Aflatoxicosis in cattle

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Aflatoxins are closely related group of bifurano coumarins primarily produced by some strains of Aspergillus, particularly *A. parasiticus* and *A. flavus*. The importance of aflatoxins was recognised in 1960 following one of the most intensive and productive investigations on toxic factors of natural origin. Peanut imported to Great Britain from Brazil was found to be responsible for large number of deaths in turkeys and ducklings and these deaths were due to consumpt ion of aflatoxin contaminated peanut meal. Ever since, aflatoxicosis has been identi fied as a problem of economic importance in the animal production system.

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The aflatoxin producing fungi are ubiquitous in nature and grow in most of the feed commodities when optimum conditions of tempe rature and humidity are available in the environment. A temp erature of 33-35°C and a relative humidity of over 12% are ideal for the growth and toxin production. The tropic al climate, prevalent in India is ideally suited for these fungi to grow and produce toxin.

High susceptibility of hybrid varieties of grains to fungal attack, its poor storage conditions and introduction of crossbred animals for increased productivity, which are very sensitive for toxicosis have compounded the significance of the problem. In Kerala, at this department we have been studying this problem for the last thirty-five years and identified it as a most important threat to livestock sector. Aflatoxin contamination occurs more in groundnut cake and maize, which are extensively used as livestock feed. In fact there is no feed, which cannot get contaminated with aflatoxins. Because of the tropical climate, poor post harvest technology and very poor storage conditions every commodity is contaminated with varying levels of aflatoxin and a situation has come wherein we have to live with it. Rajan *et al.* (1995) made a detailed investigation on aflatoxin contamination in cattle feed in Kerala. Analysis of 3314 feed samples during the period 1986-91 revealed that 43% were contaminated with aflatoxin and 26% of the sample contained very high level of aflatoxin ranging from 300-1800 ppb.

Aflatoxins are very potent toxins and are well-known hepatotoxins and carcinogens. The biological effects of aflatoxin include hepatotoxicity, immunotoxicity teratogenicity and carcinogenicity. These effects lead to variety of disease problems in livestock. In fact, aflatoxins are considered as agents in search of disease syndromes. Besides the lowered mortality and lowered productivity the immunotoxicity leads to break down of immunity and outbreaks of disease even after vaccination.

Anorexia and reduced milk yield are the early symptoms noticed in cattle. In young animals reduced feed intake, loss of weight, stunted growth are the common symptoms. Often there are no other symptoms until a few days before death when the animals appear dull, develop ataxia, and finally become recumbent. Other clinical manifestations include Jaundice, photosensitization, dry muzzle, tucked up abdomen and diarrhoea. The clinical symptoms depend on the dosage and duration of ingestion of the toxin and may be manifested in acute, sub-acute or chronic forms. Buffaloes are more susceptible than white cattle. Recent studies on analysis of samples of groundnut cake col-

lected from areas where the outbreaks of anorexia were reported revealed that it was found to contain aflatoxin ranging from 300 to 1800 ppb. Experimentally anorexia syndrome with typical clinical symptoms seen in the field was reproduced in calves by feeding the contaminated ground nut cake. Associated with hepatosis abomasal ulcers were also observed in these cases.

In buffalo calves the lesions are more severe as they are more susceptible. Generally generalised icterus, varying degrees of sub-cutaneous haemorrhage and ascites are observed. Hydropericardium with pale yellow enlarged friable liver is generally observed. The liver may show greenish spots of bile stasis. Severe distension of the gallbladder due to stagnation of bile and thickening of the wall of the gall bladder is also seen. In chronic cases the liver is enlarged, firm and moderately nodular.

Histologically fatty changes, biliary epithelial hyperplasic centrilobular degeneration and necrosis, hepatocytomegaly and severe fibrosis particularly in chronic cases are seen. Endophlebitis of the hepatic veins has also been reported. In the kidney nephrosis and occasionally interstitial nephritis are also seen.

The presence of residual toxins in the form of metabolities and original toxin have been identified in variety of animal tissues and products including meat and milk (M1 and M2). It is also pertinent to point out that human milk was also identified to contain aflatoxin residues. A survey made in our laboratory in Kerala showed that 17.7% of milk samples are contaminated with AFMI. A linear relationship has been demonstrated between AFBI in feed and AFMI in milk. Therefore, aflatoxin enters into the human food chain through livestock feed.

The economic significance of aflatoxin is still to be brought to light. A limited study conducted in our department has revealed that 83.5% crores are lost per year in the state due to reduction in milk yield. The loss caused by aflatoxicosis is tremendous and drastically affects livestock industry in the country.

Aflatoxin besides causing severe hepatotoxicity by its biological effects in the system produces immunosuppression, teratogenicity and carcinogenicity. Abortion in cows and the transplacental passage of aflatoxin in to the young ones are major problems. Testicular degeneration leading to subfertility and infertility are significant biological effects. Control of aflatoxin contamination in livestock feed is a complex and difficult task. In USA, FDA has prescribed an action level of 100 ppb in feed and for dairy cows' 20 ppb. In our country, various factors like the availability of feed, cost of feed ingredients etc. have to be taken into consideration while prescribing an action level for adoption. The synergistic effects of difficult mycotoxins, like ochratoxin, zearalenone, T2 toxins etc. may present in the same feed and will exert additive toxic effect. However, a level of 100 ppb may be suggested as a relatively safe level for cattle.

Even though mould inhibitors like propionic acid, Acetic, Sorbic, benzoic and formic acids were tried, several factors still limit their usefulness and practical use. Adsorbent materials like alumino silicates, bentonite, silicas, zeolite, etc. have been evaluated. Of this hydrated sodium calcium alumino silicate (HSCAS) was found to be of much value. Many new possibilities like the use of sulphur containing amino acids, antioxidants, vitamins, trace minerals and other nutrients have been suggested to minimise the effect of aflatoxin. The possibilities of developing strains of grains and nuts resistant to fungal attack are also investigated. Development of transgenic crops, which can resist fungal attack, is a future possibility in preventing aflatoxin contamination in cattle feed.

It is very difficult to detoxify large quantity of livestock feed. Prevention of contamination is the best approach. Sun drying of contaminated feed and mixing of spoiled feed with good feed and diluting the toxin level are the practical methods of controlling the level of contamination.

FOOT AND MOUTH DISEASE DISRUPTS EUROPEAN UNION TRADE

The spread of foot and mouth disease in Europe has disrupted grain trade between European union and North African countries. Importers report that they required to prove and certify that any cereals from U.K. were from areas free of Foot and Mouth disease and were transported in trucks or railcars, which either did not pass through Foot and Mouth areas, or were disinfected before loading.

World grain