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**TITLE:** Effect of two limestone sources on ileal IP6, tibia ash and performance of broilers fed diets supplemented with two phytases

**PRESENTATION TYPE:** Oral

**CURRENT CATEGORY:** Metabolism and Nutrition, Enzymes

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**IS THE PRESENTER A STUDENT AT THE TIME THE ABSTRACT IS SUBMITTED?:**

Yueming Dersjant-Li : No

**ABSTRACT BODY:**

**Abstract Body:** The effect of two limestone sources on the efficacy of two phytase products was evaluated in broilers during 0-21d of age. The limestone sources were a coarse (75% between 0.3-0.6 mm; Ca=37.4%) and a fine limestone (<0.09 mm; Ca=38.3%), with in vitro Ca solubility of 26 vs. 100% respectively after 30 minutes at pH 3. For each limestone source, positive control (PC) starter (0-10 d) and grower (10-21 d) diets were formulated (Aviagen specifications NL, 2014). Four test diets were formulated with reduced P (0.189%), retainable P (0.159%), Ca (0.199%) and Na (0.04%) contents only by exchange of MCP-P, limestone, salt and diamol vs PC and supplemented with 500 or 1000 FTU/kg of either a Buttiauxella phytase (PhyB500 or PhyB1000) or E coli phytase (PhyE500 or PhyE1000). Each treatment (10) had 8 replicates (30 Ross 308 male broilers/pen). Pelleted diets (based on corn/SBM/rapeseed meal/sunflower meal) and water were provided ad libitum. At 21 d, the left tibia bone was collected from 4 birds per pen and pooled per pen to measure defatted tibia ash. Ileal digesta were collected from 12 birds per pen, pooled for phytate P (IP6) analysis. BWG, FI, FCR were determined per phase and for overall 0-21d. Data were analysed based on a 2x5 (with PC) and 2x2x2 (without PC) factorial arrangement using JMP 11 ( $P \leq 0.05$  considered as significant). Coarse limestone improved ( $P < 0.05$ ) FI (1320 vs 1295g) and BWG (1079 vs 1056g) during 0-21d and FCR during 0-10d (1.08 vs 1.09). A limestone x diet interaction ( $P < 0.05$ ) was found for FI, BWG and FCR during 11-21d, and for FI and BWG during 0-21d, as PhyE500, PhyE1000 and PhyB500 performed worse when provided with fine limestone. Tibia ash and ileal IP6 content were not affected by limestone source. Across limestone sources, during 0-21d, PhyB1000 showed the best ( $P < 0.001$ ) BWG, FI, FCR, tibia ash and lowest ileal IP6 content compared to other phytase treatments (1089c, 1070b, 1088c, 1031a, 1059b g for BWG; 1355c, 1306b, 1325c, 1268a, 1303b g for FI; 1.225bc, 1.221ab, 1.219a, 1.23c, 1.23c for FCR; 508d, 502bc, 505cd, 482a, 498b g/kg DM for tibia ash; 3.54a, 1.07d, 0.43e, 2.03b, 1.42c %DM for ileal IP6 content, respectively for PC, PhyB500, PhyB1000, PhyE500, PhyE1000). The IP6 reduction vs PC was 70, 88, 43 and 60% respectively for PhyB500, PhyB1000, PhyE500, PhyE1000 ( $P < 0.001$ ). Across doses and excluding PC, a limestone and phytase interaction ( $P < 0.05$ ) was found for 0-21d BWG, where fine limestone reduced BWG by 3.3% for PhyE and by 1.2% for PhyB. PhyB had lower ileal IP6 content than PhyE (0.75 vs 1.73% DM). In conclusion, PhyB showed a higher efficacy and was less impacted by soluble Ca than PhyE, this is most likely due to a higher IP6 degradation rate.

**AWARDS:**

**Competition:** (none)

**Graduate or Undergraduate:** (none)

**Major Professor:** (none)

**KEYWORDS:** Limestone particle size, Ca solubility, Phytase, Broilers, ileal IP6 content.