

Phibro Seminar on antioccidial program

On May 16, 2023, Phibro Animal Health Corporation held a one-day seminar on its anticoccidial strategies and to introduce new products that could assist the poultry industry in antimicrobial use reduction, respectively mitigate antimicrobial resistance (AMR).

Dr Georgina Inwood, Veterinary Technical Manager for Phibro Australia, welcomed an impressive number of key industry identities and introduced Dr Vasil Stanev, the Director of Global Technical Services for poultry nutrition and health.

Dr Stanev is a veterinarian by profession and holds a Masters of Business Administration. His extensive training includes poultry nutrition, least cost feed formulation, feed technology, poultry pathology and health management, pharmacovigilance, business strategies and management.

Dr Stanev has worked at Zoetis, where he handled poultry intestinal health and the in-feed business as the Technical Manager in Europe, the Middle East and Africa.

He has worked as a Poultry Group Director for four years in the Scandinavian poultry feed and premix business.

Currently, his office address is in Belgium and today works for Phibro, a leading US based corporate animal health – truly a global citizen!

His first presentation was ‘Five major points for the implementation of an anticoccidial program’.

“Coccidiosis ranks at number two in importance for broiler research priorities by the American Association of Avian Pathologists (AAAP) according to a 2019 survey of American Broiler Veterinarian practitioners,” Dr Stanev stated in introducing his presentation.

“It is an omnipresent protozoal disease that results in damage to the intestinal epithelium causing inflammation and secondary infection. This leads to diarrhea, dehydration and increased mortality.

“A reduced area of absorption contributes to reduced daily weight gain and increased FCR.”

“Clinical coccidiosis can result in mortality rates typically 1 to 2 % but can be as high as 5 to 15%. Typical post-mortem findings are blood in the ceca.

“More important and more challenging is sub-clinical coccidiosis which may lead to a drop in performance and slight diarrhea. For this, dedicated lesion scoring on an integra-



Dr Vasil Stanev, the Director of Global Technical Services for poultry nutrition and health at Phibro.

tion production level and trend analysis is needed.”

“Economic losses due to clinical infections are estimated at 20% with 80% from sub clinical ones. Prevention cost is a fraction of the financial penalty of coccidiosis production challenges.

“Coccidiosis is a ubiquitous protozoal disease and Eimeria spp. are well adapted to the host. Sporulated oocysts are very robust in the external environment so it’s not feasible for eradication but requires careful management.”

“The cost of coccidiosis globally is estimated (Blake et al 2020) to be \$0.22 per bird or \$14 billion+ (£10.4 billion at 2016 prices) in annual production,” Dr Stanev revealed.

“Non-specific tools in an overall coccidiosis management program start with removing stress and keeping infection levels low. It’s important to pay attention to husbandry and have appropriate farm infrastructure and sewage to enable good and thorough cleaning of the farm.

Maintaining dry litter is a paramount in coccidiosis control, managing condensation with adequate ventilation and well-maintained feeder and drinker lines is also important.

“Good cleaning and disinfection are vital, as is taking care over stocking density levels – all measures that reduce bird stress.

“Improve non-specific host defence systems to optimise general immunity

and reduce enteritis risk,” Dr Stanev said.

“Balanced diets containing low protein levels with amino acids (L-theonine and L-arginine), appropriate fibre levels and NSP enzymes.

“Include vitamins A, E, D3, niacin and trace minerals Zn and Se and essential fatty acids, as well as betain” he suggested.

“Consider immunomodulating feed additives like phytogenics, nucleotides, beta glucans etc.

“Manage immunosuppressive (MD, IBD, Reo, Adeno etc.) and concurrent (Necrotic enteritis) diseases.

Although the positive effect of all those nonspecific tools coccidiosis control is not sufficient without the use of specific tools – either in-feed anticoccidials or vaccines.

“Vaccines have been commercially available since the late 1950s. Today there are numerous vaccine options that may differ dependent on market location but there are live non-attenuated vaccines as well as live attenuated (pre-cocious) and a mixture of attenuated and non-attenuated strains.

“They provide good coccidiosis control, allow for the restoration of sensitivity, also there are no residuals, no withdrawal and no negative (market) connotations.

“However, they can be expensive when the cost of both the vaccine itself

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and application is considered, also the cost of immunity.

“Application and the housing management is an issue, also turn-out timing. Immunity development takes time which makes vaccine application in short living birds as broilers questionable”

“There can be adverse vaccine reactions with over cycling and subsequent NE or dysbacteriosis.

All that said, vaccines are a valuable tool for restoring sensitivity toward anticoccidial drugs.

“They are mostly used in long living birds, vaccines are a standard tool in pullets reared for either broiler breeders and layers in cage free systems, as well as certified slow growing, organic or ‘No Antibiotics Ever’ (NAE) broilers.

In a paper issued by the Commission of European Communities on in-feed anticoccidials, one of the key conclusions was “At the present time, the use of coccidiostats as a preventive measure for the control of coccidiosis in modern poultry production is essential”.

“This practice contributes significantly to the protection of both animal health and animal welfare by preventing a disease that is present on all farms.

“In-feed anticoccidials have been in use since the 1940s. Today, there are chemically synthesised anticoccidials and polyether ionophore anticoccidials and combination products.

“They provide very good coccidiosis control, are cost efficient, reliable and easy to administer in feed. They are applicable for various species, and at appropriate levels, they do not compromise the intestinal health and performance of the birds.

“However, resistance development and safety aspects must be carefully considered in their use.”

Dr Stanev next spoke about resistance (i.e. lack of sensitivity), how it developed, the concept of leakage and the pace of resistance development for different products from very rapid for some chemicals to slow in the case of ionophores and nicarbzin.

“Cross resistance developed against a specific product affecting other similar products, so they become less efficient. While all presently available synthetic (chemical) anticoccidials belong to different chemical classes, have a different mode of action, thus they are not affected by cross-resistance.

Ionophores however, share common modes of action so there is a well-documented cross-resistance especially across molecules from the same family (monovalent, divalent or glycoside)”. ▷



Dr Vasil Stanev with Jennifer Houlihan, Monogastric Business Unit Manager and Dr Georgina Inwood, Veterinary Technical Manager for Phibro Australia,

“The solution can be a rotational strategy that addresses resistance and cross resistance.

Rotation means changing the anticoccidial tools to one of another class after a few cycles.

“A full (straight) program is to use the same anticoccidial from day one through starter, grower, finisher to withdrawal.

“Shuttle program means using one anticoccidial in the starter grower and another in the grower /finisher phases.

“Vaccination could be part of the rotational program, either as a stand-alone strategy or in a Bio-shuttle where vaccination is followed by a low dose use of an ionophore to alleviate the downsides of the vaccine and enhance immune development,” Dr Stanev said.

“Key rules for establishing a successful AC program, are firstly to regard it as a complex holistic problem-solving strategy.

“Consider the resistance development, keeping in mind that combination products develop resistance slower than each component independently.

“Products that do not allow leakage and develop resistance rapidly should only be used for short periods (maximum 1 cycle in full or maximum 2 cycles in a shuttle program), while products that develop resistance slowly like ionophore, nicarbzin or the combination of the two can be used 2-4 cycles

in a row. Do not use any given product for too long,” Dr Stanev warned.

“It’s not about the product, it’s about the compound (i.e., the molecule – its chemical structure and mode of action) thus only by rotating from one product to another from a different family cross resistance can be avoided (e.g. rotating from a monovalent to a glycoside or divalent ionophore).

“Take into account previous use, the effectiveness and outbreaks. Consider the local coccidia challenge.

“Local conditions and the regulatory framework are also important to consider as well as market preferences which all play a part in maintaining a successful AC program.

The side effects of different tools should play a part in the decision-making process.

“Vaccines can open the door to secondary enteric disorders so avoid use in high challenge situations,” Dr Stanev advised.

“Nicarbzin can increase heat production and thus sensitivity to heat stress, so use these products under moderate outside temperatures and in the first 21 days of age or up to 28 days in a combo product at reduced levels.

“Lasalocid can promote water intake, so limit its use in the case of high humidity periods and when removing moisture from sheds is troublesome. This product class is a

◀ good choice in hot weather conditions,” he said.

“Monensin on the other hand can be a factor in limiting water and feed intake, so avoid using in high temperature conditions.

“The side effects of anticoccidials should not prevail over their main effect, however it should be considered,” Dr Stanev added.

On presently available molecules, Dr Stanev commented on chemically synthesised anticoccidials.

“These are drugs from different groups and with different modes of action. Resistance development is very rapid, rapid, moderate and slow.

In general, they show a wide safety margin, except for nicarbazin and halofuginone,” he warned.

On polyether ionophore anticoccidials he said “they have a similar mode of action but there are big differences between different classes.

Also, slow resistance development: there is a narrow safety margin (10-20% for all ionophores)”.

After describing the mode of action for ionophores, Dr Stanev stated that this class of anticoccidials offered “good efficacy that is dose dependent with a static/-cidal effect against the extracellular forms – sporozoites and merozoites.

“There is a narrow safety margin of 10-20%. With larger overdose the main impact is on excitable tissues causing neurological problems and myopathies, lameness and mortality,” he cautioned.

But even 10-20% overdose might result in reduced feed intake, weight gain, an increased FCR and weight heterogeneity.

“However, ionophores are a very good tool, in fact the backbone of coccidiosis control, but the industry should pay attention on toxicity.

“Overdose (absolute and relative), accurate dosing, good homogeneity, prevention of feed de mixing/segregation and feed product form, are all issue of importance in ionophore use.”

Next Dr Stanev spoke about intestinal integrity in poultry and the many factors that either strengthened or impeded it.

Part of a holistic approach to generating intestinal integrity was “the use of feed additive such as probiotic; live microorganisms providing health benefits to the host when ingested in adequate amounts,” he said.

“Phytogenic, plant derived products like saponins, polyphenols and some essential oils that deliver immunomodulatory properties, stimulate specific immune responses, and suppress inflam-

mation, also ammonia reduction (saponins and essential oils).

The description of these established properties of probiotics and phytogenics were an introduction to two products from Phibro.

Magni-Phi, is a 100% natural product made from *Quillaja saponaria* and *Yucca schidigera*, providing an optimised blend of saponins and polyphenols.

“It helps to improve the immune response which can lead to healthier birds with better ability to resist disease and infection”.

“Magni-Phi can also contribute to the immunomodulation process by boosting specific immune response and in the reduction of non-specific inflammation (tolerance).

“It is a natural alternative that helps to promote intestinal integrity and optimises nutrient absorption to address challenges in all poultry production systems and different challenge situations,” Dr Stanev said.

“Microlife (Prime) is a four strain probiotic (*Bacillus amyloliquefaciens*, *B. subtilis*, *B. licheniformis* and *B. coagulans*) for poultry.

“It is a sprayed dried culture with a minimum of 4x10⁹ CFU/g viable spores from the four strains of bacillus; inclusion rate should be a minimum of 125g/t of feed (providing 5x10⁸ CFU/kg of feed); withdrawal time is 0 days; it delivers maximum *Bacillus* spore yield and is thermostable.

“It offers superb heat stability and a long shelf life with no refrigeration requirements and is able to stand up to most manufacturing processes. It is a diverse and versatile product, built on four synergistic species that complement each other.

“Scientific research based in commercial use has demonstrated that Microlife (Prime) contributes to improved body weight gain and lower FCR.

“Improved intestinal health lowers disease challenges and can reduce the need for antimicrobial use and can contribute to reduction in *Salmonella* colonisation,” Dr Stanev stated.

He went on to describe trials into novel modulation of the immune response and the mechanisms of action, also trials with Microlife Prime vs single strain probiotics where the challenge was coccidia, *C. perfringens*, *Salmonella* spp, and *E. coli*.

Further trial results were reported by Dr Stanev on the replacement of AGPs and potential synergies generated by inclusion of MicroLife Prime.

Also critical, Dr Stanev reported,

was research conducted to ensure that no AMR genes were present in the genome of the four strains in Microlife Prime.

“A floor pen study with coccidiosis vaccinated broilers conducted in the USA compared Magni-Phi, MicroLife and combination of Magni-Phi and MicroLife with challenged and non-challenged controls.

“It was a floor pen NE challenge model using litter from a broiler farm with a history of high mortality containing *C. perfringens* and other bacteria additionally supplemented with *E. acervulina* and *E. maxima* oocysts.

“Measurements were Coccidiosis control (OPG at days 21 & 28), *C. perfringens* and *Salmonella* counts, then performance (BWG and FCR at days 21, 25 and 42 – also processing yield,” Dr Stanev explained.

“Both Magni-Phi and Microlife Prime provided significant improvement of performance and reduction of mortality, *C. perfringens* and *E. coli* intestinal counts as well as *Salmonella* incidence in the trial.

“The highest improvement was provided when both products were used together. The combination was significantly better than each of the products used alone,” Dr Stanev reported.

Phibro Animal Health is an American animal health and mineral nutrition company. Its products include antibacterial, anticoccidials, anthelmintics, as well as animal nutrition and vaccines for livestock.

The company operates through three segments Mineral Nutrition, Performance Materials and Animal Health, from which most of its revenue is derived.

The company operates in the United States, Latin America, Canada, Europe, Middle East, Africa, and the Asia-Pacific region.

In the Australian and New Zealand market Phibro is best known for its coccidiostats.

“Today, however, as the pressure to reduce antimicrobial use in poultry production increases, there is a clear need to develop alternative disease reduction and performance enhancing strategies while reducing antimicrobial use wherever possible.

“Prebiotics and phytogenic products like Microlife Prime and Magni-Phi will offer useful tools, not only for antimicrobial reduction, but also the ability to continue to use coccidiostats where they are critically necessary.”

Phibro has received ACO allowable input certification for Magni-Phi.