low levels of toxins — below observable overt toxicity — in rations are likely to alter normal immune functions.

Mycotoxin deactivation

Effective mycotoxin management is a vital part of the portfolio of many different strategies. Without proper mycotoxin management, birds, as well as other animal species, will be constantly exposed to different concentrations and combinations of mycotoxins. The bird’s immune system will be weakened and will not be able to defend against infectious diseases like, for example, avian influenza. The United Nations' approach for detoxification of mycotoxins involves the use of nutritionally inert feed additives with the capacity to bind and immobilize mycotoxins in the gastrointestinal tract of animals, thus reducing their bioavailability (Magnoli et al., 2011).

According to this approach successfully eliminates the risk of central nervous system affections such as aflatoxins, it does not work comprehensively on all of the mycotoxins relevant to the poultry industry. In general, the negative effects of a mycotoxin on the body of an animal depend upon the extent and rate of its absorption from the gastrointestinal tract, its distribution, its bioactivation and its excretion processes (Kubena et al., 2012). Mycotoxin contamination is a complex mix of different processes that can occur simultaneously to provide a defense against a variety of mycotoxins.

Natural mycotoxin bio-inactivation generally takes place in the gastrointestinal tract and liver and is a consequence of the action of mycotoxin-metabolizing microflora and tissue enzymes. In the gastrointestinal tract, mycotoxins can be detoxified by bacteria and protozoa have the ability to bio-inactivate mycotoxins from the trichothecenes family into nontoxic or less toxic metabolites. In poultry, T2 toxin is usually metabolized and eliminated after ingestion. This process takes place in the crop, small intestine and liver, where hydrolysis, hydroxylation, de-epoxidization and conjugation yield more than 20 different metabolites.

Bio-inactivation has been one of the proven approaches for detoxifying the non-adsorbable mycotoxins (trichothecenes) by either altering their molecular structure into nontoxic metabolites or by binding onto the surface of probiotic bacteria (El Nezami et al., 2002).

Summary

In conclusion, mycotoxins may alter the bird’s susceptibility to infectious diseases by affecting the intestinal health and immune and adaptive immune systems.

Further research will be necessary to investigate the impact of mycotoxins on infectious diseases and to develop practical and economically applicable detoxification methods in poultry mycotoxin contamination of feed and the effects on animal health.

Bayer CropScience celebrates latest investments

BAYER CropScience recently celebrated its two most recent investment milestones: completion of a $33 million office modernization project and the groundbreaking of Greenhouse 6 at its headquarters in Research Triangle Park (RTP), N.C. These projects are among the latest in a series of investments the company has made at the RTP location since 2012 that total nearly $150 million.

“The modern office at our North American crop protection and global seeds headquarters in RTP reflects Bayer’s desire to play a leading role in shaping the future of innovation in the life sciences industry,” Bayer CropScience chief executive officer Liam Condon said. “Whether we are expanding our facilities here in RTP or opening other locations throughout the world, we seek to do so in a way that promotes and achieves our mission of ‘Bayer: Science for a Better Life.’

The newly renovated facility has a modern and open design where employees have the resources and space to work efficiently, the announcement said. Now, more than 780 scientists and specialists work together in this 533 million square space, which was specifically designed to incite creativity and collaboration.

Greenhouse 6 is the third in a trio of new state-of-the-art facilities at the RTP headquarters, which will increase the Bayer CropScience’s ability to analyze and develop crops and find novel seeds and traits that may ultimately lead to better crop yield and resistance to pests and diseases.

Greenhouse 5 and Greenhouse 1 are the other two facilities that make up this trio. Greenhouse 5 opened in 2012, and Greenhouse 1 is scheduled to open in late 2015.

“We are proud to continue making investments in Research Triangle Park and around the United States,” said Jim Blome, president of Bayer CropScience North America. “As we expand our business and grow our research hub in RTP, we further enhance our abilities to make meaningful contributions to farming and modern agricultural production, ensuring that we all have enough safe, abundant and affordable food. That’s a job we take seriously.”

Bayer CropScience plans to invest close to $1 billion in capital expenditures in the U.S. between 2013 and 2016, mainly to ramp up research and development and to expand the product supply of its top crop protection brands. These are part of a global investment program Bayer CropScience started last year, with total capital expenditures of approximately $3.3 billion for 2013-16.

Besides the modernized office space and Greenhouse 6, some of the other investments at the RTP location since 2012 include:

• Greenhouse 5 opened in July 2012, focused on corn, soy and other broadacre crop research ($20 million).

• Land adjacent to the Bayer CropScience RTP headquarters was purchased in December 2012, facilitating the ability to expand in the future ($62 million).

• The new Development North America Facilities were completed in May 2013, where scientists conduct crop protection and environmental science research, including pest and turf and ornamentals ($16.1 million).

• The North American Bee Care Center opened in April 2014, bringing together resources to support colony health stewardship, sustainable agriculture and comprehensive solutions for honeybee health ($2.4 million).

• Ground was broken in September 2014 on Greenhouse 1, a 29,560 sq. ft. facility that will complement other on-site greenhouse facilities ($26.9 million).

Bayer is a global company with core competencies in the fields of health care, agriculture and high-tech materials.

Bayer CropScience, the subgroup of Bayer AG responsible for the agricultural business, had annual sales of 9.494 billion euros in 2014 and is a leading global crop science company with a focus on seeds, of crops, of crop protection and non-agricultural pest control. It has a global workforce of 23,100 people, operating in more than 120 countries.