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Editorial

Interactive Effects of Glycine and Threonine in Low Protein Broiler Diets on Performance, Blood Ammonia Level, Intestinal Mucosa Development and Nutrient Digestibility

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In most parts of the world, about 90% of the diets are based on soy and corn. Due to the excessive increase in the price of foodstuffs in recent years, tendency to decrease the level of protein produced from soy and corn has been increased. Due to the feeding of excess AA above requirement and also inefficiency of AA absorption in gastrointestinal tract, about 70 to 75% of ingested nitrogen be excreted. This excreted nitrogen remains in the litter, and part of this is subsequently converted to ammonia by bacterial fermentation and diffuses into the air through volatilize elevated ammonia concentrations in broiler houses and may be cause some problems such as poor performance and immunity and occurring respiratory problems both in the poultry and in humans. An effective strategy to reduce environmental pollution is reducing dietary CP content by supplementation with the adequate commercially available AA. Attempts to decrease CP content of broiler diets have been successful to a point, but most researchers agree that reduction of CP has some noxious effects on performance and appetite. This failure is seen even with providing all requirements for those amino acids considered as essential. Failure to obtain optimum result in performance may be attributed to one or more of the following factors including: potassium concentrations and dietary electrolyte balance, concentrations of essential AA, ratio of essential AA to CP level, addition of non-essential AA, the ratio of Trp to other large neutral AA, and imbalances among certain amino acids such as Arg to Lys, Lys to Thr and between branched-chain amino acids. Based on the assumption that the non-essential amino nitrogen may likely become a limiting factor in the low-CP diets, Glycine is considered a limiting AA for broiler chickens during the starter phase, and for this reason, the Gly requirement has been determined specifically for birds at this stage. The non-protein synthesis roles of Gly are as a precursor to glutathione, nucleic acid bases, heme, creatine, uric acid and bile acids along with methyl group metabolism. There are multiple metabolic pathways that ultimately promote the synthesis of Gly. Threonine is precursor of Gly that considered being the third limiting amino acid for broilers fed corn-soybean meal diets. This influences proper development and function of the intestines of chickens because it is the main AA in intestinal mucin. This glycoprotein plays a crucial role in maintaining the intestine and protecting it from chyme acidity, digestive enzymes, and pathogens. Furthermore, mucin plays a role in filtering nutrients in the gastrointestinal tract, thereby affecting the digestion and absorption of nutrients. It is possible that Gly supplementation could indirectly influence mucin production by preventing Thr catabolism into Gly or directly by serving as a substrate for the protein backbone of mucin because the central domain of mucin is Gly-rich. Additionally, Thr is a major component of plasma γ-globulin in poultry and is crucial for the function of immune system. Most of studies in Gly and Thr interactive effect in broiler feeding focuses more on growth performance parameters and less on mucin secretion dynamic, intestinal mucosal development and nutrients digestibility. Based on this information, the objectives of the present study are evaluation of Gly requirements in a low-CP diet with different levels of Thr, and their supplementation effects on performance, Blood ammonia level, mucin secretion, intestinal mucosal development and nutrients digestibility of broiler chickens from 8 to 28 d post hatch. The basal diet with reduced protein content will be formulated based on corn and soybean meal to supply male broiler nutritional recommendations as suggested by Rostagno., *et al*. (2011), except for crude protein, total Gly+Ser and Thr. The other experimental diets will be obtained by supplementing

the basal diet with Gly and L-Thr. A total of 480 male broilers will be fed a commercial starter diet from day 0 to 7, an experimental diets from day 8 to 28. A factorial arrangement in randomized complete design will be performed using of 4 levels of Gly+Ser (1.78, 1.91, 2.04 and 2.17%) and 2 levels of Thr (0.85 and 0.99%) in a low crude protein (18%) diet. 480 male broiler chickens of Rass-308 were allocated to each of 8 treatments with 5 replicates of 12 birds.

Broilers will be weighed in every pen at 1, 7, 14 and 28d of age for performance evaluation (feed intake, weight gain and feed conversion ratio). Broiler mortality will be recorded daily to correct the conversion ratio. For digestibility trial chromic oxide (Cr_2O_3) will be used as indigestible marker. The experimental diet will be supplemented with 0.5% Cr_2O_3 five days before determining the ileal digestibility of nutrients (d 28). At 28d of age birds will be weighed, one birds from each of 8 treatments within 5 replications will be selected randomly and will be weighed, Blood samples will be collected from wing veins and centrifuged to determine serum ammonia, uric acid, creatinine, serum immune parameters (immunoglobulin A, IgG). After that, broilers will be euthanized by cervical dislocation and necropsied immediately. The whole gastrointestinal tract will be rapidly removed and ileal digesta will be rinsed gently with distilled water into plastic containers, subsequently will be freeze-dried, and grounded before analyses, then approximately 2-cm segments of mid-jejunum and mid-ileum will be removed to determine intestinal morphometry (villi length, width, depth and Goblet cell count), bursa, thymus, and spleen, liver will also be collected and weighed to obtain the relative of immune organ weight. Also, the pectoral muscles will be removed to analyses muscle creatine content. Diets and ileal digesta will be analyzed for DM, chromium content GE and CP. Additionally, the chromium ratio in the diet to that in the ileal digesta will be used to calculate intestinal crude mucin content on a DM intake basis (Horn., *et al*. 2009), crude mucin from the ileal digesta will be extracted according to an ethanol precipitation method (Horn., *et al*. 2009), finally samples, will be used to determine sialic acid as standards. The obtained data will be analyzed with suitable statistical methods and the results will be reported.

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