



IMPACT OF KEMZYME MAP DRY ON THE PERFORMANCE OF BROILERS FED WITH WHEAT SOYA BASED DIETS

Chinnadurai Sugumar and L.V Bindhu
Kemin Animal Nutrition and Health (Asia-Pacific)

Abstract

A trial was conducted to evaluate the effect of KEMZYME MAP on the performance of broilers fed predominantly with wheat-soybean meal based diet. One hundred and ninety two day old Arbor Acres Plus male chicks were allocated to 2 dietary treatments that included a control feed without KEMZYME MAP and treatment feed with KEMZYME MAP @ 500 g/ton. Each treatment has provided with 6 replicates by keeping 16 birds per replicate. Feeds in mash form were fed to birds and water and feed were provided for ad libitum. The control feed ME levels were 3,100kcal/kg, 3,150kcal/kg and 3,175kcal/kg for the periods 0-3 weeks, 3-6 weeks and 6-7 weeks respectively. Results of the performance trial showed KEMZYME MAP Dry significantly improved feed conversion ratio (9.5 points, $P < 0.05$) with an increase in body weight gain of 57 g ($P > 0.05$) over control diet. These results clearly demonstrated the potential of KEMZYME MAP Dry in improving the nutrient digestibility of wheat-soybean based broiler diets.

Key words: KEMZYME MAP, multi-enzyme, broilers, wheat-soybean

Introduction

Corn and soybean meal are usually used as the major sources of energy and protein in broilers diets in Asian countries. However, wheat is considered as one of the potential alternatives for corn. Many broiler integrators in Australia and few Asian countries use wheat in diet, when the prices are economical in comparison with corn. KEMZYME MAP is a multi-enzyme product containing NSP hydrolyzing enzymes, multi-amylases and multi-proteases have been specifically developed for multi-substrates including wheat-soybean meal based diets for broilers to increase the availability of nutrients and release extra energy and amino acids from these diets. This paper explains the results of growth study conducted to evaluate the efficacy of KEMZYME MAP on the performance of broilers fed with wheat-soybean based diet.

Materials and Methods

The growth trial was conducted at Bangkok Animal Research Center (Thailand). One hundred and ninety two day old newly hatched male broiler chicks of commercial strain (Arbor Acres Plus) were randomly allocated to 2 treatments with 6 replications using 16 male birds in a pen as an experimental unit. Details of dietary treatments were given in Table 1. The experiment was conducted in a closing house with tunnel ventilation and evaporative cooling system. Birds were raised on the solid-concrete-floor pens using rice hull as bedding material. Each pen measured 1.0 m x 1.5 m and was equipped with a self-feeder and 3 nipple water drinkers. Feed and water were provided ad libitum. All experimental diets were in mash form. Cygro (maduramicin 1%) was used in feed at the level of 500 g/t to control coccidiosis. Lighting program was provided according to the Arbor Acres Plus broiler management manual. All birds were vaccinated for Newcastle and Infectious Bronchitis diseases at 7 days of age and Gumboro disease at 14 days of age. The average max/min temperature and relative humidity in the experimental house were 33.9/29.5oC and 55.32% during 0-7 days of age, 29.1/26.6oC and 75.33% during 7-21 days of age, 28.8/26.8oC and 79.24% during 21-35 days of age and 28.53/26.43oC and 78.40% during 35-42 days of age, respectively. Total pen feed consumption was recorded weekly. Body weight and feed intake as pen basis were measured for growth calculation. Mortality was recorded daily. Body weight gain, feed intake, feed conversion ratio, mortality and culled were calculated and were subjected to analysis of variance as a randomized complete block design.

Table 1. Treatments used for the growth trial.

| Diet | Details | Enzyme & Dosage (g/t) |
|-----------|--|-----------------------|
| Control | Predominantly wheat-soybean based diet | Nil |
| Treatment | Control feed + KEMZYME MAP | 500 g/t |

Table 2. Composition of experimental diets (%)

| Ingredients | Starter (0-21 days) | Grower (21-35 days) | Finisher (35-42 days) |
|-------------------------------|------------------------|------------------------|---------------------------|
| Wheat 9.49% | 45.23 | 45.57 | 44.05 |
| Soybean meal (dehulled) 49.7% | 34.40 | 27.69 | 23.64 |
| Cassava | 3.00 | 6.00 | 9.00 |
| Rice bran, full fat 11.9% | 3.00 | 4.00 | 5.00 |
| Canola meal | 2.00 | 3.00 | 4.00 |
| Palm oil | 7.97 | 9.98 | 10.63 |
| Monocalcium phosphate | 1.29 | 1.24 | 1.21 |
| Limestone 39.9% | 1.56 | 1.35 | 1.24 |
| Salt | 0.37 | 0.32 | 0.26 |
| DL-Methionine | 0.33 | 0.21 | 0.26 |
| L-Lysine HCl | 0.20 | 0.06 | 0.11 |
| L-Threonine | 0.11 | 0.04 | 0.08 |
| Choline Chloride 60% | 0.09 | 0.09 | 0.07 |
| Sodium bicarbonate | 0.15 | 0.15 | 0.15 |
| BS premix | 0.20 | 0.20 | 0.20 |
| Toxin binder | 0.05 | 0.05 | 0.05 |
| Coccidiostat (Maduramicin 1%) | 0.05 | 0.05 | 0.05 |
| Total | 100.00 | 100.00 | 100.00 |

Calculated analysis

| Nutrients | Unit | | | |
|-------------------|---------|-------|--------|--------|
| Dry matter | % | 89.95 | 90.19 | 90.30 |
| ME for poultry | kcal/kg | 3000 | 3125 | 3175 |
| Crude protein | % | 23.00 | 20.00 | 18.50 |
| Crude fat | % | 9.702 | 11.785 | 12.541 |
| Linoleic acid | % | 1.326 | 1.481 | 1.509 |
| Crude fiber | % | 3.205 | 3.172 | 3.232 |
| Dig.Lys (poultry) | % | 1.240 | 0.970 | 0.920 |
| Dig.Met (poultry) | % | 0.610 | 0.460 | 0.480 |
| Dig.Cys (poultry) | % | 0.308 | 0.273 | 0.249 |
| Dig.M+C (poultry) | % | 0.938 | 0.765 | 0.774 |
| Dig.Thr (poultry) | % | 0.810 | 0.650 | 0.640 |
| Dig.Trp (poultry) | % | 0.251 | 0.219 | 0.200 |
| Dig.Arg (poultry) | % | 1.396 | 1.206 | 1.096 |
| Dig.Val (poultry) | % | 0.931 | 0.817 | 0.751 |
| Dig.Ile (poultry) | % | 0.803 | 0.699 | 0.637 |
| Dig.Leu (poultry) | % | 1.455 | 1.271 | 1.162 |
| Lysine | % | 1.396 | 1.108 | 1.049 |
| Arginine | % | 1.557 | 1.347 | 1.226 |
| Methionine | % | 0.662 | 0.514 | 0.538 |
| Met + Cys | % | 1.052 | 0.868 | 0.871 |
| Cystine | % | 0.390 | 0.354 | 0.334 |

| | | | | |
|----------------------|-----|-------|-------|-------|
| Threonine | % | 0.956 | 0.779 | 0.760 |
| Tryptophan | % | 0.289 | 0.253 | 0.231 |
| Gly + Ser | % | 2.100 | 1.947 | 1.883 |
| Histidine | % | 0.584 | 0.513 | 0.472 |
| Isoleucine | % | 0.985 | 0.854 | 0.777 |
| Leucine | % | 1.631 | 1.427 | 1.307 |
| Valine | % | 1.074 | 0.945 | 0.871 |
| Phenylalanin | % | 1.019 | 0.899 | 0.827 |
| Calcium | % | 1.000 | 0.900 | 0.850 |
| Phosphorus-total | % | 0.686 | 0.667 | 0.661 |
| Phosphorus-available | % | 0.450 | 0.420 | 0.400 |
| Non phytate | % | 0.396 | 0.378 | 0.368 |
| Potassium | % | 0.993 | 0.903 | 0.862 |
| Choline | ppm | 2000 | 1875 | 1750 |
| Sodium | % | 0.200 | 0.180 | 0.160 |
| Chloride | % | 0.234 | 0.202 | 0.170 |
| Salt | % | 0.379 | 0.330 | 0.281 |

Results and discussion

Results of the performance trial showed (Table 3) KEMZYME MAP significantly improved feed conversion ratio (9.5 points, $P < 0.05$) with an increase in body weight gain of 57 g ($P > 0.05$) over control diet.

Table 3. Effect of KEMZYME MAP broiler growth performance.

| | Positive control | Negative control + KEMZYME MAP |
|----------------------|--------------------|--------------------------------|
| Body weight (g/bird) | 2903 ^a | 2961 ^a |
| Feed intake (g/bird) | 5545 ^a | 5373 ^b |
| FCR | 1.910 ^a | 1.815 ^b |

^{a, b}. Means with different superscripts are significantly different ($P < 0.05$).

In this study, digestibility of NSPs, starch and proteins were maximized through the use of an optimum combination of NSP enzymes, multi-amylases, and multi-proteases. The beneficial effect of KEMZYME MAP supplementation may be attributed to a combination of different factors such as (1) the elimination of the nutrient encapsulating effect of the cell walls thereby improving energy and amino acid availability, (2) solubilization of cell wall, NSPs for more effective hindgut fermentation and improved overall energy utilization, (3) maximizing digestibility of protein by maintaining protease action throughout the GI tract and (4) hydrolysis of different types of amylolytic linkages in starch thus maximizing digestibility and (4) elimination of the anti-nutritive properties of dietary components, including NSP, by their enzymatic hydrolysis to the prebiotic type components which, in turn, may facilitate gut development and health in chicken.

These results clearly demonstrated the potential of KEMZYME MAP in improving the nutrient digestibility of wheat-soybean based broiler diets.

Return on investment (ROI) for KEMZYME MAP: KEMZYME MAP supplementation to wheat-soybean meal based broiler diets could effectively improve broiler growth performance which leads to a net return of USD 29.63/ton of feed and a corresponding ROI of 1:10 (Table 4). For every 10,000 ton of feed, use of KEMZYME MAP at 500g/t gives a profit of 3 million USD/annum.

Table 4. Value added calculator for KEMZYME MAP supplementation based on growth performance

| | Control | Treatment |
|--|---------------|---------------|
| Broiler PERFORMANCES | | |
| LIVABILITY (%) | 100.0 | 100.0 |
| MORTALITY (%) | 0.00 | 0.00 |
| FINAL WEIGHT (g) | 2903 | 2960 |
| FINAL WEIGHT (kg) | 2.90 | 2.96 |
| F.C.R. | 1.910 | 1.815 |
| FEED CONSUMED per BIRD (Kg) | 5.545 | 5.373 |
| COST OF Animal PRODUCTION | | |
| Live weight (Kg) per kg of feed | 0.52 | 0.55 |
| Live weight (kg) per ton of feed | 523.56 | 550.96 |
| Feed cost per kg live wt (USD) | 0.242 | 0.257 |
| REVENUES | | |
| REVENUE from live weight for every ton of feed (USD) | 680.63 | 716.25 |
| Gross Income (USD/ton of feed) | 217.63 | 250.25 |
| Relative % | 100.00 | 114.99 |
| Gross Returns from Kemzyme MAP (USD/ton) | | 32.63 |
| Investment for Kemzyme MAP (USD/Ton) | | 3.00 |
| Net return from Kemzyme MAP (USD/ton) | | 29.63 |
| Return On Investment | | 10.88 |

Conclusion

The aim of the present study was to evaluate the effect of KEMZYME MAP, a multi-enzyme product containing NSP hydrolyzing enzymes, multi-amylases and multi-proteases, on the production performance of wheat-soybean meal based diet of broiler birds. Results of the performance trial showed KEMZYME MAP significantly improved feed conversion ratio (9.5 points, $P < 0.05$) with an increase in body weight gain of 57 g ($P > 0.05$) over control diet. KEMZYME MAP supplementation to broiler diets could effectively improve broiler growth performance which leads to a net return of USD 29.63/ton of feed and a corresponding ROI of 1:10 (Table 4). For every 10,000 ton of feed, use of KEMZYME MAP at 500g/t gives a profit of 3 million USD/annum

References

PO-11-00097 Improving nutritional quality of broiler diets using a multi-substrate KEMZYME product