CHAPTER 1

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Poultry industry in India is considered as one of the most dynamic and fast growing sectors. Having evolved from a backyard to a vertically integrated and organized form, it has achieved unprecedented growth during last 2 decades. Its development has not only been in size but also in productivity, sophistication and quality. India is one of the top ten countries in the world in broiler production (Desai, 2004) Broiler production has potential to grow at the rate of 15% to 20% and will touch to 4000 million in the year 2020 (Devegowda, 1998 and Gupta, 2000).

At present there is great need for making quality feed from ideal feed ingredients, which are free from any harmful toxic principles. Feed and feed ingredients are rich in nutrients, moisture and thus support the growth of fungi at any stage from harvest till ingestion by birds. Broiler chicks are sensitive to many mycotoxin contaminated feed. Mycotoxicosis in broilers costs millions of dollars annually in broiler industry (Edrington et al, 1997).

Mycotoxin contamination in the feed is a global problem. Mycotoxins are poisons produced by molds that grow on grains and feeds. There are about 100 species of fungi known to produce mycotoxins (Das, 1992). Till date more than 350, different mycotoxins have been identified in nature, but
aflatoxicosis, ochratoxicosis, T2 toxicosis and fusariotoxicosis are common in poultry (Dwivedi et al. 1999). More than one mycotoxin is commonly found in feed and not only aflatoxin to cause health hazards in poultry. Jand and Singh (1995) screened poultry feeds and raw materials and detected aflatoxins, ochratoxins, citrinins and streigmatocystins either alone or in combination, in different concentrations.

Aflatoxin is produced by *Aspergillus flavus* and *Aspergillus parasiticus* species of molds. There are four metabolites of Aflatoxin viz. B₁, B₂, G₁ and G₂. Out of these B₁ is biologically the most active. Aflatoxin, besides causing hepatocellular degeneration is also known to have effect on haemopoietic system (Mohiuddin et al., 1986). Mycotoxin especially aflatoxins are produced during and after manufacture of feed in apparently normal operations, with losses of productivity in healthy broilers (Jones et al., 1982). Aflatoxins are hepatotoxic, carcinogenic and suppress immune mechanism of bird.

Ochratoxins are secondary metabolites of some toxigenic species of *Aspergillus* and *Penicillium*. This food borne, widespread mycotoxin is nephrotoxic, hepatotoxic and immunosuppressive in action. Ochratoxins are a group of structurally related metabolites designated as ochratoxin A, B and C produced by *Aspergillus ochraceus* and *Penicillium viridicatum*. Ochratoxin A (OA) is produced more abundantly by these fungi and is most toxic metabolite
of the three ochratoxins (Rama Devi et al., 1994). Ochratoxin A (OA) produced by *Aspergillus ochraceus* is extremely toxic to poultry (Chu, 1977).

There are many reports about toxic effects of aflatoxin and ochratoxin in poultry through feeds, however literature on the synergistic effect of these two is rare. These two highly toxic mycotoxins often occur simultaneously in a single feedstuff as contaminants. These mycotoxins when consumed in combination may show greater negative effects on the well being and productivity of broiler chicken than when consumed alone (Devegowda et al., 1998). Toxicity that results from dual exposure of aflatoxin and ochratoxin is much greater than the sum of the individual toxicity of these mycotoxins (Huft, 2004).

Mycotoxin contamination can take place at any stage from the point of harvesting to the ingesting of feed by the bird. Many of the times, controlling measures at the point of harvesting and transport of feed ingredients is out of control of compound feed manufacturers.

Hence, despite all the precautionary measures taken in routine managerial practices like moisture control, feed storage, feeding practices, mycotoxins invariably creep into the feed.

Ultimate Toxic Prevention Programme (UTPP) Biotech, a broad spectrum commercial toxin binder prepared by M/s Vetcare, Division of Tetragon, Chemie Ltd., Bangalore, is a combination of mold inhibitors, toxin
binder and lipotropic agents and is claimed to be better than other available toxin binders in market. Mold inhibitors present in UTPP Biotech include buffered organic acids and oxine copper. Oxine copper, at the lowest concentration i.e. 6-12 μm can inhibit the growth of all fungal species of importance like Aspergillus, Fusarium and Penicillium in vitro. Toxin binders include specially treated aluminosilicates and mannanoligosaccharides (MOS). Mannanoligosaccharides is a unique toxin binder derived from cell wall of yeast Saccharomyces cerevisiae (SC). It has diverse mycotoxin binding ability.

In recent times, feed manufacturers and poultry farmers are using some mycotoxin binder in poultry feed as preventive measures for mycotoxicosis. Commercial mycotoxin binders are prepared by different firms and are available in the market. Inhibition of mold growth and binding of mycotoxins by incorporation of different binders in the poultry feed can reduce these hazardous effects.

Taking into consideration the above facts, the present study is planned with the objectives.

1] To screen poultry feeds and raw materials for possible presence of aflatoxin and ochratoxin in Marathwada region.

2] To study the individual toxic effects of feeding known quantity of aflatoxin and ochratoxins in broilers.
3] To study the combined effect of feeding known quantity of aflatoxin and ochratoxin in broilers.

4] To study the efficacy of a commercial toxin binder in ameliorating the deleterious effects of aflatoxin and ochratoxin, given alone and in the combination.