

the NRC (1994) requirements for broiler chickens. The analyzed composition of the Creamer consisted of moisture 5.21%, crude protein 3.02%, crude fat 5.86%, crude fiber 2.42%, and crude ash 3.27%. From d 28 to 35, chromic oxide (0.2%) as an indigestible marker was added to diets for determination of nutrient digestibility of dry matter (DM), Calcium (Ca), phosphorus (P), and nitrogen (N). All data were statistically analyzed using the GLM procedure of the SAS program (SAS Inst. Inc., Cary, NC, USA). Differences among treatments were separated by Tukey's range test. The broilers were weighed by pen and feed intake (FI) and the number of living broiler chickens were recorded on d 7, 21, and 35. This information was then used to calculate body weight gain (BWG), feed conversion ratio (FCR). With regards to meat quality, no adverse effects were observed among the treatments. However, a higher score ($P < 0.05$) in redness was observed in T3 (10.68) than T1 (9.63). In addition, the relative weight of breast muscle was reduced ($p < 0.05$) in T3 (13.97) compared with T1 (15.74). There were no significant differences on BWG, FCR and nutrient digestibility among the treatments in both starter and grower phases. There were no negative effects on growth performance, meat quality, and nutrient digestibility were observed. In conclusion, non-dairy creamer could be a kind of fat sources additive in broiler diets, but further studies are needed to test the optimum levels of NDC to be supplemented in the diets of broilers.

Key Words: non-dairy creamer, growth performance and nutrient digestibility, broilers

NONRUMINANT NUTRITION I: MINERALS

242 Effects of Dietary P Concentrations in Response to Increasing Dietary Ca Concentrations on Growth Performance of Nursery Pigs. F. Wu*, M. D. Tokach, J. M. DeRouchey, S. S. Dritz, J. C. Woodworth, R. D. Goodband, *Kansas State University, Manhattan, KS*

A total of 360 pigs (initially 6.0 ± 1.08 kg BW) were used in a 45-d study to determine the effects of 2 standardized total tract digestible (STTD) P concentrations on growth performance of nursery pigs fed increasing dietary Ca. In a completely randomized design, pens of pigs (6 pens/treatment) were randomly allotted to 1 of 6 dietary treatments. Dietary treatments were arranged in a 2×3 factorial with main effects of STTD P (at or above NRC, 2012 recommended levels) and total Ca (0.65, 0.90, and 1.20%). Experimental diets were fed

STTD P:	Treatment						SEM
	NRC			>NRC			
Ca, %:	0.65	0.90	1.20	0.65	0.90	1.20	
d 0 to 24							
ADG, g	230	226	195	236	226	224	8.1
G:F, g/kg	760	725	639	761	753	738	16.3

during phase 1 (d 0 to 10) and 2 (d 10 to 24), followed by a common phase 3 diet from d 24 to 45. Diets formulated to meet NRC (2012) P requirements contained 0.45 or 0.40% STTD P in phases 1 and 2, respectively. Diets exceeding NRC (2012) P requirements contained 0.56 or 0.52% STTD P in phases 1 and 2, respectively. During the treatment period (d 0 to 24), no Ca×P interactions were observed for ADG and ADFI. Increasing Ca concentration decreased (linear, $P=0.006$) ADG, but did not affect ADFI. Feeding higher STTD P marginally increased ($P=0.084$) ADG, but did not affect ADFI, compared with pigs fed STTD P levels suggested by NRC (2012). When diets contained NRC (2012) levels of STTD P, pigs fed 1.20% Ca had lower ($P<0.05$) G:F than those fed 0.65 or 0.90% Ca; however, when high levels of STTD P were fed, G:F was not affected by the dietary Ca concentrations (Ca×P interaction, $P=0.018$). When common diets were fed from d 24 to 45, no interactive or main effects of Ca and STTD P were observed for ADG, ADFI, or final BW. However, pigs previously fed increasing concentrations of Ca had improved (linear, $P=0.003$) G:F regardless of dietary STTD P content, resulting in no evidence for difference in overall growth performance across treatments. In conclusion, excess dietary Ca decreased ADG and G:F of nursery pigs especially in low STTD P diets. The STTD P levels estimated by NRC (2012) meet the requirement of 6 to 12 kg pigs when diets contain low Ca concentrations, but result in decreased ADG and G:F when diets contain more than 0.90% Ca.

Key Words: calcium, nursery pigs, phosphorus

243 Effects of increasing salt concentration on growth performance of 11 to 30 and 27 to 65 kg pigs. D. J. Shawk*, A. B. Lerner, M. D. Tokach, S. S. Dritz, J. C. Woodworth, B. D. Goodband, J. M. DeRouchey, *Kansas State University, Manhattan, KS*

Two experiments were conducted to evaluate the effects of added salt on pigs weighing 11 to 30 kg and 27 to 65 kg. Treatments were assigned in a randomized complete block design based on BW with pen as the experimental unit. In Exp. 1, 300 pigs (DNA