Effect of diets with different contents of soybean α-galactosides and crude fibre on modification of duodenal microstructure and selected parameters of nutrient utilization in young turkeys

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Abstract

The aim of the present study was to assess the physiological response of growing turkeys' duodenal surface to dietary replacement of a common dietary component – soybean meal (SBM) with a soy protein isolate (SPI), as this treatment was associated with almost complete removal of α-galactosides from the diet (from 2.44 to 0.15%). Additionally, the utilization of selected dietary ingredients upon dietary treatments was recorded. Effects of raffinose-family oligosaccharides were assessed as well in low- and high-fibre dietary environment (3.5 and 5.3% of crude fibre, respectively). This study revealed that the duodenal morphological parameters were differently affected by dietary treatments at different production stages, i.e. at 4 and 8 weeks of life. Although villus height/crypt depth ratio (VCR) was insignificantly decreased by high-α-galactoside treatment in younger 4-week birds, the presence of these oligosaccharides in the diet positively influenced the VCR index in 8-week turkeys. A similar tendency was observed when calcium retention was considered. Different contents of dietary crude fibre affected the physiological action of α-galactosides, including duodenal crypts depth and phosphorus retention in the 4-week birds, as well as duodenal goblet cells number and nitrogen utilization in the older turkeys. A high content of α-galactosides in the diet resulted in increased hydration of intestinal contents, but without a significant decline in the dry matter digestibility and utilization of nitrogen, calcium and phosphorus. Having in mind the development and physiology of the GIT, it may preliminary be concluded that in later production stages, total withdrawal of soybean α-galactosides from turkeys' diets does not seem to be nutritionally advisable.

Key words: soybean α-galactosides, fibre, intestinal morphology, nutrient utilization, turkeys

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