Histological estimation of the small intestine wall after administration of feed containing deoxynivalenol, T-2 toxin and zearalenone in the pig*

K. Obremski, Ł. Zielonka, M. Gajęcka, E. Jakimiuk, T. Bakuła, M. Baranowski, M. Gajęcki

Division of Veterinary Prophylaxis and Feed Hygiene, Department of Veterinary Health Protection, Faculty of Veterinary Medicine, University of Warmia and Mazury in Olsztyn, Oczapowskiego 13, 10-718 Olsztyn, Poland

Abstract

Fusarium spp. moulds are common in moderate climate regions of North America, Asia and Europe. They produce hepatotoxic and nephrotoxic mycotoxins, acting like estrogens, impairing hemopoiesis and immunosuppressing. Actively dividing skin cells, lymphatic tissue, haemopoietic tissue and gastrointestinal tissue are the most sensitive for these trichothecenes action. The mucosal membrane of the gastrointestinal tract is the first barrier of the organism contacting with foreign antigens like feed proteins, saprophytic and pathogenic microflora and mycotoxins. The aim of this study was to perform histological estimation of the porcine small intestine after short term intoxication with low doses of deoxynivalenol (DON), T-2 toxin (T-2) and zearalenone (ZEA) obtained from wheat naturally contaminated with Fusarium moulds. Experimental pigs (n=5) were fed for 14 days feed containing DON, T-2 and ZEA (28.9, 11.5 and 33.2 µg kg⁻¹ of feed). On the last day of the experiment, the animals were euthanised and samples of the jejunum were collected for histological examination. In the experimental pigs, normally developed intestinal villi and crypts were found. However, number of acidophilic granulocytes in the mucous membrane and decreased numbers of goblet cells, increased numbers of endothelial lymphocytes and numerous plasma cells in intestinal epithelium was observed. On the surface of the intestinal epithelium the glycocalyx was poorly developed. The results obtained suggest that short term intoxication with low doses of DON, T-2 and ZEA does not cause significant changes in the histological structure of the small intestine in the pig. However, low concentrations of DON, T-2 and ZEA probably influence enterocytes metabolism and evoke inflammation of the mucous membrane of the small intestine.

Key words: deoxynivalenol, T-2 toxin, zearalenone, histology, intestine, pig

Correspondence to: K. Obremski, e-mail: kazimierz.obremski@uwm.edu.pl

* The study was financed by a grant of PBZ-KBN-097/P06/2003