

Effect of Prebiotic Fermacto® on Gut Development and Performance of Broiler Chickens Fed Diet Low in Digestible Amino Acids

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Abstract: A complete randomized design experiment with 9 dietary treatments was conducted to evaluate the effect of prebiotic Fermacto® and digestible amino acid levels on performance, gut development and transit time of feed of Ross male broiler chicks. Each diet was fed to five pens of 12 chicks each, during starter (0-21 day), grower (22-41 day) and finisher (42-47 day) periods. Three diets were provided to meet 100 (control), 95 and 90% of Recommended Digestible Amino Acids (RDAA) of starter, grower and finisher periods. The starter and grower diets were further subdivided into 3 parts and supplemented with 0.0, 0.0; 2.0, 2.0 and 2.0, 1.0 g kg⁻¹ Fermacto®, respectively. Body Weight Gain (BWG) and feed intake (FI) was recorded and Feed Conversion Ratio (FCR) was calculated during 1-21, 22-41, 42-47 day. The carcass yield and cuts of broiler chicks were measured at the end of the experiment. Chick weight was recorded individually to determine the uniformity at day 7, 21 and 47. Chromic oxide at the rate of 0.3% was added to each diet to determine the Gastrointestinal Transit Time (GTT) at day 16 and 32. Tissues from the midpoint of ileum and jejunum was excised to assay the lactobacillus bacteria counts in ileum and villi height, surface area and lamina propria thickness in jejunum of chicks at 21 day of age. Fermacto® supplementation of starter and grower diets improved BWG, FCR, breast yield and gut development regardless of DAA levels in diet. Addition of more than 1.0 g kg⁻¹ Fermacto® in the grower diet did not further improve the BWG or FCR. Flock uniformity was increased ($p < 0.05$) by the inclusion of Fermacto® in diet as compared to non-Fermacto® treated at day 21 when fed 100 or 90% RDAA diets. Fermacto® prolonged the GTT of feed and increased ($p < 0.05$) the ileal lactobacillus counts and improved the jejunal histological traits. Performance and breast yield of broiler chickens fed 95% RDAA diet was similar to those fed control diet, whereas birds fed diet contained 90% RDAA were significantly smaller and less efficient as compared to control birds. Formulating diet based on 95% RDAA did not have a negative effect on performance, but may decrease environmental pollution and cost of broiler chicken production. A 10% decrease in RDAA increased AF, lowered GTT, ileal lactobacillus counts and weakened jejunum morphometry.

Key words: Prebiotic Fermacto®, gut development, feed transit time, digestible amino acids, broiler performance

INTRODUCTION

The currently used feed additives in broiler diets aim to enhance nutrient utilization by means of diverse mechanisms. It is suggested that enhance effect of nutrient uptake of feed additives might be detected, when a marginal digestible amino acid deficient diet is fed to broiler chickens. In the modern intensive poultry production, newly hatched chicks have little chance to contact with hen, thereby normal microflora is slowly colonized in the intestine. Due to possible hazards and risks of antibiotics in poultry production, the importance of using prebiotics as an alternative has increased more

than ever (Fuller, 1989). Fermacto® is a microbial feed supplement derived from *Aspergillus Mycelium* (AM) has been used as an alternative tool for helping newly-hatched chicks. Fermacto is shown to affect the host animal through stimulation of growth and/or improvement in intestinal microbial balance (Mamiak, 1993; Tangendjaja, 1993). Kim *et al.* (2003) reported that feeding Fermacto supplemented diet to broiler chickens significantly enhanced feed intake and body weight gain. Supplementation of 2 g kg⁻¹ AM to normal and insufficient protein diets for both young and old laying hens resulted in a longer transit time of feed (212 vs. 196±4.6 min) in gastrointestinal tract (Grimes *et al.*, 1997).

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