CHAPTER V

SUMMARY
CHAPTER 6

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The aim of present study was to evaluate the individual and combined toxicity of dietary aflatoxin B₁ and ochratoxin A and antitoxic efficacy of a commercial toxin binder (UTPP - Biotech) in counteracting such adverse effects in broilers. An experiment was conducted on two hundred and forty broiler chicks for a period of 42 days, which were divided into eight groups containing 30 chicks each. Group CON was given plain feed, which served as control. Group TBR was fed plain feed mixed with UTPP Biotech @ 1.5 gm/kg of feed, which served as treatment control group. Group AFB, OCA and AAO were fed with aflatoxin B₁ @ 1.5 ppm, ochratoxin A @ 1.5 ppm and combination of these two mycotoxins @ 0.75 ppm each, respectively. Groups AFT, OCT and AOT were treated with AFB₁ @ 1.5 ppm along with UTPP @ 1.5 gm/kg, ochratoxin A @ 1.5 ppm along with UTPP @ 1.5 gm/kg and combination of AFB₁ @ 0.75 ppm and OA @ 0.75 ppm along with UTPP 1.5 gm/kg respectively in diet.

Field samples of poultry feed and feed ingredients were collected from different farms and feed manufactures and were tested to know incidence of different mycotoxins in this area. Out of 28 samples tested, 7 (25%) were
found positive for aflatoxin, 5 (17.86%) for ochratoxin A and 1 (3.57%) was found positive for both of these toxins.

Feed intake, body weight gain and feed conversion ratios in chicks were computed at weekly intervals. Six chicks from each group were sacrificed fortnightly to record, organ weighs, haematological and serum biochemical estimations and gross and histopathological findings.

In aflatoxin B1 fed chicks (AFB group) there was significant reduction in feed intake, body weight gain, relative weights of heart, values of TSP, SA, serum cholesterol, SUA, Hb, PCV, TEC and TLC. Whereas, significant increase in FCR, relative weights of liver, kidney, spleen, bursa, serum bilirubin, ALP and BCT was noted. Over all differential leucocyte counts of experimental birds remained unaltered except heterophil, basophil and lymphocytes, which were found significantly increased (at 14th day interval), non significantly increased (at 42nd day interval) and significantly decreased (at 14th day interval) respectively over respective interval of control group.

In AFB group, grossly liver was enlarget, pale to yellowish in colour with necrotic patches on it. Kidneys were pale, yellow, mottled and slightly enlarged. Spleen was slightly congested with petechial haemorrhages. Bursa was atrophied with mild catarrhal exudate. Heart was dilated at the end of experimental period. Lungs, brain and intestines were mild to severely congested. Microscopically, liver section showed granular and vacuolar
degenerative changes, liver showed fatty necrobiotic and necrotic changes, ductular or acinar pattern of hepatocytes was noticed. Focal areas of lymphocytes infiltration and disorganization of hepatic parenchyma were also recorded. Kidney section showed granular, vacuolar degenerative changes and necrobiotic and necrosis. Mild to severe depopulation of lymphocytes in spleen with thickening of splenic artery was observed. In bursa mild to severe depopulation of lymphocytes, interfollicular oedema and desquamation of bursal epithelial cells were seen. Brain section showed mild to severe congestion with gliosis. Lungs were congested and oedematosus. Intestines were congested. In heart section, Zenker's degeneration and interstitial oedema were evident.

In the birds fed aflatoxin B₁ along with UTPP Biotech toxin binder (AFT group), significant increase in feed intake, body weight gain, values of TSP, SA, serum cholesterol, Hb, PCV, TEC and TLC, whereas significant decrease in FCR, relative weights of liver, kidney, bursa, values of ALP and BCT as compared to AFB group were recorded. Over all differential leucocyte count in this group remained unaltered except heterophil, basophil and lymphocyte count which showed significant decrease (at 14<sup>th</sup> day interval), non significant reduction (at 42<sup>nd</sup> day interval) and significant increase (at 14<sup>th</sup> day interval) respectively over respective intervals of AFB group. In birds fed aflatoxin along with UTPP toxin binder, the pathological lesions in different
organs studied were less severe as compared to lesions observed in birds of AFB group.

In birds fed with ochratoxin A (OCA group), significant increase in mean values of FCR, relative weights of kidney, spleen (at 42nd day interval), serum uric acid, bilirubin, ALP and BCT was recorded, whereas, significant decrease in FL, BWG, relative weights of liver, spleen (at 28th day interval), heart, values of TSP, SA, cholesterol, values of Fb, PCV, TEC and TLC over CON group was recorded. Over all relative weights of bursa and DLC were found unaltered throughout the experimental period except heterophil count at 14th day interval which was increased significantly over control group at respective interval.

In birds fed ochratoxin A (OCA group), grossly, liver was slight pale with focal areas of necrosis. Kidneys were pale and congested with focal areas of necrosis. At 28th and 42nd day intervals, kidneys were enlarged and bulged out from lumbar fossa. Spleen, bursa and brain were slightly congested. Lungs and intestines were also congested throughout the experimental period. Microscopically, kidney section revealed granular and vacuolar degeneration, necrobiotic and necrosis in tubular epithelial cells. Increased cellularity in few glomeruli was seen. Heart, spleen and Bursa were normal except for congestion. In lung section congestion and oedema were observed. Intestines were congested and in few cases, enteritis was noticed.
In birds fed ochratoxin A along with UTTP toxin binder (OCT group), there was significant increase in the mean values of FI (except at 6th week interval), BWG, relative weights of liver, serum cholesterol, Hb, PCV and TLC, whereas, significant reduction in the values of FCR, relative weights of kidney, values of SAU and BCT over the values in OCA group was noted. Overall relative weights of bursa, spleen, heart, values of TSP, SA, SUA and bilirubin, TEC and DLC of this group remained unaltered throughout the experimental period. The pathological lesions in different organs studied in birds fed ochratoxin along with UTTP toxin binder (OCT group), were less severe as compared to lesions in OCA group.

In birds fed aflatoxin B1 and ochratoxin A in combination (AAO group) there was significant increase in FCR, relative weights of bursa (except at 14th and 28th day interval), values of serum uric acid, bilirubin, ALP (except at 28th day interval); and BCT values, whereas, significant reduction in values of FI, BWG, relative weights of liver, spleen (except at 42nd day), heart, values of TSP, SA, cholesterol, Hb, PCV, TEC and TLC over control group was recorded. Overall DLC values of birds of this group remained unaltered except heterophil and lymphocyte count, which showed significant increase and significant reduction at 14th day interval respectively.

In birds of AAO group, grossly, liver was congested and pale in colour and enlarged with diffuse areas of necrosis. Kidneys were congested and
haemorrhagic. Bursa was atrophied and brain, lungs, spleen and intestines were congested. Microscopically, the liver section revealed diffuse granular and vascular degenerative changes. Necrobiosis and necrosis was also noticed in hepatocytes and at places lymphocytic aggregation were observed. Kidney section revealed acute cellular swelling in tubular epithelial cells. Focal areas of necrobiosis changes were observed. There were cystic spaces in renal section. In bursa of fabricius mild depopulation of lymphocytes from bursal follicles and denudation of bursal epithelium at places were observed. Severe congestion of microcapillaries was noticed. In spleer, congestion and mild depopulation of lymphocytes were noticed. Intestines, lungs and heart sections showed congestion and oedema.

The birds fed aflatoxin B₁ and ochratoxin A along with UTP² toxin binder (AOT group) showed significant increase in mean values of relative weights of liver (except at 14ᵗʰ day interval), values of TSP, SA (except at 14ᵗʰ day interval), serum cholesterol, Hb, PCV (except at 14ᵗʰ day interval), TEC and TLC, whereas, significant reduction was recorded in values of FCR, relative weights of kidney, values of serum uric acid, bilirubin and BCT over AAO group. Overall feed intake, BWG, relative weights of buna, spleen, heart, values of ALP and DLC remained unaltered except weight of heart and heterophil count at 14ᵗʰ day interval at which they were significantly increased and significantly decreased respectively over AAO group at corresponding
interval. In birds of AOT group, the pathological lesions in different organs studied were mild as compared to lesions in AAO group.