

Effects of Novel Protease Enzyme From *Bacillus subtilis* on Low Protein and Low Energy Guar Meal (*Cyamopsis tetragonoloba*) Meal Based Diets on Performance and Nutrients Digestibility in Broilers

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Abstract : The supplemental effects of novel protease produced from *Bacillus subtilis* K-5 and beta-mannanase were evaluated on growth performance, carcass characteristics, nutrients digestibility, blood profile and intestinal morphometry of broilers fed guar meal (*Cyamopsis tetragonoloba*) based diets with reduced Crude Protein (CP), Essential Amino Acids (EAAs), and Metabolizable energy (ME) contents. One-day old Ross 308 broiler chicks (n=360) were randomly allotted to thirty six experimental units in a way that each of the nine dietary treatments received four replicates with ten birds per replicate. A control diet without guar meal (0GM) was formulated with standard nutrient specifications of Ross 308 for the starter and finisher phases. Two negative control diets, one with 5% (5GM) and second with 10% (10GM) guar meal, were formulated with reduction of 5% CP, 5% EAAs and 80 Kcal/kg ME. These three basal diets (no enzyme) were supplemented with novel protease enzyme (PROT) and commercial beta-mannanase (Beta-M) enzyme. The birds were reared up to 35d of age. The data on weekly body weight gain (BWG) and feed intake were recorded to compute feed:gain for the starter (0-21d) and finisher (22-35d) phases. At the end of 35d of experimental period, four birds per experimental unit were randomly selected for blood samples collection and later slaughtered for ileal digesta, intestinal tract and carcass trait sampling. The data on overall performance (1-35d) indicated improved ($P<0.05$) BWG and feed:gain in birds supplemented with PROT (1.41% and 1.67) and Beta-M (2.79% and 1.64) than non-supplemented groups. Improved ($P<0.05$) carcass yield, breast meat yield and thigh meat yield were noted with the supplementation of Beta-M. However, non-significant ($P>0.05$) effect on carcass traits was noted in broiler fed guar meal based PROT supplemented diets. Crude protein digestibility, nitrogen retention (Nret) and apparent digestibility coefficient for nitrogen (ADCN) were improved ($P<0.05$) only with PROT. The improvement in apparent metabolizable energy (AME) and apparent metabolizable energy corrected for nitrogen (AMEn) was noted ($P<0.05$) with both supplemented enzymes. However, no effect ($P>0.05$) of enzyme addition was noted on blood glucose, total protein and cholesterol. Improved villus height of duodenum, jejunum and ileum was noted ($P<0.05$) with the addition of both enzymes. The EAAs digestibility was improved ($P<0.05$) only with PROT. In conclusion, beta-mannanase and protease supplementation better improved the overall bird performance in low nutrient profile guar meal based diets than non-supplemented diets.

Keywords : novel protease, guar meal, broilers, low protein diets, low metabolizable energy diets, nutrients digestibility

Conference Title : ICAN 2024 : International Conference on Animal Nutrition

Conference Location : Vancouver, Canada

Conference Dates : May 20-21, 2024