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**Abstract**

The purpose of the study was to determine the effects of phytase-predigested palm kernel meal (PKM) on nutrient utilization and growth performance of broilers. The study was divided into 3 experiments. Experiment 1 evaluated the effects of phytase predigestion methods on the amount of inorganic phosphorus (iP) or available phosphorus (aP) released from PKM. A 3x3x2x2 Factorial Arrangement experiment in Completely Randomized Design (CRD) was used. Treatments were the combinations of 4 factors. Those were: 3 levels of phytase enzyme, 500, 750 or 1,000 FTU/kg of sample; 3 types of digesting media, distilled water, 0.2% acetic acid or 0.1% hydrochloric acid; 2 levels of moisture, 30 or 50%; and 2 lengths of incubation, at room temperature, periods, 6 or 12 hours. It was found that alteration in levels of each factor significantly affected ($P<0.01$) the amount of released iP. Among those treatment combinations, 3 predigesting methods releasing the highest iP levels-500 (PKM1), 750 (PKM2) and 1,000 (PKM3) FTU phytase/kg of sample in 0.1% hydrochloric acid, 50% moisture at 12 hours incubation period-were selected for further investigation. Available phosphorus of PKM1, PKM2 and PKM3 were 47.39, 61.24 and 68.04% of total phosphorus in PKM or 0.229, 0.296 and 0.329% of sample, respectively.

Experiment 2 was to evaluate the levels of utilizable nutrients in the selected phytase-predigested PKM's in broilers at 3 and 6 weeks of age. Four kinds of palm kernel meal-PKM, PKM1, PKM2 and PKM3-were individually fed at 10 g/d to 3-weeks-old broilers and a similar study using 6-weels-old broilers, individually fed at 25g/d, was subsequently repeated. At 3 weeks of age, the dry matter digestibility was similar across treatments; however, the true metabolizable energy (TME), nitrogen-corrected TME (TMEn) and the utilizable nitrogen, calcium and phosphorus in each predigested PKM's were significantly higher than those of the PKM ($p<0.05$). Also, the utilizable levels of all five nutrients significantly increased with the increasing levels of phytase used in predigestion. The TME values of PKM, PKM1, PKM2 and PKM3 were 2.96, 3.23, 3.29 and 3.38 Kcal/g and the TMEn were 2.95, 3.22, 3.28 and 3.36 Kcal/g, respectively. The PKM1 had true digestibility of dry matter, nitrogen, calcium and phosphorus at 63.04, 76.60, 58.99 and 81.00%, PKM2 had at 59.62, 76.81, 60.40 and 79.75% and PKM3 had at 64.84, 82.78, 58.64 and 79.83%, respectively. At 6 weeks of age, the true digestible dry matter, TME and TMEn were not significantly different among treatments. Again, the utilizability of nitrogen, calcium and phosphorus in PKM1, PKM2 and PKM3 were significantly higher than those of PKM ($p<0.05$). True digestibility of nitrogen, calcium and phosphorus were 84.72

39.63 and 45.14% for PKM, 86.66 50.56 and 56.21% for PKM1, 86.84 49.90 and 57.92% for PKM2 and 88.63 49.53 and 63.47% for PKM3, respectively.

Experiment 3 was to evaluate the effects of phytase predigestion of PKM on growth performance of broiler during 0-6 weeks of age. Four hundreds one-day-old Arbor Acres broiler chicks were used in a 5 treatments-4 replications of 20 birds CRD experiment. The five dietary treatments were: Diet 1 PKM, birds were fed corn-soybean meal basal diet containing PKM at 10% during 0-3 weeks and at 15% during 3-6 weeks; Diet 2 PKM+, similar to diet 1 but the diets were supplemented with phytase enzyme at 500 FTU/kg; Diet 3 PKM1, similar to diet 1 but the PKM was replaced, at the similar amounts, by PKM1; Diet 4 PKM2, similar to diet 1 but replacing PKM by equal amounts of PKM2 and Diet 5 PKM3, similar to diet 1 but contained PKM3. At the end of 6 weeks tested period, the body weight gain (BWG), feed intake (FI), feed conversion ratio (F/G), feed cost per kg BWG and carcass dressing percentage of broilers in all treatments were not significantly different ($P>0.05$). Also, the length and weight of tibia bone (before or after fat extraction) were similar across treatments. However, the width of tibia bone of broilers fed PKM3 was wider than those in PKM and PKM+ ($P<0.05$), but not significantly different from those fed with PKM1, and PKM2. Similarly, the porosity score of tibia bones from broilers fed PKM3 was the highest and significantly higher ($p<0.01$) than the others particularly that of the PKM+, the lowest one. Tibia ash percentage of the PKM and predigested PKM's broilers were significantly higher ($p<0.05$) than that of the PKM+. Similarly, calcium and phosphorus contents of tibia bone of the PKM3 broilers (14.70 and 8.18%) were significantly higher ($p<0.05$) than those of PKM (14.28 and 7.46%), PKM+ (13.08 and 7.46%), PKM1 (13.08 and 7.60%) and PKM2 (14.39 and 7.82 %). Results of the studies indicated that predigestion of PKM significantly increased the availability of phosphorus and the recommended inclusion levels of predigested PKM's were not over 10% of starter and 15% of finisher broiler diets.