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**Influence of diet type on the inclusion of plant origin active substances on morphological and histochemical characteristics of the stomach and jejunum walls in chicken**

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**Abstract**

Three hundred and thirty-six 1-day-old male Hubbard HI-Ye broiler hybrids, kept in battery cages, were fed with diets based on maize (groups I and II) or wheat and barley (groups III and IV) and supplemented with or without plant extract (XT\* 100 mg/kg) containing 5% carvacrol, 3% cinnamaldehyde and 2% of capsicum oleoresin. The morphological and histochemical examinations were carried out on days 21 and 42 of bird's age. The middle part of glandular part of the stomach and 30 mm long segment from the central part of the small intestine (jejunum) were taken out and then prepared for morphometrical and histochemical assays. Mobilization of mucocytes in superficial epithelium of the glandular stomach and increased secretion of neutral mucopolysaccharides and small amounts of sialomucins with or without local cell disruption with releasing of large amounts of mucus were observed in both 'grain' groups of 21-day-old birds fed with extract. In some animals, particularly those fed mixtures with plant extract, the folds of the proventriculum mucosa were fused into large, unshaped structures. In groups fed with plant extract the mucus secretion intensity and accumulation inside cells of the gastrointestinal mucosa were slightly higher. Morphological changes on gastrointestinal mucosa observed in young chickens fed XT were reduced in older animals. The results of this study showed that the increased releasing of large amounts of mucus and the creation of a thick layer of mucus on glandular stomach and wall of jejunum in chickens fed diets with plant extract could suggest villi-related protective properties of the use of the carvacrol, cinnamaldehyde and capsaicin mixture. This can explain the reduced possibility of adhesion to epithelium and number of Escherichia coli, Clostridium perfringes and fungi in the intestinal content of bird fed with XT supplemented diet. In morphometrical parameters of depth of jejunum crypt and height of villi, the influence of kind of grain and extract supplementation was observed in 21-day-old chickens only. The significant interaction between higher jejunum wall villi layer was observed only in chickens fed on maize diet supplemented with plant extract.

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