

Featured expert of the month...

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Mycotoxins & Immunity

Mycotoxins are secondary metabolites secreted by moulds belonging mainly to the genus *Aspergillus*, *Penicillium* and *Fusarium*. They are produced on a wide variety of raw materials before, during and after harvest. Very resistant to technological treatments, mycotoxins can be present in foodstuffs intended for man and animals. The clinical toxicological syndromes caused by the ingestion of moderate to high amounts of mycotoxins have been well characterised. The effects range from acute mortality, to slow growth and reduced reproductive efficiency.

Consumption of lesser amounts of fungal toxins may result in impaired immunity and decreased resistance to infectious diseases. Indeed, it has long been recognised by veterinary clinicians that marked immunosuppression is observed in livestock ingesting mycotoxins at levels below those that cause overt toxicity. Mycotoxin-induced immunosuppression of farm animals is significant for several reasons. First of all, from an agricultural standpoint, it is conceivable that altered immune function may contribute mechanistically to the symptoms of some animal mycotoxicoses. Mycotoxins could also predispose livestock to infectious diseases and reduce productivity. Secondly, from a public health perspective, increased infections in animals may well result in increased animal-to-human transmission of pathogens and/or increased antibiotic concentrations in meat or milk, as a consequence of animal treatment. In addition, ingestion or inhalation of mycotoxins by humans may contribute etiologically to immune dysfunction diseases or to an increased susceptibility to infectious agents.

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The sensitivity of the immune system to mycotoxin-induced immunosuppression arises from the vulnerability of the continually proliferating and differentiating cells that participate in immune-mediated activities and regulate the complex communication network between cellular and humoral components. The mycotoxins can act on the different aspects of the immune system: inflammation, cellular response and the humoral response. Mycotoxin induced immunosuppression may manifest as depressed T or B lymphocyte activity, suppressed antibody production and impaired antigen presenting cells- or phagocyte-effector functions.

As the immune system is primarily responsible for defence against invading organisms, the mycotoxin intoxication may decrease resistance to infectious diseases or reactivate chronic infection.. This has also been observed not only in laboratory but also in domestic animals. In pigs, consumption of feed contaminated with Aflatoxin increased the severity of the *Erysipelothrix rhusiopathiae* infection. Similarly, ingestion of Fumonisin B1 increases the susceptibility to *Escherichia coli* and to *Pasteurella multocida*. When, Ochratoxin A contaminated feed was given to piglets, spontaneous infection with *Salmonella choleraesuis*, *Serpulina hyodysenteriae* and *Campylobacter coli* were observed.

The presence of mycotoxins in the feed can also reduce vaccine and therapeutic efficacies. The impaired vaccinal immunity may lead to the occurrence of disease even in properly vaccinated flocks. These reactions are of considerable consequence in animals which rely on an effective therapeutic program for disease prevention.