

EFFECT OF DIFFERENT PROCESSING METHODS AND TYPE OF DIETARY FIBER ON ILEAL PROTEIN DIGESTIBILITY OF BROILER AT 42 DAYS OF AGEZeinab Panahpour^{1*}, Abbas Ali Gheisari², Mohamad Mehdi Gheisari³, Meisam Kochakzad⁴

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Introduction: Digestion of nutrient depends on availability of them and concentration of digestive enzymes in small intestine. Several feeding strategies have been proposed to improve digestion, including use of highly digestible ingredients feeds, enzyme supplementation, heat processing and inclusion of moderate amount of fiber (Gonzalez-Alvarado et al., 2008). Heat processing modifies the composition and availability of nutrient and other components in raw materials by gelatinization of starch, denaturation of protein and inactivation of anti-nutritional factors (Engberg et al., 2002 and Sun et al., 2006). Furthermore, it is widely accepted that a reduction in the crude fiber content of the diet increases nutrient digestibility in broilers but Gonzalez-Alvarado et al. (2008) observed that the inclusion of fiber in diet improves nutrient digestibility, probably through stimulating gizzard activity and improving enzyme secretion. The aim of this study was to investigate the effect of different processing methods and type of dietary fiber on ileal protein digestibility of broilers at 42 days of age.

Materials and methods: In a completely randomized design with factorial arrangement (2×5) with 10 treatments and four replicates, a total of 560 one day old broiler chicks (Ross 308) were used in this experiment. The 10 dietary treatments consisted of five sources of fiber (none, 3% rice hull, 3% wheat straw, 3% sugar beet pulp, and 0.5% processed fiber), by 2 processing (mash and pellet). Starter (1 to 21 d) and grower (22 to 42 d) experimental basal diets were formulated to meet or exceed NRC (1994) nutrient requirements for broilers. Acid insoluble ash (AIA), as an internal marker, was measured to determine ileal protein digestibility.

Results and discussion: Processing method had significant effect on ileal protein digestibility ($P < 0.05$); broilers fed pelleted diet had highest ileal protein digestibility. Form of feed is one of the most important factors which influence digestibility and performance of the broilers so that in heat processing under moisture, availability and nutrient digestibility are increased by starch cereal gelatinization and physico-chemical structure change. Inclusion of fiber source in broiler's diet hadn't any negative effect on ileal protein digestibility and even inclusion of fiber sources such as rice hull and wheat straw, same as control group, increased ileal protein digestibility. This result is supported by the finding of Gonzalez-Alvarado et al. (2008) that the inclusion of fiber sources in broilers diets increases the nutrient digestibility and absorption. Diets rich in fiber remain longer in the upper GIT and might be digested more completely because of increased peristalsis, production of hydrochloric acid, pepsin, bile salt concentration and nitrogen and energy retention absorbed. Furthermore, heat processing has consolidated effects of inclusion of fiber source in broilers so that ileal protein digestibility in the groups fed pellet diets is significantly higher than groups fed mash diets with same compositions and type of fiber sources as that of the pellet diet ($P < 0.05$).

Keywords: Broiler, Processing methods, Fiber, Ileal protein digestibility

References:



- Engberg RM, Hedemann MS, Jensen BB. 2002. The influence of grinding and pelleting of feed on the microbial composition and activity in the digestive tract of broiler chickens. *British Poultry Science*, 43: 569-579.
- Gonzalez-Alvarado JM, Jimenez-Moreno E, Valencia DG, Lazaro R, Mateos GG. 2008. Effects of fiber source and heat processing of the cereal on the development and pH of the gastrointestinal tract of broilers fed diets based on corn or rice. *Journal of Poultry science*, 87:1779–1795.
- Jimenez-Moreno E, Gonzalez-Alvarado JM, Lazaro R, Mateos GG. 2009a. Effects of type of cereal, heat processing of the cereal, and fiber inclusion in the diet on gizzard pH and nutrient utilization in broilers at different ages. *Journal of Poultry Science*, 88: 1925-1933.
- Sun T, Learke HN, Jorgensen H, Bach Knudsen KE. 2006. The effect of extrusion cooking of different starch sources on the in vitro and in vivo digestibility in growing pigs. *Journal of Animal Feed Science and Technology*, 131:66-85.



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