccine (control). Both vaccines were administered subcutaneously at day-old following manufacturers' guidelines. Key parameters evaluated included mortality, body weight, macroscopic lesions, serological response to IBDV (via ELISA), and PCR detection of vaccine virus in the bursa of Fabricius. Sampling occurred at 28, 42, and 70 days post-vaccination.

Results: imm-IBDV flocks exhibited earlier seroconversion with consistent PCR detection of vaccine virus from 28 dpv. Mortality and Body weight progression was comparable between groups, with no statistically significant differences across farms. As expected, Bursa-to-body weight ratios decrease was observed indicating imm-IBDV was successfully replicated but did not affect performance.

Conclusion: In conclusion, imm-IBDV showed a favorable safety profile and strong immunogenicity under field conditions. It provided early replication and production of an immune response without compromising growth or health status, supporting its use in commercial laying hen operations.

Keywords: Commercial Laying Hens, Infectious Bursal disease virus (IBDV), Immune-Complex Live Attenuated Vaccine, Immunogenicity & safety, Seroconversion, Vaccine detection

PP-33

Efficacy of vaccination with live and inactivated NDV vaccines against an experimental challenge with genotype XIII Newcastle disease virus in broiler-type chickens

Hicham Fathi[1], Nitin Kurkure[2], P. M. Sonkusale[2], M. P. Kaore[2], Deepak Koli[1], Massimiliano Baratelli[1], Eduard Carceller[1], Ester Taberner[1]
[1]*HIPRA S.A., Amer, Spain*
[2]*Nagpur veterinary college, Maharashtra Animal & Fishery Sciences University, Nagpur, 440006, India*

Introduction: Genotype XIII Newcastle disease virus (NDV) co-circulates with genotype VII in South Asia and has been increasingly reported in Africa and the Middle East, raising concerns about the performance of genotype I/II-derived vaccines against heterologous challenge.

Objectives: The efficacy of a day-old vaccination plan combining a bivalent live ND-avian infectious bronchitis vaccine (HIPRAVIAR® CLON/H120) with an inactivated ND vaccine (HIPRAVIAR® BPL2), both genotype II–based, was evaluated in broiler-type chickens experimentally challenged with a velogenic genotype XIII NDV.

Experimental Design and Methodology: Forty birds were assigned to two groups (n=20/group). Group A received 0.03 mL of the live vaccine ocularly and 0.2 ml of the inactivated vaccine subcutaneously; Group B received PBS (0.03 mL) via the ocular route. At 21 days of age, all birds were challenged oculo-nasally with 10^4 EID_{50} per bird and monitored until 35 days of age (14 days post-challenge) for clinical outcome, cloacal shedding by F gene PCR, serology by indirect ELISA, and growth performance.

Results: Vaccination elicited anti-NDV antibodies despite the presence of maternally derived antibodies, whereas controls seroconverted only post-challenge. Mortality reached 50% in controls but was 5% in vaccinated birds, indicating a 90% relative reduction. Vaccination also reduced PCR positivity of cloacal swabs and mitigated growth loss relative to controls.

Conclusion: These results demonstrate effective heterologous protection of genotype II vaccines against genotype XIII NDV and support their use as a practical strategy to reduce mortality, viral shedding, and productivity losses in settings where genotype XIII circulates.

Keywords: Newcastle disease virus (NDV), Genotype XIII challenge, Genotype II vaccines, Heterologous protection, Broiler vaccination efficacy

PP-34

Effectiveness of Enhanced Hatchery Biosecurity Measures in Reducing Aspergillus Contamination and Hatchery Aspergillosis

Annisa Rofiqoh Syafikriatillah[1], Nicky Wulan Pinesty[2], Erry Setyawan[1]
[1]*Marketing & Sales Department, Agrinusa Jaya Santosa, Jakarta, Indonesia*
[2]*Product Development Department, Agrinusa Jaya Santosa, Bogor, Indonesia*

Introduction: Hatcheries are critical for producing healthy day-old chicks but frequently serve as sources for fungal disease transmission. Areas such as setter, hatcher, transfer, and chick-pulling rooms are highly susceptible to Aspergillus spp., which can cause severe economic losses if biosecurity is inadequate.

Objectives: This study evaluated the efficacy of fogging Clinazole-150 (active ingredient: Enilconazole) to reduce environmental mold and Aspergillus contamination in hatcheries.

Experimental Design and Methodology: The method used was surface swab isolation and air sampling exposure from rooms in hatcheries that routinely applied Clinazole and hatcheries that had not applied Clinazole. Isolation was carried out on Sabouraud Dextrose Agar (SDA) media.

Results: The results demonstrated that fogging with Clinazole-150 reduced overall mold contamination by 100% and Aspergillus by 86%.

Conclusion: These findings prove that Enilconazole fogging is a highly effective method for fungal reduction. However, to maintain optimal hygiene, this chemical intervention must be combined with strict sanitation protocols, proper traffic management, and stringent quality control of incoming hatching eggs.

Keywords: Day-old chicks, Clinazole-150 (Enilconazole), Fogging application, Fungal pathogens, Hatchery

PP-35

First field monitoring efficacy and production impact of a turkey herpesvirus double construct vaccine (Innovax®-ILT-IBD) within native broiler flocks in different governorates in Egypt

Mohamed El Zayat[1], Hossam Gado[1], Ibrahim Elemary[2], Mostafa Nayel[2], Hazem Ibrahim Darwish[3]
[1]*Biotechnology Unit, Animal Health Research Institute (AHRI), Zagazig branch, Agricultural Research Center (ARC).*
[2]*Innoval affiliate, International Free Trade Corporation (IFT), Cairo, Egypt*
[3]*MSD Animal Health, Cairo, Egypt.*

Introduction: Native broiler breeds in Egypt are highly susceptible to Infectious Bursal Disease (IBD) and Infectious Laryngotracheitis (ILT), which are widespread in various localities, giving these diseases high priority in vaccination programs. Herein lies the importance of Innovax® ILT-IBD vaccine, which represents a strategic shift in the vaccination program for native broiler flocks, protecting against IBD and ILT.

Objectives: Innovax®-ILT-IBD vaccination was extensively monitored in diverse native broiler flocks, for the first time in Egypt.

Experimental Design and Methodology: covering 45 farms with a total of 1,047,800 birds during the period from May 2025 to April 2026 in different governorates with previous IBD and/or ILT infections. Innovax®-ILT-IBD was administered at day-old in the hatchery, along with a single live IBD vaccine in the farm, with no live ILT vaccinations given. Monitoring of Innovax®-ILT-IBD vaccinated flocks involved, firstly, clinical monitoring, which included observing clinical symptoms, recording and necropsy of mortality, and checking the Bursa of Fabricius integrity; secondly, tracking production performance indicators like weight uniformity, and FCR; and thirdly, laboratory investigation, which included periodic PCR testing to detect exposure to IBD and ILT viruses, and ELISA at 3 and 6 weeks to measure IBD VP2 and ILT gI titers, respectively.

Results: The monitoring results revealed that implementing Innovax® ILT-IBD in native breeds provided significant protection against IBD and ILT as the mortality rates in vaccinated flocks ranged from 3% to 6%, even with some flocks testing positive for IBD or ILT. Regarding production efficiency, there was a boosted improvement in average weights and FCR, with flocks like Saso reaching 2.450 kg at 60 days, and some Rossi flocks reaching 2.222 kg at 69 days.

Conclusion: Using Innovax®-ILT-IBD in native broiler flocks won't just provide dual protection against ILT and IBD, but also reduce reliance on conventional live ILT vaccines, decreasing its epidemiological spread, alongside significant production improvements.

Keywords: FCR, IBD, ILT, Innovax®-ILT-IBD, Native broiler, Performance

PP-36

Quantitative monitoring of the efficacy of immune complex vaccine in laying hens

Melissa Akal[1], Ozgur Ozturk[1], Betul Kucuk[1], Murat Pat[1], Akin Unal[2]
[1]*Ankara University Institute of Health Sciences Veterinary Microbiology*
[2]*Department of Microbiology, Faculty of Veterinary Medicine, Ankara University*

Infectious Bursal Disease (IBD), also known as Gumboro disease, is a highly contagious viral disease that causes immunosuppression and lesions in the bursa of Fabricius. In addition to live attenuated vaccines, other strategies including vector vaccines and immune complex (Icx) vaccines have been developed to control the disease. This study aimed to quantitatively monitor the vaccination efficacy in a layer flock vaccinated with an Icx in hatchery. Within this scope, 5 bursa of Fabricius and 5 spleen samples were collected individually from the flock on days 7, 14, 21, 28, 35, and 42, and analyzed via RT-qPCR. On day 7, the IBD vaccine strain was not detected in the bursa of Fabricius, whereas it was detected in 40% (2/5) of the spleen samples. On day 14, the vaccine strain was detected at a rate of 60% (3/5) in the bursa of Fabricius; 80% (4/5) in the spleen samples. On day 21, the rates were 80% (4/5) in the bursa of Fabricius; 100% (5/5) in the spleen samples. On day 28, it was detected in 100% (5/5) of the bursa of Fabricius; 60% (3/5) of the spleen samples. On day 35, the detection rates were 100% (5/5) in the bursa of Fabricius; 60% (3/5) in the spleen, while on day 42, the vaccine strain was detected in 100% (5/5) of the bursa of Fabricius; 40% (2/5) of the spleen samples. Evaluating the obtained findings, it was noteworthy that the vaccine strain was first detected in the spleen and subsequently colonized the bursa of Fabricius, reaching its peak detectability in the bursa of Fabricius between days 21 and 28. The detectability of the vaccine strain in the bursa of Fabricius decreased in a age-dependent manner. It's concluded that molecular analyses can be effectively utilized to monitor immune complex vaccines in layer flocks.

Keywords: Infectious Bursal Disease, immunecomplex vaccine, layer, RT-qPCR, vaccine efficacy

PP-37

Broader Early Humoral Immunity with a Multi-Clade H5Nx Vaccine Compared to a Mono-Clade H5N8 Formulation

Ibrahim Ali[1], Hanan Abbdien[1], Walid Kilany[2], Mohamed Ali[3], Ahmed Qandil[3], Wael Elfeil[1]
[1]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*
[2]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt*
[3]*Mevac For Vaccines*

Introduction: Highly pathogenic avian influenza (HPAI) viruses remain a major global threat to the poultry industry and public health, causing severe economic losses. HPAI H5Nx viruses of the goose/Guangdong (Gs/GD) lineage now dominate worldwide. Egypt is an HPAI hotspot where multiple clades of H5N1 and H5N8 co-circulate, complicating vaccination due to ongoing viral evolution and new variant emergence. New strategies, including immunostimulant-supplemented multi-clade vaccines, aim to broaden protection against diverse H5 variants.

Objectives: To evaluate early humoral immune responses (two weeks post-vaccination) in chickens induced by two inactivated H5Nx vaccines containing immunostimulants: a mono-clade (V1: H5N8, clade 2.3.4.4b) and a multi-clade (V2: H5N1 clade 2.3.4.4b + H5N8 clade 2.3.4.4b + H5N1 clade 2.2.1.1) vaccine.

Experimental Design and Methodology: Thirty 14-day-old chickens were vaccinated intramuscularly with 0.5 mL of either V1 or V2. Serum samples were collected at 1 and 2 weeks post-vaccination (WPV). The humoral response was assessed by hemagglutination inhibition (HI) assays against a panel of representative H5 antigens from clade 2.3.4.4b (H5N8 and H5N1), the classical Gs/GD lineage (H5N1 and H5N3), and Egyptian clades 2.2.1.1 and 2.2.1.2.

Results: By 2 WPV, both vaccines elicited measurable HI antibody responses. V2 induced higher cross-reactive HI titers than V1 against all homologous and heterologous H5 antigens tested, except for goose/Guangdong H5N1 (no seroconversion by V1) and H5N3 (minimal titer ~0.8 $\log_2$ by V2). Peak HI titers included 8.2 ± 2.8 $\log_2$ for V2 against H5N1 (clade 2.2.1.1) and 7.6 ± 3.1 $\log_2$ for V1 against H5N8 (clade 2.3.4.4b).

Conclusion: Both immunostimulant-supplemented vaccines elicited early antibody responses, but the multi-clade formulation (V2) provided broader cross-reactive coverage across diverse H5 strains. These findings support multi-clade vaccine strategies to address HPAI antigenic diversity in endemic settings.

Keywords: Avian influenza, H5Nx viruses, H5N1 clade 2.3.4.4b, Hemagglutination inhibition, H5 vaccines, immunostimulants, early immunization

PP-40

Field evaluation of production and economic outcomes of three IBV vaccination strategies in commercial broilers

Davor Jankovic, Lovorka Špiric, Katarina Huic Babic, Lana Ljuma Skupnjak, Marina Gabric Dragovic
Vaxxinova Zagreb d.o.o (part of Vaxxinova Group), Zagreb, Croatia

Introduction: Infectious bronchitis virus (IBV) remains one of the most economically important respiratory pathogens in broiler production, negatively affecting growth performance, feed conversion and overall profitability. Due to the high variability of IBV, protectotype vaccination strategies using multiple live vaccine strains are widely applied to increase protection against field challenge; however, their economic impact under commercial conditions remains insufficiently quantified.

Objectives: The aim of this study was to compare production performance and economic outcomes of three IBV vaccination programmes applied at hatchery level: a three-strain programme (Avishield® IB QX, GI-13 and H120), a two-strain programme (GI-13 and H120), and a single-strain programme (H120).

Experimental Design and Methodology: The study included three commercial Ross 308 broiler flocks (~19,000 birds per flock) on a commercial farm in the European Union. Chicks were vaccinated on day 1 via coarse spray. General health status, mortality, production parameters, serology and molecular detection were monitored throughout the production cycle. Economic analysis was based on normalised production data, incorporating feed costs, vaccination costs and live-weight revenue.

Results: With all three vaccination programs, no adverse clinical signs were observed, and mortality was within expected limits. The three-strain group achieved superior production performance (FCR 1.614; performance index 386.15), followed by the two- and single-strain groups. After normalisation to a common slaughter age, the three-strain programme maintained the highest biological efficiency.

Economic evaluation showed the highest profit after feed and vaccination cost in the three-strain group (1,160.57 EUR/1,000 birds), compared to 1,113.61 EUR and 1,064.81 EUR in the two- and single-strain groups, respectively. The three-strain programme generated an additional 47 EUR and 96 EUR per 1,000 birds compared to the two- and single-strain programmes.

Conclusion: In conclusion, the three-strain protectotype approach provided superior production performance and economic return, supporting the use of multi-strain vaccination strategies in commercial broiler production.

Keywords: broilers, economic impact, infectious bronchitis, production performance, protectotype, vaccination

PP-41

Integrated Evaluation of Compatibility of Two- and Three-Strain Live Attenuated IBV Vaccination Regimens in Day-Old Chickens

Davor Jankovic[1], Lovorka Špiric[1], Lana Ljuma Skupnjak[1], Marina Gabric Dragovic[1], Katarina Huic Babic[1], Nikol Ocuršcak[1], Gert Jan Boelm[2], Olga Zorman Rojs[3]
[1]*Vaxxinova Zagreb d.o.o. (part of Vaxxinova Group), Zagreb, Croatia*
[2]*Royal GD, Deventer, the Netherlands*
[3]*Veterinary Faculty, Ljubljana, Slovenia*

Introduction: The compatibility of multi-strain live attenuated vaccination regimens is a critical factor in developing effective control strategies against avian infectious bronchitis virus (IBV), particularly under conditions of co-circulating genotypes.

Objectives: This study presents an integrated evaluation of the compatibility of two- and three-strain IBV vaccination regimens administered by spray in day-old chickens.

Experimental Design and Methodology: The evaluated vaccines included Avishield® IB H120 (Mass type, GI-1 lineage), Avishield® IB GI-13 (strain V-173/11, GI-13 lineage), and Avishield® IB QX (strain QX 1285, GI-19 lineage). In controlled SPF studies, chickens were vaccinated with either a two-strain (H120 + GI-13) or three-strain combined regimen and challenged with homologous virulent IBV strains. Protection was assessed by tracheal ciliary activity following challenge.

Results: Combined vaccination with H120 and GI-13 induced 80–90% protection against M41 and up to 100% against 793B, with no negative effect on the onset or duration of immunity. The three-strain combined regimen provided 95–100% protection against M41 and QX at 21 days post-vaccination, while protection against 793B increased from 65% at 10 days to 85% at 21 days. Duration of immunity extended up to 56–63 days, reaching 85–100% depending on the strain.

Compatibility was further supported by PCR detection of IBV RNA, with GI-13, H120, and QX identified in 93%, 40%, and 80% of oropharyngeal samples, respectively. A laboratory safety study confirmed that simultaneous administration of a 10-fold maximal dose of each vaccine caused no clinical signs or growth impairment.

Conclusion: In conclusion, both two- and three-strain vaccination regimens demonstrated high compatibility, enabling early, broad, and sustained protection against multiple IBV genotypes.

Keywords: compatibility, infectious bronchitis virus, live attenuated vaccines, multi-strain vaccination, protection

PP-42

Post-challenge supplementation with a phytogenic additive improves recovery and performance of broilers under experimental Eimeria challenge

Muhammad Umar, Ilkin Huseynov, Anne Möddel, Bernhard Eckel
Dr. Eckel Animal Nutrition GmbH & Co. KG, Im Stiefelfeld 10, 56651 Niederzissen, Germany

Introduction: Coccidiosis is one of the major enteric diseases affecting broiler production, leading to impaired growth performance, poor feed efficiency and increased mortality. Nutritional strategies using phytogenic additives may support recovery and performance following enteric challenge.

Objectives: To evaluate the effects of supplementation with a phytogenic additive on recovery and zootechnical performance of broilers experimentally challenged with *Eimeria* spp.

Experimental Design and Methodology: One-day-old male Cobb chicks were divided into four treatments groups (T1–4), with 70 animals per group. The trial comprised six parallel replicates and 1,680 animals in total. At 14 days of age, birds from treatments 2, 3 and 4 were orally challenged with *Eimeria acervulina* (80,000 oocysts/bird), *E. maxima* (60,000 oocysts/bird) and *E. tenella* (5,000 oocysts/bird). Treatment 4 received Anta®Phyt (Dr. Eckel Animal Nutrition GmbH & Co KG) supplementation after infection to evaluate its potential to support recovery under enteric stress. Performance parameters evaluated from days 1 to 38 included growth performance and mortality. Statistical significance was determined by ANOVA at $P<0.05$.

Results: The *Eimeria* challenge impaired productive performance and increased mortality in challenged groups. The non-challenged control group (T1) showed the best overall performance, confirming challenge efficacy. Among challenged groups, birds supplemented with Anta®Phyt after challenge (T4) demonstrated significantly improved recovery and performance compared with challenged controls (T2 and T3). T4 increased final weight (2741 g vs. 2645-2655 g), total weight gain (2696 g vs. 2603-2613 g) and daily weight gain (71 g vs. 69 g). Birds in T4 also showed improved feed conversion ratio (1.607 vs. 1.626-1.644) and reduced mortality (14.05% vs. 15.24-13.57%). Feed intake was numerically improved in T4.

Conclusion: Post-challenge supplementation with Anta®Phyt improved growth performance, feed efficiency and recovery of broilers subjected to experimental *Eimeria* challenge, demonstrating its potential as a sustainable nutritional strategy to mitigate enteric stress in poultry production.

Keywords: Broilers, Coccidiosis, Eimeria, Feed conversion ratio, Phytogenic additive, Poultry performance, Recovery strategy

PP-43

PCR-Based Evaluation of Rispens Vaccine Intake in Breeder Chickens in Iran: A Quality Control Indicator for Vaccination Success and Vaccine Potency

Arash Ghalyanchi Langeroudi[1], Zahra Ziafati Kafi[1], Fahimeh Jamiri[1], Soroush Sarmadi[1], Alireza Bakhshi[1], Hirbod Sheikhi[1], Amitis Sedighi[1], Fatemeh Garagouzlou[1], Soheil Kahrizi[1], Hossein Hosseini[2], Mohammad Abdoshah[3], Najmeh Motamed[3], Mohsen Mahmoodzadeh Akhijahani[3]

[1]*Department of Microbiology and Immunology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
[2]*Department of clinical science, Faculty of veterinary medicine, Karaj Islamic Azad University, Alborz, Iran*
[3]*Razi Vaccine & Serum Research Institute, Agricultural Research, Education & Extension Organization, Karaj, Alborz, Iran*

Introduction: Marek's Disease (MD) is a major economic struggle for poultry farms all over the world, caused by the ubiquitous gallid herpesvirus 2 (GaHV-2). GaHV-2 causes a wide range of clinical signs from neurological manifestations to neoplastic-wasting conditions and varying mortality rates depending on the strains virulence. Immunization of newly hatched chicks or 18-days in ovo are the primary disease prevention strategies, with live-attenuated vaccines—particularly the Rispens strain and herpesvirus of turkeys (HVT) vaccines—representing the most widely adopted formulations in commercial settings. However, vaccine efficacy failures can result in substantial economic losses through increased mortality, reduced productivity, and flock management complications.

Objectives: This study aimed to assess the effectiveness of Rispens vaccination programs implemented across commercial breeder flocks in Iran through molecular detection of vaccine-strain virus.

Experimental Design and Methodology: Feather samples (n = 20 per flock) were collected from 110 commercial breeder flocks at 10 days post-vaccination. Genomic DNA was extracted from feather follicles, and a polymerase chain reaction (PCR) assay targeting the glycoprotein B (gB) gene was employed for detection and identification of GaHV-2.

Results: Considerable inter-flock variation in GaHV-2 detection rates was observed, ranging from 10% to 70% of sampled birds across flocks, indicating heterogeneous vaccine performance.

Conclusion: A gB-targeted PCR assay appears to offer a practical diagnostic tool for retrospective assessment of Rispens vaccine uptake and performance in broiler breeder populations. The substantial inter-flock variation suggests that vaccine failure is multifactorial and may not necessarily reflect the emergence of vaccine-resistant viral strains; rather, suboptimal vaccination protocols, including improper vaccine administration technique, inadequate vaccine handling, and environmental stress factors, may constitute primary contributors to apparent vaccination failures.

Keywords: Marek's disease, Rispens vaccine, vaccine intake, PCR, quality control, breeder chickens, Iran

PP-44

Molecular Characterization and Species Distribution of Fowl Aviadenoviruses (FAdV-C, -D, -E) in Poultry Flocks with Viral Hepatitis in Iran

Arash Ghalyanchi Langeroudi[1], Zahra Ziafati Kafi[1], Hossein Hosseini[2], Mohammad Hossein Fallah Mehrabadi[3], Soroush Sarmadi[1], Fahimeh Jamiri[1], Hirbod Sheikhi[1], Amitis Sedighi[1], Mahtab Heydarpour Chaleshtori[1], Fatemeh Garagouzlou[1], Soheil Kahrizi[1]

[1]*Department of Microbiology and Immunology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran*
[2]*Department of clinical science, Faculty of veterinary medicine, Karaj Islamic Azad University, Alborz, Iran*
[3]*Razi Vaccine & Serum Research Institute, Agricultural Research, Education & Extension Organization, Karaj, Alborz, Iran*

Introduction: Fowl Aviadenoviruses (FAdVs) are economically significant pathogens of poultry, responsible for substantial clinical and sub-clinical losses worldwide. Within the genus Aviadenovirus, FAdVs are taxonomically organized into 12 serotypes distributed across five species (FAdV-A through FAdV-E). Distinct disease syndromes have been etiologically associated with specific serotypes and species. Hepatitis-Hydropericardium Syndrome (HHS), characterized by accumulation of straw-colored pericardial fluid and hepatic necrosis, is classically linked to FAdV-4 (species FAdV-C). Inclusion Body Hepatitis (IBH) defined by intranuclear inclusion bodies within hepatocytes and acute hepatic necrosis, is most frequently linked to FAdV-2 and FAdV-11 (species FAdV-D) and FAdV-8a and FAdV-8b (species E. The occurrence of mixed-species infections complicates accurate diagnosis and undermines targeted disease management strategies.

Objectives: This study aimed to describe the FAdV species circulating in poultry flocks with suspected adenoviral hepatitis in northern Iran.

Experimental Design and Methodology: A total of 119 samples (comprising liver or cecal tonsil tissues and cecal swabs) were collected from commercial farms exhibiting clinical signs of hepatitis. Samples were initially screened using a broadly reactive polymerase chain reaction (PCR) assay. All PCR-positive samples were subsequently subjected to three species-specific PCR assays utilizing previously designed and validated primers to differentiate between species FAdV-C, D and E.

Results: Of the 119 samples analyzed 32 (26.9%) tested positive in the first PCR assay. Species-level characterization revealed FAdV-E as the predominant species, detected in 18 samples (56.2%), followed by FAdV in 11 samples (34.4%) and FAdV-C in 3 samples (9.4%). Co-infections were identified in two samples: one involving FAdV-D and E, and another involving FAdV-E and C.

Conclusion: The concurrent circulation of multiple FAdV species across geographically proximate farms highlights the necessity of implementing continuous, species-level molecular surveillance programs to inform more targeted prophylactic interventions and improve outbreak response strategies in poultry populations.

Keywords: IBH, Iran, FAdV-C, FAdV-D, FAdV-E, Fowl Aviadenovirus, PCR

PP-46

The Potential of Quillaja saponaria Saponins as a Sustainable Alternative to Antibiotic Growth Promoters in Broiler Production

Murat Bilgiç
Tiryaki Agro

Global restrictions on antibiotic growth promoters (AGPs) have driven the poultry industry towards safe and sustainable alternatives. This systematic review examines the multidimensional effects of triterpenoid saponins derived from the Quillaja saponaria tree in broiler chicken (Gallus gallus domesticus) production. Studies published between 2000 and 2026 were screened from PubMed, Scopus, Web of Science, and ScienceDirect databases in accordance with PRISMA 2020 guidelines. Evidence shows that Quillaja saponins (i) exert antiviral effects by disrupting lipid envelopes of enveloped viruses (NDV, IBV), (ii) exhibit antibacterial activity by increasing cell wall permeability of pathogenic bacteria (Clostridium perfringens, Salmonella), (iii) improve nutrient absorption by elongating intestinal villi and reducing crypt depth, (iv) enhance humoral and cellular immunity by increasing IgA, IgG, IgM titres and CD4+/CD8+ ratios, and (v) balance inflammation through cytokine profile modulation (IL-6↓, TNF-α↓, IL-10↑). The Quillaja/Yucca (QY) combination at 250–500 mg/kg has been reported to increase live weight gain by 3.5%, improve FCR by 5.4%, and reduce mortality from 10.5% to 2.2% in 42-day broilers. Current evidence supports standardized Quillaja saponin formulations as versatile AGP alternatives in broiler production; however, dose optimization, nanoformulation strategies, and long-term safety studies are needed.

Keywords: Quillaja saponaria, broiler, saponin, immunomodulation, gut health, antibiotic alternative

PP-47

Effect of Dietary 25-Hydroxycholecalciferol D_3 Supplementation on Productive Performance, Egg Quality, Blood Biochemistry, and Antioxidant Status in Late-Phase Laying Hens Under Controlled Environmental Conditions

Ahmed A. Saleh[1], Mohamed A. Kamal[4], Fuad Saleh[2], Abdul Rahman A. Alkhsmisi[1], Khairy Amber[1], Neamat Badawi[1], Ahmed El Hadi[3], Mohamed M. Aboud[1], Whad Fayed[2], Nihat Öztürk[2]
[1]*Department of Poultry Production, Faculty of Agriculture, Kafrelsheikh University, 333516, Kafrelsheikh, Egypt*
[2]*Devenish Nutrition Ltd, 96 Duncrue Street, Belfast, BT3 9AR, Northern Ireland*
[3]*Department of Animal Production, Faculty of Agriculture, Al-Azhar University, Assiut 71524, Egypt*
[4]*Department of Veterinary Hygiene and Management, Faculty of Veterinary Medicine, Cairo University, 11221, Giza, Egypt*

Introduction: This investigation examined how dietary 25-hydroxycholecalciferol (25-OH-D_3) supplementation influences productive performance, egg quality characteristics, plasma biochemical profiles, and hepatic antioxidative capacity in aging laying hens maintained under standardized housing conditions. One hundred forty-four ISA-brown hens (61 weeks old, 80% production rate) were individually housed in environmentally controlled facilities with regulated temperature (24-26°C) and photoperiod (14L:10D).

Objectives: Assessment of Effects of Dietary 25-Hydroxycholecalciferol Supplementation on Performance, Egg Quality, Blood Biochemistry, and Antioxidant in Late-Phase Laying Hens Under Controlled Environmental Conditions

Experimental Design and Methodology: Birds randomly allocated into three dietary treatments (n=48 per group, 12 replicates of 4 hens each) for eight-weeks experimental period. The control group received a basal diet containing 2,500 IU vitamin D_3/kg feed, treatment groups received basal vitamin D_3 level supplemented with either 1,250 or 2,500 IU of 25-OH-D_3/kg feed.

Results: Results demonstrated that 25-OH-D_3 supplementation significantly enhanced hen-day egg production and total egg mass ($p<0.05$), while feed conversion efficiency improved notably compared to controls. Although average egg weight remained unaffected, supplementation substantially reduced the incidence of cracked and shell-less eggs. Eggshell quality parameters, including shell thickness, shell percentage, and yolk pigmentation intensity, showed marked improvement with 25-OH-D_3 inclusion. Yolk compositional analysis revealed elevated vitamin D content and reduced triglyceride concentrations, while total cholesterol and lipid levels remained stable across treatments. Plasma biochemical evaluation indicated significant increases in total protein, albumin, calcium, phosphorus, and vitamin D_3 concentrations following 25-OH-D_3 supplementation. Furthermore, reproductive hormone profiles improved significantly, with elevated luteinizing and follicle-stimulating hormone levels observed in supplemented groups. Hepatic antioxidant assessment demonstrated enhanced superoxide dismutase activity alongside reduced malondialdehyde and cholesterol concentrations in plasma.

Conclusion: Findings collectively suggest that incorporating 25-OH-D_3 into layer diets under monitored environmental conditions effectively maintains performance, enhances egg quality parameters, strengthens antioxidant defense mechanisms, and optimizes reproductive hormone secretion in late-phase layers.

Keywords: 25-hydroxycholecalciferol, vitamin D_3 metabolism, egg shell quality, reproductive hormones, Oxidative stress

PP-50

Detection and differentiation of aMPV subtypes A, B, and C in chickens and turkeys using a new multiplex real-time PCR assay

Dario Zammerini, Lisa Gow, Michael Angelichio, Hayley Webber
IDEXX Laboratories, Inc.

Avian metapneumovirus (aMPV) is a highly contagious respiratory pathogen infecting various poultry species including chickens and turkeys with wild waterfowl being natural viral reservoirs. aMPV infection can result in significant economic losses due to respiratory disease, reduced egg production, and increased mortality. Dual or secondary bacterial infections can lead to elevated disease severity. Diagnosis of the AMPV is of key importance in controlling the disease at the flock level by vaccination and biosecurity measures.

This study reports on the development and validation of a multiplex RT-PCR assay for detection and differentiation of aMPV subtypes A, B, and C. In addition, this assay includes an internal sample control detecting endogenous host RNA in both chickens and turkeys designed to ensure sample quality as well as assay performance.

Performance measures of the aMPV A/B/C RT-PCR test were evaluated: exclusivity, inclusivity, analytical sensitivity (LDPCR), and diagnostic specificity and sensitivity (calculated as percentage of agreement with reference methods). Characterized field samples from chickens and turkeys were collected from multiple sources.

In-silico analysis and experimental testing of the RealPCRTM aMPV A/B/C RNA Test demonstrated high inclusivity for the individual aMPV subtype strains and lack of cross-reactivity with other avian respiratory targets. The LDPCR was estimated at 10 copies per reaction for all aMPV subtypes. Using characterized negative samples, diagnostic specificity of 100% was shown. This study showed excellent analytical and diagnostic performance of a new RT-PCR for detection of aMPV A, B, and C strains circulating in North America. These results support the use of this new multiplex RT-PCR test for routine testing of aMPV samples in veterinary diagnostic laboratories to support global needs.

Keywords: Avian metapneumovirus, aMPV, RT-PCR, respiratory disease, chicken, turkey

PP-51

Development of eight RT-PCR tests for detection of infectious bronchitis virus (IBV) types (Q1, Var2, QX, D274, 793B, GA13, Conn, and DMV1639) in chickens

Dario Zammerini, Olivia Hamilton, Lori Plourde, Roxanne Chan, Kathy Velek, Hayley Webber
IDEXX Laboratories, Inc.

Infectious bronchitis (IB) is a global and highly contagious disease in chickens caused by avian gamma coronaviruses. It can quickly spread in non-protected birds via viral shedding through the respiratory tract and feces. The outcome of the disease is dependent on the immune status of the birds, the vaccination schedule used, the pathogenicity of the IB virus strain, and secondary or co-infections such as Mycoplasma or E. Coli.

This study reports on the development and validation of eight RT-PCR tests for detection and differentiation of IBV serotypes (Q1, Var2, QX, D274, 793B, GA13, Connecticut, and DMV1639) currently circulating in North America and Europe. These new assays complement the on-market IDEXX RealPCR® pan-IBV screening assay and five IBV subtyping assays (Arkansas, Massachusetts, GA07, GA08, DE/GA98).

Performance measures of the eight RT-PCR tests were evaluated: exclusivity, inclusivity, limit of detection (LOD), and diagnostic specificity and sensitivity (calculated as percentage of agreement with reference methods). For this study, field samples and characterized samples from chickens were sourced from multiple countries.

In-silico analysis and experimental testing of the RealPCR® IBV RNA Tests demonstrated high inclusivity for the respective IBV serotype strains and lack of cross-reactivity with other avian respiratory targets and IBV serotypes. The LOD was estimated at 10 copies per reaction for all eight IBV serotypes. Diagnostic specificity for each test was 100% when tested against characterized negative avian samples. This study showed robust analytical and diagnostic performance for all eight RT-PCR assays for detection of IBV serotype strains circulating in North America and Europe. During development, emphasis was given to detection of contemporary strains of IBV. These results support the use of individual IBV RT-PCR assays for routine IBV serotyping of IBV positive samples in veterinary diagnostic laboratories.

Keywords: Infectious bronchitis, IBV, RT-PCR, respiratory disease, QX, Q1, Var2

PP-52

Effects of Low Crude Protein Diets on Heat Stress in Broilers

Esra Türel
Ankara Üniversitesi Veteriner Fakültesi Hayvan Besleme ve Beslenme Hatalıkları

Crude protein (CP) is one of the most expensive components in poultry diets and a major contributor to metabolic heat production, which becomes particularly critical under heat stress conditions. High CP diets increase the thermal load due to the elevated heat increment associated with protein metabolism, negatively affecting growth performance, welfare, and litter quality in broilers. Therefore, reducing dietary CP while maintaining amino acid (AA) balance has emerged as a nutritional strategy to mitigate these challenges. This review aims to evaluate the role of low cp diets in alleviating heat stress in broiler chickens and to highlight the nutritional strategies required to maintain performance under such conditions. This study is based on a structured review of recent literature focusing on low CP diets in broiler exposed to heat stress. Emphasis was placed on nitrogen excretion, metabolic heat production, AA balance and growth performance. Studies evaluating the supplementation of synthetic AAs, enzymes and organic acids were included. Findings indicate that reducing dietary CP decreases nitrogen extraction and metabolic heat production, leading to improved litter quality and reduced environmental impact. When diets are properly supplemented with essential AAs such as lysine, methionine, threonine and valine, growth performance and feed efficiency can be maintained under heat stress. However, imbalances in AAs, particularly glycine and serine deficiency, may limit protein synthesis and compromise performance. In conclusion, low CP diets represent an effective nutritional strategy to alleviate heat stress in broilers when precisely formulated. The success of this approach depends on optimal AA supplementation and dietary adjustments, allowing improved sustainability, animal welfare, and economic efficiency without compromising production performance.

Keywords: Low crude protein, heat stress, amino acid balance, broilers, nitrogen excretion, sustainability

PP-53

Recent update on Enterococcus cecorum in broilers and inhibitory potential of a three-strains Bacillus-based probiotic

Ayman Tolba, Dawn Reinhoudt, Kirsty Gibbs
danisco animal nutrition and health

Introduction: Enterococcus spp., particularly Enterococcus cecorum, have emerged as significant opportunistic pathogens in poultry, causing lameness, increased morbidity, and mortality in intensive production systems. Since initial reports in 2002, outbreaks have been described worldwide, and control has become increasingly challenging due to the high prevalence of antimicrobial resistance (AMR) among Enterococci. This highlights the need for effective antibiotic-independent interventions.

Objectives: Bacillus-based Probiotics may provide a useful tool in managing Enterococcus-associated disease in poultry. In a study published in 2019, Fernandez et al. described an in vitro assay to evaluate the inhibitory potential of probiotic Bacillus-strains on the growth of pathogenic E. cecorum isolates. In this assay, the inhibitory effect of the individual Bacillus-strains in Enviva® PRO was also evaluated. Enviva® PRO is a commercially available, three-strain Bacillus velezensis probiotic used in broilers to support gut health and strengthen the gut barrier.

Results: Results from the study by Fernandez et al. show that the level of inhibition varies strongly among pathogen isolates and Bacillus-strains.

Conclusion: These findings demonstrate that selected probiotic Bacillus velezensis strains exhibit robust and inhibitory activity against pathogenic E. cecorum and support their potential as a practical, antibiotic-independent strategy for mitigating enterococcal challenges. Recently, an update on the inhibition of new Enterococcus-isolates by the Bacillus-strains in Enviva® PRO, including pathogenic Enterococcus cecorum isolates recently collected from broilers across North America, Europe, and the Middle East.

Keywords: Enterococcus spp., different region isolates, AMR, Bacillus-based Probiotics, and inhibitory potential

PP-56

Effects of Breeder and Broiler Dietary L-Selenomethionine Suplementation on Hatchability, Growth Performance, Selenium Status and Antioxidant Responses

Remzi Alihafizoglu[1], Serdar Özlü[2], Özgür Öztürk[3], Tushar Kulkarni[1], Jolien Van Soest[1], Betül Küçük[3], Akın Ünal[4]
[1]*Orffa Additives*
[2]*Department of Animal Science, Faculty of Agriculture, Ankara University*
[3]*The Graduate School of Health Sciences of Ankara University*
[4]*Avitek R&D Veterinary Diagnostic Laboratory*

Introduction: This study evaluated the effects of integrated L-Selenomethionine supplementation in breeder hens and broilers on hatchability, growth performance, serum selenium status, gut microbiota composition, and the expression of inflammation- and antioxidant-related genes.

Experimental Design and Methodology: Hatching eggs were obtained from 43 wk old two breeder flocks fed diets supplemented with either L-Selenomethionine (Excential Selenium 4000; Orffa Additives) or inorganic selenium during laying period. A total of 2535 eggs were incubated in a single stage setter and hatcher under optimum conditions. At pull time, all chicks were feather sexed, weighed and placed to 48 floor pens with 32 chicks in each. The pens from each breeder flock were randomly separated into two groups and fed either L-Selenomethionine supplementation or inorganic selenium during rearing period. Hatchery performance, growth performance, carcass characteristics, serum biochemistry, antibody titers, 16S rRNA-based gut microbiome analysis, and RT-PCR assessment of inflammatory (TLR2, TLR4, IL6, IFNGF, IL1B, and NOX4) and antioxidant-related genes (GPX1, GPX4, Selenop, GPX, GSSG, SOD, and FRAP) were evaluated.

Results: Feed additive was numerically improved hatch results but it was not significant ($P>0.05$). Chicks originating from breeders fed L-Selenomethionine exhibited significantly higher body weights at 14 and 21 days of age ($P<0.05$). Serum selenium concentrations were significantly higher in supplemented groups than in controls ($P<0.001$). Carcass traits, Newcastle disease antibody titers, and gut microbiota composition were not significantly affected by feed additive ($P>0.05$). Molecular analyses revealed a tendency toward reduced expression of inflammatory genes and increased expression of antioxidant- and selenoprotein-related genes, indicating improved redox regulation and antioxidant capacity.

Conclusion: L-Selenomethionine supplementation throughout the breeder–broiler production chain enhanced hatchability, improved early growth performance, increased selenium status, and favorably modulated antioxidant and inflammatory pathways. These findings support the use of L-Selenomethionine throughout the production chain to improve chick quality, resilience, and production efficiency in broiler production systems.

Keywords: Antioxidant response, broiler, breeder hens, L-Selenomethionine, performance

PP-57

The Role of Astaxanthin in Broiler Nutrition: Effects on Health, Meat Quality, and Intestinal Microbiota

Atakan Bundur, Özge Sizmaz
Department of Animal Nutrition and Nutritional Diseases, Faculty of Veterinary Medicine, Ankara University, Ankara, Türkiye

Introduction: In intensive broiler production, heat and environmental stressors frequently induce severe oxidative stress, negatively impacting flock health, growth performance, and meat quality. Astaxanthin (AST), a keto-carotenoid predominantly derived from microalgae and yeast, is a highly potent antioxidant, anti-inflammatory, and apoptosis-regulating agent exhibiting a free radical scavenging capacity significantly superior to other commercial carotenoids.

Objectives: This review aims to comprehensively summarize the multifaceted roles of dietary AST in broiler nutrition, specifically focusing on its effects on growth performance, meat quality, antioxidant defense mechanisms, mucosal immunity, and cecal microbiota.

Experimental Design and Methodology: Current literature indicates that while AST supplementation does not always produce a dramatic alteration in baseline feed consumption or feed conversion ratios, it noticeably enhances breast and thigh meat redness and yellowness while decreasing lightness.

Results: Furthermore, AST improves the water-holding capacity of broiler meat, which effectively reduces drip loss and stabilizes postmortem pH decline. Physiologically, AST strongly mitigates lipid peroxidation by lowering tissue malondialdehyde (MDA) concentrations while simultaneously boosting Superoxide Dismutase (SOD), Catalase (CAT), and Total Antioxidant Capacity (T-AOC) levels. It also alleviates hyperthermic stress by downregulating hepatic Heat Shock Protein (HSP27, HSP70, HSP90) gene expressions, modulating lipid metabolism genes such as SREBP1, and reducing feather corticosterone. At the intestinal level, AST improves morphometry by increasing villus height and the villus-to-crypt ratio. By modulating the TLR4/MyD88 signaling pathway, AST suppresses pro-inflammatory cytokines (IL-1β, IL-6, TNF-α) and promotes anti-inflammatory IL-4 secretion. Moreover, AST minimizes intestinal permeability by upregulating tight junction proteins (ZO-1, Occludin) and favorably modulates cecal microbiota by increasing beneficial short-chain fatty acid-producing bacteria (Faecalibacterium, Lachnospiraceae) while restricting pathogenic genera.

Conclusion: In conclusion, AST holds immense potential as a functional feed additive in broiler nutrition for preserving the intestinal barrier, supporting systemic immunity, preventing oxidative damage, and enhancing end-product quality.

Keywords: Broiler nutrition, Astaxanthin, Oxidative stress, Meat quality, Intestinal health, Gut microbiota, Immunity

PP-59

Effects of a Yeast- and Bacillus-Based Synbiotic (Provilli-Max) on Growth Performance, Carcass Characteristics, Digestive Health, and Cecal Microbiology in Broilers

Manel Ben Larbi[1], Mariem Saidani[2], Wassim Hichri[3], Zied Maalaoui[4], Theresia Lavergne[5], Charlie Elrod[6]
[1]*Manel Ben Larbin, Higher School of Agriculture of Mateur, Carthage University; Tunisia*
[2]*Mariem Saidani, Higher School of Agriculture of Mateur, Carthage University; Tunisia*
[3]*Wassim Hichri, Higher School of Agriculture of Mateur, Carthage University; Tunisia*
[4]*Zied Maalaoui, Natural Biologics, Inc., Newfield, NY*
[5]*Theresia Lavergne, Natural Biologics, Inc., Newfield, NY*
[6]*Charlie Elrod, Natural Biologics, Inc., Newfield, NY*

This trial was conducted to evaluate the effects of Provilli-Max (Natural Biologics, Inc., Newfield, NY), a synbiotic combining yeast-derived components with four species of Bacillus (Bacillus amyloliquefaciens, Bacillus licheniformis, Bacillus pumilus, Bacillus subtilis), on growth performance, digestive health, carcass characteristics, and cecal microbiology of broilers.

Six hundred forty male Arbor Acres broilers were randomly allocated to two treatments: 1. Control or 2. Provilli-Max (125 g/MT), with eight replicates per treatment and 40 broilers per replicate. Body weight (BW), average daily gain (ADG), feed conversion ratio (FCR), mortality rate, carcass characteristics, digestive health, and meat and cecal microbiology were evaluated.

Broilers fed Provilli-Max (2630.50 g; 100.74 g/day) had greater ($P<0.0001$) BW at day 35 and higher ADG during the finishing phase than control fed broilers (2535.88 g; 89.00 g/day). In contrast, FCR and mortality rate were not affected by treatment.

Carcass yield was not affected by treatment. However, breast meat yield was increased for broilers fed Provilli-Max (39.31% vs. 35.62%; $p = 0.0002$), indicating a more efficient partitioning of nutrients toward muscle deposition. Carcasses from broilers fed Provilli-Max had increased water-holding capacity and reduced moisture loss during cooking and storage.

Broilers fed Provilli-Max had improved gastrointestinal tract integrity, characterized by a 27% reduction in gizzard erosion lesions. Microbiological analyses demonstrated an improved intestinal microbial balance, with increased ($P<0.03$) populations of beneficial bacteria (Lactobacillus spp.) and reduced ($P<0.01$) levels of undesirable microorganisms, including Enterobacteriaceae, Escherichia coli, Clostridium spp., and Salmonella spp.. These changes resulted in improved microbiological quality of carcasses.

Overall, this synbiotic, yeast-derived components plus four species of Bacillus, represents a promising nutritional strategy for broiler production which can result in improved growth performance, digestive health, intestinal integrity, and microbiological composition, as well as maintain optimal health status of broilers.

Keywords: Provilli-Max, Bacillus; Broilers fed, Growth Performance, Cecal Microbiology; Carcass Characteristics, Digestive Health

PP-60

Mitigating the impact of botulism in free-range layers: effects of Pediococcus acidilactici CNCM I-4622 supplementation on performance and gut health

Eray Altinbas, Serge Soler, Louise Vigier
LALLEMAND ANIMAL NUTRITION

Botulism outbreaks in laying hens can lead to severe mortality, particularly in free-range systems with increased environmental exposure. Probiotics may support gut health and improve flock resilience under such challenge conditions.

This field study aimed to evaluate the effect of Pediococcus acidilactici CNCM I-4622 (PA) supplementation on mortality, performance, and gut microbiota balance in a commercial layer farm with a history of botulism.

The study was conducted on a commercial free-range farm housing 19,000 Hy-Line Brown Rural laying hens. Since 2021, the farm has been recurrently affected by botulism, and antimicrobial treatments failed to control the disease, with mortality increasing from 4.62% in 2021 to 23.69% in 2023. Following this severe outbreak, the 2024 flock was supplemented with PA throughout the laying at 109 CFU/kg of feed, while previous flocks (2021–2023) served as controls. Zootechnical parameters included mortality, egg weight, total egg mass, eggs per hen housed, and feed conversion ratio (FCR). In 2024, fecal microbiota were analyzed at 20 and 25 weeks.

Supplementation in 2024 was associated with a marked reduction in mortality (3.66% vs 23.69% in 2023). Egg production increased from 341 to 358.6 eggs per hen housed, returning to 2021 levels. Feed efficiency improved, with FCR decreasing from 2.42 (2021–2023) to 2.38 in 2024. After 5 weeks, fecal analyses showed reduced enterobacteria and an improved Lactobacilli/E. coli ratio, indicating better microbial balance.

Supplementation with PA under field conditions was associated with improved survival, performance recovery, and enhanced gut microbiota balance in a flock previously exposed to botulism. These results support the role of probiotics as a preventive strategy to strengthen intestinal health and resilience in free-range laying hens.

Keywords: Probiotic, botulism, laying hens, performance, mortality

PP-61

Gut health modulation improves femoral head integrity during coccidiosis challenge

Eray Altinbas, Eric Chevaux, Louise Vigier, Audrey Sacy
LALLEMAND ANIMAL NUTRITION

Lameness represents a major welfare and economic concern in modern poultry production, with increasing evidence linking locomotor disorders to impaired gut health. Intestinal dysbiosis and barrier dysfunction may promote systemic inflammation and bacterial translocation, thereby contributing to skeletal lesions such as femoral head necrosis. Coccidiosis is a key predisposing factor, as it disrupts intestinal integrity and exacerbates gut health fragility. This study aimed to evaluate the effect of yeast cell wall (YCW) supplementation on gut health and femoral head integrity in broilers under coccidiosis challenge.

A total of 260 ROSS 308 female broilers were allocated to three treatments: a non-supplemented control group, YCW1, and YCW2 (OPTIWALL) both at 2 kg/t. Birds were reared in 20 floor pens and subjected to a coccidiosis challenge at day 35. Performance and litter quality were evaluated before the challenge, and femoral head integrity (D42) on 20 birds.

Overall, performance remained high across all groups, with no significant differences. However, YCW supplementation numerically improved performance indicators, with reduced mortality (6.4% in control vs. 5.5% and 3.3% in YCW1 and YCW2, respectively), improved feed conversion ratio (1.709 vs. 1.663), and increased European Production Efficiency Factor (313.6 vs. 332.3 and 333.5).

Litter quality was markedly improved with YCW, with a shift from 100% degraded litter (score 3) in challenged controls to 66% for YCW1 and only 33% degraded litter for YCW2, potentially reflecting a better gut health. In parallel, femoral head integrity was enhanced, with reduced incidence of necrosis prevalence observed for both YCW birds compared to controls inoculated.These observations support the hypothesis of reduced bacterial translocation, potentially involving Enterococcus cecorum, through improved intestinal barrier function.

In conclusion, YCW supplementation, particularly OPTIWALL, contributes to the maintenance of gut integrity and microbial homeostasis, supporting its relevance as a strategy to mitigate leaky gut-associated disorders in broilers.

Keywords: coccidiosis, femoral head necrosis, yeast cell wall, performance, litter quality

PP-62

Sustainable Management and Evaluation of Poultry Litter

Gamzenur Berber Yıldırım[1], Gamzenur Berber Yıldırım[2], Ali Çalık[1]
[1]*Ankara University, Faculty of Veterinary Medicine, Department of Animal Nutrition and Nutritional Diseases, 06110, Ankara, Türkiye*
[2]*Graduate School of Health Sciences, Ankara University, Ankara, Turkey*

Litter quality in poultry production systems is directly linked to animal health, nutritional performance, and production efficiency. Considering these factors, the selection of litter material represents a crucial component of sustainable animal production. An appropriate litter material absorbs moisture, thereby limiting pathogen proliferation and ammonia accumulation. The type of material exerts a direct impact on production performance, product quality, animal welfare, and environmental management. In poultry farming, plant-based residues such as straw, wood shavings, rice hulls, and corn cobs are traditionally utilized. However, in recent years, disruptions in the supply of these litters, economic issues, declines in quality standards, and reductions in production quantities have adversely affected the sustainability of litter materials.

This review study comparatively evaluates the advantages and constraints of mineral-based materials such as sand and gypsum, wood derivatives like sawdust and wood shavings, agricultural by-products such as rice hulls and corn cobs, and recycled materials. Furthermore, the review addresses the environmental pollution, eutrophication, and public health risks associated with the uncontrolled land application of untreated litters, which contain high levels of nutrients (N, P, K), pathogens, and heavy metals at the end of the production cycle. To minimize the threats posed by traditional methods, the significance of modern management strategies is highlighted, ranging from biological stabilization processes like composting for bio-fertilizer production to energy recovery technologies such as gasification. In conclusion, proper litter management not only enhances in-barn performance and animal welfare but also ensures the sustainability of the poultry sector by contributing to the economic cycle.

Keywords: animal welfare, alternative materials, poultry litter, sustainability, waste management

PP-67

Molecular identification of IBDV outbreaks in some Egyptian Broilers farms (2023–2026): Across Different Vaccination Programs

Hesham Sultan[1], Shaimaa Talaat[1], Mahmoud Moawad[2], Asmaa Shaaban[2], Shereen Said[3], Karim Selim[4]
[1]*Department of Birds and Rabbits Medicine, Faculty of Veterinary Medicine, University of Sadat City, Menoufia 32958, Egypt*
[2]*Reference Laboratory for Quality Control on Poultry Production, Animal Health Research Institute, Agriculture Research Center, Giza*
[3]*El Watania Poultry Company.*
[4]*Zoetis Middle East operation Egypt*

Introduction: Infectious bursal disease (IBD) remains a major immunosuppressive threat to poultry, with diverse serotype 1 lineages circulating despite vaccination. In Egypt, very virulent IBDV (vvIBDV) has persisted since the late 1980s, and the emergence of novel variant IBDV (nvIBDV) underscores the need for genomics-guided surveillance to assess vaccine fit and detect reassortment or antigenic drift. To characterize currently circulating IBDV, we surveyed broiler flocks under different vaccination programs across multiple governorates.

Methods: Between January 2023 and January 2026, 80 bursal samples were collected from suspected IBD outbreaks in broiler flocks aged 16–32 days across four Egyptian governorates (Beheira, Menoufia, Giza, and Dakahlia). Samples were imprinted onto FTA™ cards and processed at Genovo GmbH for typing and sequencing. Vaccination histories included HVT-IBD vector vaccines, immune-complex (ICX) vaccines, and/or live vaccines administered as boosters or post-vector doses.

Results: Twenty-five of 80 samples (29%) (31.2%) tested IBDV-positive. PCR typing identified A1, A3, and A2 field genotypes among positives. A1 detections were more frequent in ICX-vaccinated flocks, whereas A2 predominated in HVT-IBD vector programs and in a subset of ICX programs. Both genotypes were detected across governorates, with mixed patterns at the governorate level. VP2 and VP1 phylogenetic analyses of field strains supported the concurrent circulation of A2 lineages.

Conclusion: IBDV continues to circulate in Egyptian broiler operations despite diverse vaccination strategies. A2 genotypes were identified in 100% of vector-vaccinated farms and in 44% of ICX-program–vaccinated farms across governorates, a pattern consistent with early bursal occupancy by the vaccinal strain prior to potential nvIBDV challenge. These findings highlight the importance of ongoing genomic surveillance to guide vaccine selection and optimize field protection.

Keywords: Infectious Bursal disease, nvIBD, Immune complex vaccine, Vector HVT-IBD, Bursal colonization

PP-68

Mapping Vertical Transmission in Commercial Poultry: Molecular Surveillance of Reovirus, CAV, and FAdV in Broiler Breeder Systems (2025–2026)

Karim Selim, Mohamed Fawzy, Ahmed Mohyeldin, El Sayed Yehia
Zoetis Middle East Operation

Background: Vertical transmission of immunosuppressive viruses from broiler breeders to progeny can compromise flock health, vaccine take, and overall performance. To assess this risk in commercial production, we conducted PCR-based surveillance during 2025–2026 targeting three key vertically transmitted viruses, Reovirus (Reo), Chicken anemia virus (CAV), and Fowl adenovirus (FAdV) across multiple breeds and governorates in integrated broiler breeders' systems.

Methods: We performed 110 diagnostic PCR assays on field samples collected from breeder–broiler integrations: 73 assays targeted Reo and/or CAV, and 37 targeted FAdV. PCR-positive samples were subsequently sequenced for molecular characterization and preliminary genogroup/serotype assignment. Sequencing was conducted at Genovo (Reo) and at the Animal Health Research Institute (AHRI) for CAV and FAdV to support lineage and serotype comparisons.

Results: Eleven distinct sources tested positive for Reo and 34 for CAV, with most detections occurring in 2025. Fifteen samples were positive for FAdV. Sequence analysis indicated genetic diversity among detected strains. For Reo, two samples were clustered within GCVI and one within GCII. For CAV, five sequenced samples grouped within the GGII genogroup. For FAdV, two samples aligned with serotype 8a, and five aligned with serotypes 11 and 2. These findings point to concurrent circulation of multiple immunosuppressive agents and diverse viral lineages within the breeder–broiler supply chain.

Conclusions: Detection of Reo, CAV, and FAdV across multiple sources with molecular evidence of varied genogroups and serotypes highlights. These results showed the importance of strengthened breeder follow-up, including routine serological monitoring and critical role of biosecurity.

Keywords: Reovirus, Chicken anemia virus, Fowl adenovirus, Vertical transmission, Immunosuppression

PP-71

Cross-Neutralization Analysis of Avian Orthoreovirus classical and mutant Genogroups Using Monovalent Inactivated Vaccines in SPF Chickens

Wael Elfeil[1], Hanan Abbdien[1], Eslam Arafa[1], Mohamed Zain El Abideen[2], Amro Hashish[3], Mona Abdallah[1]
[1]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*
[2]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt*
[3]*Department of Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA 50011, USA*

Introduction: The antigenic diversity of avian orthoreovirus (ARV) limits the effectiveness of monovalent vaccines and necessitates the development of broadly protective vaccination strategies.

Objectives: demonstrated the cross-neutralization between different reovirus genogroups and compared the immunogenicity and cross-protective potential of a multigenotype inactivated ARV vaccine with monovalent vaccines in specific pathogen-free (SPF) chickens.

Experimental Design and Methodology: A total of 90 birds were randomly assigned to five groups (n = 18/group). Groups 1–3 received monovalent inactivated vaccines derived from S1133 (GC1), GC4, or GC5 strains, respectively. Group 4 received a multigenotype inactivated vaccine containing S1133, GC2, GC4, and GC5 strains. Group 5 served as an unvaccinated control. All vaccinated groups were immunized at 2 and 6 weeks of age using a prime–boost regimen. Serum samples were collected at 0, 6, and 10 weeks of age and evaluated using ELISA and serum neutralization tests (SNT) against a panel of ARV strains, including classical GC1, variant GC1, GC2, GC4, and GC5.

Results: All vaccinated groups showed strong humoral responses, with ELISA geometric mean titers ranging from 2800 to 4600 after the booster shot. Monovalent vaccines induced strong homologous neutralizing responses (7–11 $\log_2$) but showed no detectable cross-neutralization against heterologous strains. In contrast, the multigenotype vaccine elicited neutralizing antibodies against all included genotypes (GC1, GC2, GC4, and GC5).

Conclusion: These findings demonstrate that while monovalent ARV vaccines provide strong strain-specific immunity, they fail to confer cross-protection against heterologous genogroups. The multigenotype vaccine broadens the immune response and partially addresses antigenic diversity, though complete cross-protection remains limited. This highlights the importance of incorporating multiple circulating genotypes into vaccine formulations and supports the need for continuous surveillance and periodic vaccine updates to optimize ARV control strategies.

Keywords: Avian orthoreovirus (ARV), Reovirus Genogroup diversity, Cross-neutralization, Multigenotype vaccine, monovalent vaccines, Reovirus Vaccine efficacy

PP-72

Comparative Pathogenicity of Avian Orthoreovirus Genotypes GC4 and GC5 in SPF Chickens

Ahmed Sedeek[1], Hanan Abdien[2], Mona Abdallah[2], Eslam Arafa[3], Amro Hashish[4], Wael Elfeil[1]
[1]*Animal Health Research Institute (AHRI), Agriculture Research Center (ARC), Giza, Egypt*
[2]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, 41522, Egypt*
[3]*MEVAC for Vaccines*
[4]*Department of Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA 50011, USA.*

Introduction: Avian orthoreovirus (ARV) infections cause significant economic losses in poultry production, primarily due to viral arthritis and tenosynovitis. In Egypt, several ARV genotypes are currently circulating, with genotype clusters 4 (GC4) and 5 (GC5) being among the most prevalent; however, comparative data on their pathogenicity are limited.

Objectives: The present study aimed to compare the pathogenic profiles of these two genotypes in specific pathogen-free (SPF) chickens under controlled experimental conditions. Experimental Design and Methodology: A total of 54 SPF chickens were randomly allocated into three groups (A, B, and C; n = 18/group) and housed in separate isolation units. At 10 weeks of age, chickens in groups A and B were experimentally inoculated via the right footpad with 4.5 $\log_{10}$ $TCID_{50}$ of ARV strains belonging to GC4 and GC5, respectively (GenBank accession numbers OQ675707 and OQ675709). Group C served as a negative control and received sterile phosphate-buffered saline using the same inoculation route.

Results: Birds were observed three times daily for clinical signs for up to 10 days post-infection (DPI). Clinical manifestations were first detected at 3 DPI and included marked inflammation, skin reddening, and pronounced swelling of the inoculated footpad, reaching a maximum clinical score of 4. Chickens infected with GC5 consistently exhibited more severe clinical signs and greater footpad swelling compared with those infected with GC4. In contrast, postmortem examination revealed that GC4-infected birds developed more severe pathological lesions, including tendon rupture and hemorrhages. No clinical or pathological abnormalities were observed in the control group.

Conclusion: These findings demonstrate clear differences in the pathogenic behavior of circulating ARV genotypes and highlight genotype-specific variation in clinical and pathological outcomes. The results emphasize the importance of incorporating genotype-specific pathogenicity data into ARV surveillance programs and of developing effective control and prevention strategies.

Keywords: Avian orthoreovirus (ARV), genotype-specific pathogenicity, Reovirus GC4, Reovirus GC5, viral arthritis, tenosynovitis

PP-73

Prevalence and Molecular Characterization of Chicken Astrovirus (CAstV) in Commercial Broiler Flocks in Egypt

Mohamed Elsayed[1], Mohamed Zain El Abideen[2], Walid Kilany[2], Dalia Mansour[1], Mona Abdallah[1], Sherif Gaber[3], Wael Elfeil[1]

[1]Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt
[2]Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt
[3]MEVAC for Vaccines

Introduction: Chicken astrovirus (CAstV) has emerged as an important enteric pathogen in poultry, associated with enteritis, growth retardation, white chick syndrome, and economic losses in broiler production.

Objectives: his study investigated the prevalence and pathological features of CAstV infection in commercial broiler flocks in Egypt during 2025–2026.

Experimental Design and Methodology: Day-old broiler chicks (1–2 days of age) were sampled from multiple governorates, including Ismailia, Sharqia, Menoufia, and Behira. Affected chicks exhibited typical clinical signs, including weakness, depression, reduced activity, uneven growth, low body weight, and a characteristic white-chick appearance. Postmortem examination revealed unabsorbed yolk sacs, watery intestines, enlarged pale livers, and renal lesions. Viral RNA was extracted from intestinal contents, liver and kidney tissues, and cloacal swabs, followed by conventional PCR targeting the ORF1b gene encoding the RNA-dependent RNA polymerase.

Results: Overall, 37% of the examined samples tested positive for CAstV, indicating a relatively high prevalence in affected broiler flocks. Molecular characterization based on ORF1b sequencing demonstrated that Egyptian isolates shared 93% nucleotide identity with a United Kingdom reference strain, suggesting close genetic relatedness and possible regional viral circulation. These findings are consistent with the recognized global distribution and genetic diversity of CAstV, which significantly impact poultry health and productivity. The detected clinical and pathological findings further support the role of CAstV in hatchery-associated disorders, including white chick syndrome and runting–stunting syndrome.

Conclusion: CAstV emerged in Egypt and began spreading among breeders, broilers, and their progeny, and represents a significant contributor to early-life performance issues in broiler flocks in Egypt.

Keywords: Chicken astrovirus (CAstV), White chick syndrome, Runting-stunting syndrome, Broiler chickens, avian nephritis virus (ANV)

PP-74

Protective Efficacy of a Trivalent Inactivated H5 Vaccine Against Early and Standard Challenge with HPAI H5N1 Clade 2.3.4.4b in SPF and Commercial Broiler Chickens

Shaimaa Talaat[1], Mohamed Zain El Abideen[2], Sherif Gaber[3], Wael Kamel[4], Ahmed Sedeek[2], Wael Elfeil[4], Hesham Sultan[1]

[1]*Birds and Rabbits Medicine department, Faculty of veterinary Medicine University of Sadat city, Menoufia, Egypt*
[2]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt*
[3]*MEVAC for Vaccines*
[4]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*

Introduction: Highly pathogenic avian influenza viruses (HPAIVs) of the H5 lineage have continued to evolve and spread globally since their emergence in 1996. In recent years, clade 2.3.4.4b H5N1 viruses have circulated widely, including in the Middle East and Egypt, and additional mutations have been detected in 2025–2026. Vaccination remains a cornerstone for controlling clinical disease, mortality, and virus shedding in endemic areas.

Objectives: This study evaluated the efficacy of newly developed trivalent whole inactivated H5-based vaccines against contemporary H5N1 viruses (clade 2.3.4.4b/2026) in specific pathogen-free (SPF) chickens and commercial broiler chickens with maternally derived antibodies (MDA), using early (3-weeks post-vaccination; 3-WPV) and standard (4-WPV) challenge models and evaluating the effect of MDA on protection level.

Experimental Design and Methodology: Ten experimental groups (n=15/group) were established: five SPF groups and five commercial broiler groups derived from vaccinated breeders. Birds were vaccinated at 7-days of age via intramuscular injection with a trivalent H5+ND inactivated vaccine. Control groups included non-vaccinated/non-challenged birds and non-vaccinated challenged controls at both challenge time points. Serological responses were monitored weekly by hemagglutination inhibition assay, and virus shedding was assessed post-challenge.

Results: SPF birds developed strong humoral immunity, reaching mean titers of >5, 7, and 9$\log_2$ at 2-, 3-, and 4-WPV, respectively, whereas commercial broilers showed lower titers (3, 5, and 6$\log_2$), consistent with MDA interference. Following the early challenge (3-WPV), vaccinated SPF and commercial broiler birds achieved 94% and 87% protection, respectively, while all non-vaccinated challenged birds died within 4–6 days post-challenge. At 4-WPV, protection increased to 100% in SPF chickens and 94% in commercial broilers; non-vaccinated controls again showed 100% mortality.

Conclusion: homologous trivalent inactivated H5 vaccination effectively protects chickens against contemporary H5N1 clade 2.3.4.4b viruses, although maternal immunity reduced protection by approximately 6–7%, indicating the need for optimized early vaccination strategies in broilers.

Keywords: Highly pathogenic avian influenza (HPAI), H5N1 Clade 2.3.4.4b, Inactivated vaccine, Vaccine efficacy, Maternal-derived antibodies

PP-75

Surveillance of HPAI H5 Viruses in Egypt (2025-2026) Reveals Ongoing Antigenic Drift and Informs Vaccine Strain Selection

Ibrahim Ali[1], Hanan Abdien[1], Walid Kilany[2], Mohamed Ali[3], Ahmed Qandil[3], Wael Elfeil[1]
[1]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*
[2]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt*
[3]*Mevac For Vaccines*

Introduction: Highly pathogenic avian influenza (HPAI) H5 viruses remain a serious global threat to poultry production due to rapid evolution, genetic reassortment, and antigenic drift that undermines vaccine efficacy, and Egypt has been an endemic HPAI hotspot since 2006, with co-circulating H5N1 and H5N8 viruses of the goose/Guangdong lineage.

Objectives: This study aimed to surveil and characterize contemporary H5 viruses circulating in Egyptian poultry during 2026 to inform vaccine strain selection and control strategies.

Experimental Design and Methodology: A total of 47 tracheal swabs and tissue samples were collected from broiler, breeder, and layer chicken farms across several Egyptian governorates with suspected HPAI outbreaks and screened by real-time RT-PCR targeting influenza A matrix and H5 subtype genes, followed by virus isolation in specific-pathogen-free embryonated chicken eggs and antigenic characterization using hemagglutination inhibition (HI) assays with hyperimmune antisera from different H5 clades.

Results: Most samples were positive for matrix and H5 genes, with cycle threshold values ranging from 15 to 34; infectious H5 viruses were recovered from the majority of PCR-positive specimens; and HI assays showed stronger cross-reactivity of 2026 field isolates with antisera to clade 2.3.4.4b H5N8 viruses than with older H5N1 antisera, indicating ongoing antigenic drift.

Conclusion: These findings confirm the continued circulation and antigenic evolution of H5 HPAI in Egyptian poultry, demonstrate the value of integrated molecular, virological, and serological surveillance, and underscore the need to update the composition of H5 vaccine strains and refine control strategies to improve protection against evolving H5 viruses in endemic settings.

Keywords: HPAI H5, surveillance, antigenic drift, cross-reactivity, Hemagglutination inhibition, Vaccine strain selection

PP-76

Beyond Protection: Immunomodulation and Vaccine-Seed Matching Outline Shield against Genotype VII Newcastle Disease Virus

Mohamed Abaza[1], Norhan Khalil[1], Marwa Abdelhalim[1], Samier Nassef[2], Nermeen Marden[2], Dalia Omar[2], Nermin Monir[2], Heba Abdel Aziz[2], Ahlam Mourad[2], Esraa Fouad[2], Lamiaa Omar[2], Ahmed Sedeek[3], Ahmed Elkady[4], Wael Elfeil[5]

[1]*Department of Avian and Rabbit Diseases, Faculty of Veterinary Medicine, Benha University, Benha, Egypt.*
[2]*Central Laboratory for Evaluation of Veterinary Biologics (CLEVB), Abbassia, Cairo, Egypt*
[3]*Reference Laboratory for Veterinary Quality Control on Poultry Production (RLQP), Animal Health Research Institute (AHRI), Agricultural Research Center (ARC), Giza, Egypt*
[4]*MEVAC for vaccines*
[5]*Avian and Rabbit Medicine Department, Faculty of Veterinary Medicine, Suez Canal University, Ismailia, Egypt*

Introduction: Newcastle disease (ND) poses a significant challenge to the entire poultry industry, especially in regions where genotype-VII viruses circulate despite the routine use of classical vaccines. vaccination with classical genotype-II (LaSota) vaccines.

Objectives: Assess the immunomodulatory effect of adding an Immune Modulator Complex (IMC) to inactivated ND vaccines in specific-pathogen-free (SPF) chicks in comparison with the protective efficacy of a genotype-VII-homologous vaccine seed against a genotype-VII ND challenge virus.

Experimental Design and Methodology: Two experiments were conducted. In the first, SPF chicks were vaccinated with inactivated NDV alone or in combination with IMC at graded concentrations, and immune responses were measured by RT-qPCR for IFN-γ, IL-2, IL-4, and IL-6 gene expression, with 28S rRNA as the reference gene, before and after vaccination. In the second, chicks were immunized with inactivated ND vaccines prepared from a recent genotype-VII seed (ND-24), an older genotype-VII seed (ND-11), or a classical genotype-II (LaSota) seed, each with or without IMC, then challenged with a 2024 genotype-VII NDV isolate in biosafety level 3 chick isolators.

Results: The strongest responses were observed with IMC concentration 3, where IFN-γ, IL2, IL4, and IL6 were all increased compared with vaccine alone. This immune stimulation can enhance broader immune activation, including T-cell activation, the Th2 pathway, and inflammatory pathways. In the efficacy experiment, IMC significantly enhanced HI antibody responses in different vaccine strains and increased survival rates in heterologous groups. However, vaccine-seed homology was the significant factor: ND-24 provided 100% survival with or without IMC and showed the greatest reduction in viral shedding, whereas ND-11 vaccinated birds showed intermediate protection, and the LaSota-based vaccine showed the lowest protection.

Conclusion: IMC can boost immune responses, but ideal control of genotype-VII NDV requires both immunomodulatory support and a recent homologous vaccine seed.

Keywords: Newcastle disease, Immune Modulator Complex (IMC), Genotype VII, homologous vaccine-seed, challenge, and protection

PP-78

Sustainable Mycoplasma Control in multi-age farms

Robin Rahul Achari
Bioproperties Australasia Pty Ltd

Mycoplasma infections remain a major constraint in multiage poultry farms due to continuous pathogen circulation between age groups and the persistence of environmental contamination. Effective control requires an integrated strategy that combines high-quality vaccination programs, strategic antimicrobial use, enhanced biosecurity, and sound management practices. Key elements of Mycoplasma gallisepticum (MG) and Mycoplasma synoviae (MS) control in multiage systems, emphasises the importance of robust monitoring through serology and molecular diagnostics to detect subclinical infections and vaccine failures. Critical control points include minimizing lateral spread via staff, equipment, and live bird movements, optimizing all aspects of hatchery and breeder management, and reducing stressors such as poor ventilation, high stocking density, and concurrent respiratory or immunosuppressive pathogens that exacerbate clinical disease and production losses.

At the immunological level, protection depends on coordinated B- and T-cell responses: B cells generate mucosal and systemic antibodies that block colonization and reduce shedding, while $CD4^+$ and $CD8^+$ T cells provide help for high-affinity antibody production, activate phagocytes, and clear infected respiratory epithelial cells. In this context, live attenuated vaccines are ideal because they replicate locally in the respiratory tract, more closely mimic natural infection, and therefore induce stronger and longer-lasting mucosal IgA responses, systemic antibody, and tissue-resident T-cell memory, leading to greater reductions in colonization and horizontal transmission within multiage complexes.

The paper intends to highlight the limitations of antibiotic therapy, including resistance development, supporting its use primarily as a targeted, short-term adjunct to vaccination and biosecurity rather than a standalone solution. Sustainable Mycoplasma control in multiage farms ultimately depends on long-term planning that integrates flock scheduling, compartmentalization of age groups, and rigorous bio-exclusion policies, transforming chronically infected farms into stable, low-prevalence systems while maintaining economic viability.

Keywords: Mycoplsama gallisepticum, mycoplasma synoviae, AMR, immune-response, biosecurity

PP-80

Organoid-on-Chip approach to Model Eimeria tenella Infection in the Chicken Intestine

Kevork Apkar Kevork Kevorkian, Damer P Blake, Virginia Marugan-Hernandez, Dirk Werling, Kelsilandia Aguiar Martins
Department of Pathobiology and Population Sciences, Royal Veterinary College, London, Hatfield, Hertfordshire, AL9 7TA, UK

Coccidiosis, caused by Eimeria species, is one of the most economically significant diseases affecting the poultry industry, with global annual losses amounting to billions of dollars due to prevention and treatment costs, reduced feed efficiency, impaired production performance, and secondary infections. Eimeria tenella is among the most prevalent and pathogenic species infecting domestic chickens. Although several in vitro culture approaches have been investigated to support the complete life cycle of E. tenella, none have successfully replicated productive parasite development, resulting in continued dependence on animal propagation. Recent advances in intestinal organoid technology offer new opportunities to develop physiologically relevant in vitro models for studying host–pathogen interactions while supporting the replacement, reduction, and refinement (3Rs) of animal use in research. When integrated with microfluidic organ-on-chip (OoC) technology, intestinal organoids can more closely mimic the architecture and function of the native gut compared with conventional culture systems. Therefore, in this study we aimed to construct a model in vitro for developing chicken enteroids using an OoC system. Enteroids were generated from intestinal crypts isolated from the small intestine of 5-week-old Lohmann Valo chickens and cultured in IntestiCult Organoid Growth Medium. Initial infection studies compared parasite invasion in apical-in, apical-out enteroids, and enteroids cultured within the OoC platform. Although sporozoites successfully invaded both enteroid polarities, apical-out enteroids exhibited a greater parasite invasion 24 hours post-infection. A similar increase in invasion was observed when enteroids growing as apical-out were cultured in the OoC system. Ongoing studies are evaluating whether this platform supports subsequent parasite development and oocyst production, with the aim of establishing a robust in vitro model for E. tenella research and reducing dependence on animal-based parasite propagation.

Keywords: Coccidiosis, Eimeria, Enteroids, Organoids, Organ-on-chip

PP-81

In Vitro Effects of a Liquid Herbal Product on Selected Bacterial Isolates, Eimeria Oocysts and Intestinal Microbiota

Harun Kuloğlu, Tufan Biter, Cantuğ Çağlıcan
Nutrivet İç ve Dış Ticaret A.Ş., İzmir, Türkiye

Objective: This study aimed to evaluate the antibacterial effect of a commercial liquid herbal product against selected bacterial isolates and its anticoccidial effect on the oocysts of Eimeria species, the causative agents of coccidiosis, under in vitro conditions, together with its modifying effect on the intestinal microbiota following administration in drinking water.

Materials-Methods: As the recommended dose of the product (ATEX®, Nutrivet) is 500 mL per tonne of drinking water (1/2000), the antibacterial and anticoccidial in vitro tests were performed at dilution ratios of 1/1000, 1/2000 and 1/4000. A total of eight isolates belonging to Aeromonas spp., Escherichia coli, Staphylococcus aureus and Salmonella Enteritidis were used in the antibacterial tests, whereas Eimeria acervulina, E. maxima and E. tenella were used in the anticoccidial tests. Bacterial counts (CFU/mL) and microscopic counts of Eimeria oocysts were performed at 0, 6 and 24 h. To determine changes in the intestinal microbiota, faecal samples collected before and after treatment from broilers given the product in drinking water at a ratio of 1/2000 were used. Microbiota data were evaluated by 16S rRNA gene sequencing.

Results: At 24 h, bacterial counts in all isolates studied in the 1/1000 group were below 10 CFU/mL. At the same time point, bacterial counts ranged from 17 to 63 CFU/mL in the 1/2000 group and from 480 to 1500 CFU/mL in the 1/4000 group. Eimeria oocyst counts differed according to species and dilution ratio: at 24 h, the counts recorded for E. acervulina, E. maxima and E. tenella were 300, 200 and 300 in the control group and 200, 100 and 150 in the 1/2000 group, respectively. In the microbiota analysis, the relative abundance of Lactobacillus increased from 22.4% at the initial measurement to 29.8% at the final measurement, whereas Escherichia/Shigella decreased from 9.1% to 2.1%, Klebsiella from 3.4% to 0.6% and Campylobacter from 2.7% to 0.4%.

Conclusion: Under in vitro conditions, the product reduced bacterial counts at all dilutions tested, most markedly at 1/1000, whereas oocyst counts at the 1/2000 dilution were lower than those of the control group. The microbiota shifted in favour of beneficial bacteria. The study is descriptive in nature; no statistical analysis was performed.

Keywords: ATEX, antibacterial activity, broiler, Eimeria, intestinal microbiota, 16S rRNA

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Refining inactivation parameters in H9N2 inactivated vaccine development: balancing antigenicity and shedding control

Mahmoud Samir[1], Tamer Elsharaawy[2], Mostafa Elesawy[3], Yasser El Hussieny[3], Ahmed Rizk[3], Mohamed Elsayed[3], Ayman El Deeb[4], Ayman El Deeb[5]

[1]*Reference Laboratory for Veterinary Quality Control on Poultry Production, Animal Health Research Institute, Agriculture Research Center (ARC), Giza, Egypt*

[2]*WHO Regional Reference lab for Diagnosis of Poliovirus and Enteroviruses, VACSERA Dokki, Giza, Egypt*

[3]*NOVA Pharma veterinary pharmaceutical and vaccines, Sadat City, Egypt*

[4]*Faculty of Veterinary Medicine, King Salman International University, South Sinai, Egypt*

[5]*Department of Virology, Faculty of Veterinary Medicine, Cairo University, Giza, Egypt*

Introduction: Formalin (FA) inactivation is widely applied in avian influenza and other poultry vaccines. While its effect on antigenicity has been studied, the influence of FA concentration and inactivation temperature on protective efficacy and viral shedding remains insufficiently characterized. Optimizing these parameters is essential to balance antigen preservation with effective control of post challenge shedding.

Objective: This study aimed to determine the impact of FA concentration and inactivation temperature on both antigenicity, measured by hemagglutination inhibition (HI) titers and protective efficacy, assessed by tracheal shedding following H9N2 challenge.

Experimental Design and Methodology: FA concentration study: Two concentrations (0.2% vs 0.3%) applied at 25 °C for 24 hours. Temperature study: Inactivation with 0.1% FA at 37 °C for 24 hours versus 0.2% FA at 25 °C for 24 hours. Assessment: HI titers were measured post vaccination. Tracheal shedding was quantified by cycle threshold (Ct) values and converted to equivalent EID50 at 3 and 7 days post challenge.

Results: FA concentration: HI titers favored 0.2% FA. By day 7 post challenge, tracheal shedding was absent in the 0.2% group, while the 0.3% group showed residual shedding (Ct 33; ~10^2.15 EID50).
Temperature: Complete inactivation was achieved with 0.1% FA at 37 °C and 0.2% FA at 25 °C. HI titers were comparable, but shedding reduction was superior at 25 °C. At day 3 post challenge, Ct values indicated lower viral load in the 25 °C group (Ct 30.75; ~10^2.9 EID50) compared to the 37 °C group (Ct 24.7; ~10^4.75 EID50).

Conclusion: Lower FA concentration (0.2%) and reduced inactivation temperature (25 °C) preserved antigenicity and enhanced shedding control. These findings highlight the importance of fine-tuning inactivation parameters to optimize H9N2 vaccine performance and strengthen control strategies in poultry production.

Keywords: Antigenicity, Formalin, H9N2, Inactivation, Shedding, Vaccine, Viral load