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Combined effects of repeated low doses of aflatoxin B-1 and T-2 toxin on the Chinese hamster

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The aim of this work was to find out how repeated low doses of aflatoxin B1 (AFB1) and T-2 toxin would influence the Chinese hamster and if the amplifying of these effects would occur with the application of both toxins together. The animals were treated with 10 ml/kg of 7% dimethylsulfoxid (DMSO) in the control group (C), 1.0 mg/kg of AFB1 in group A, 1.0 mg/kg of T-2 toxin in group T2, and 1.0 mg/kg of AFB1 + 1.0 mg/kg of T-2 toxin in group T2/A. All mycotoxins were dissolved in 10 ml/kg of 7% DMSO. These doses were administered intragastrically twice a week for a period of three weeks. General health condition, histological picture of some internal organs, some biochemical blood serum indicators of liver and kidney functions, and leucogram were monitored. No differences in prosperity or weight gains appeared during the course of the experiment. The histological examination did not show any changes in the investigated organs in any experimental group. On the contrary, differences were found in the biochemical blood serum profile. ALT and AST activities decreased significantly in T2/A group animals compared with the other medicated groups (T2 – 24.46 μ kat/l; 45.18 μ kat/l; A – 18.17; 41.84; T2/A – 4.74; 14.21). A similar decrease appeared in GMT activity as well, but it was significant only in comparison with the T2 group (T2 – 0.6 μ kat/l; T2/A – 0.25). ALP activity was increased in the experimental groups compared with the control, significantly in the T2 group (C – 5.0 μ kat/l; T2 – 6.92). LDH activity was lower in the T2 and T2/A groups, significantly when the T2/A group was compared with the A group (A – 94.05 μ kat/l; T2/A – 37.48). The cholesterol level was significantly increased in group A compared with the C and T2 groups. A smaller increase in the T2/A group was significant when compared with the T2 group as well (C – 3.05 mmol/l; T2 – 2.85; A – 3.59; T2/A – 3.27). Total and conjugated bilirubin concentrations decreased in group order A – C – T2 – T2/A, when differences among the A, T2 and T2/A groups were significant (T2 – 1.0 mmol/l; 0.36 mmol/l; A – 2.36; 0.85; T2/A – 0.69; 0.21). A glycemia decrease in medicated groups was significant in the T2/A group, while it approached a significant level in the T2 group (C – 10.46 mmol/l; T2 – 9.01; T2/A – 8.91). The main liver condition indicators seemed to be influenced by the T-2 toxin and AFB1 combination more than by individually applied toxins. We assume the amplification of the mycotoxin effects on proteosynthesis. The ALT activity especially was probably influenced more than in the additive manner. All the medicated groups showed a significant increase in the monocyte percent count (T2 – 9.8%; A – 9.62; T2/A – 8.85; C – 6.65). The differences observed in other leucocyte types were not significant. There were no differences in the effects of individual mycotoxins and their combination on the leucogram level.

Keywords:

mycotoxin; trichothecens; interaction; genotoxicity; biochemistry; differential count; histology

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