Detection of residual T2 toxin in liver and muscle of experimentally toxicated broilers

V.V. PANDEY1*, N.V. KURKURE1, D.R. KALOREY2 and A.G. BHANDARKAR1

1Department of Veterinary Pathology, 
2Department of Veterinary Microbiology, Nagpur Veterinary College, Nagpur 440006, India 
*pandedrvivek@rediffmail.com

Keywords: broilers; liver; muscle; metabolites; T-2 toxin

Summary
Mycotoxins can be passed through the food chain to humans via residues in meat, eggs and milk. Mycotoxin residues in food therefore may cause acute intoxication in humans. Inspite of the known toxicity of mycotoxins and their common contamination of feedstuffs, literature regarding presence of T-2 toxin residues in edible portion of broilers is scanty. Hence, an experiment was conducted to detect the T2 toxin residues in the liver and muscles of the broilers. Twenty, a day old broilers chicks were divided in two equal groups A and B. Group A served as control which received feed free of toxin while group B received feed containing T2 toxin @ 4 ppm for 28 days. Broilers from both the groups were slaughtered at 28th day of age. Liver and breast muscle of the chicks from these groups were collected and processed for the detection of T2 toxin. The result of the present study indicated presence of T2 toxin and its metabolites in the liver. While the breast muscle revealed presence of only T2 metabolites. Thus, confirming the pathway of T-2 toxin in human food chain, which substantiate the reports of human illness associated with T-2 contaminated foodstuffs.

Introduction
Poultry industry competes with human food, so low grade cereals, which are unfit for human consumption are diverted towards poultry feed. Mycotoxins are worldwide contaminants of food. Their occurrence depends upon various geographic and atmospheric conditions during harvesting, storage and transportation. Mycotoxins are secondary metabolic byproduct of various toxigenic fungi growing on suitable substrate. In general, mycotoxins such as aflatoxins and ochratoxins are produced optimally at 24-28°C but trichothecens toxins are produced maximally at 15°C. Among the trichothecenes, T-2 toxin is the most important toxin causing emerging threats in poultry industry. T-2 toxin, a secondary toxic metabolite produced mainly by fusarium spp. i.e. F. sporotrichoides, F. tricinctum, F. eusetti, F. culmorum, F. avenaceum, F. roseum, F. nivale, F. poae and others are Cephalosporium spp, Myrothecium spp, Stachybotrys spp and Trichoderma spp. (Bhatnagar et al., 2002). Pathogenesis and residues of aflatoxins, ochratoxin have been studied in detail. However, there is a paucity of scientific literature regarding pathogenicity and deposition of T-2 toxin in the muscle and liver of toxicated birds. So the present study is undertaken with an attempt to study the residues of dietary T-2 toxin in liver and breast muscle of the broilers.

Material and methods
A known culture of Fusarium sporotrichoides MTCC1894 (Source-Institute of Microbial Technology, Chandigarh, India) was used for the production of T-2 toxin as per the method described by Burmeister (1987). Briefly, the culture of Fusarium sporotrichoides was inoculated on crushed maize soaked with SDB at optimum moisture. These flasks were kept for 4 weeks at 18°C. After incubation of 4 weeks mouldy maize was autoclaved at 15 lbs pressure for 5 minutes and dried in hot air oven at 50°C for 8-10 hr. Fungus infested maize was ground and T-2 toxin was quantified as per the method described by Tapia (1985). T-2 toxin infested maize was added in the diet to attain required level of toxin for experiment. Twenty, a day old broilers chicks were divided in two equal groups A and B. Group A served as control which received control feed while group B received feed containing T2 toxin @ 4 ppm for 28 days. Broilers from each group were slaughtered at 28th day of age. Liver and breast muscle of the
chicks from these groups were collected and processed for the detection of T2 toxin as per Tapia (1985).

**Results and discussion**

The result of the present study indicated presence of T2 toxin in the liver from group B. The muscle samples from group B were negative for the T-2 toxin. All samples from control group A were negative for T-2 toxin. T-2 toxin metabolite was detected in liver and muscle samples of the toxicated broilers from group B. All samples from control group A were negative for T-2 toxin metabolite. In present study we have detected the pink fluorescence spot at the same RF (Rate of flow) value of T-2 toxin. We considered it at a T-2 metabolite. Chi et al. (1978) concluded that T-2 toxin and / or its metabolites are primarily excreted into the intestine through the bile, indicating liver an important organ to play a role in the metabolism and excretion of T-2 toxin. The products from animals fed diets contaminated with T-2 toxin therefore may cause a potential public health hazard when they are consumed by humans because of possible toxic residues. Present findings substantiate the reports of human illness associated with T-2 contaminated foodstuffs.

**References**


