

## **Impact of dietary calcium level and non-phytate phosphorus level on phytase efficacy in improving phosphorus digestibility of SBM in broilers**

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In addition to dietary calcium (Ca) level, non-phytate phosphorus (nPP) level may contribute to the variations of phytase efficacy on the improvement of phosphorus (P) digestibility of ingredients, as dietary nPP indicates the P deficient status of birds. Therefore, a battery study was conducted to evaluate the effect of dietary Ca level and nPP level on phytase efficacy in improving P digestibility of SBM in broilers. A total of 512 birds were allocated to 8 dietary treatments, with 8 replicate pens of 8 birds per treatment, in a completely randomized design. Eight dietary treatments were in a  $2 \times 2 \times 2$  factorial arrangement (0.59% or 1.02% dietary Ca; SBM with 0.17% nPP or SBM-dicalcium phosphate blend with 0.30% nPP; with or without 500 U/kg phytase). The source of phytase was CIBENZA® PHYTAVERSE® (Novus International Inc, St. Charles, MO). The diets were provided to birds for 40 h feeding duration (d 19 to d 21) in mash form. On d 21, all birds were sacrificed to collect ileal digesta for nutrient digestibility. Data were analyzed by three-way ANOVA to evaluate the main effect of dietary Ca level, nPP level, phytase and their interactions on P digestibility of SBM. Statistical difference was declared at  $P \leq 0.05$ . The results demonstrated no significant interaction among any of the factors on P digestibility of SBM. The addition of phytase significantly increased ( $P < 0.0001$ ) the P digestibility of SBM from 34.8% to 67.6%. Dietary nPP level showed no effect on P digestibility of SBM, nor did it impact the phytase uplift of the P digestibility of SBM. High Ca significantly decreased ( $P = 0.0003$ ) P digestibility of SBM from 55.5% to 46.9%, however, dietary Ca level didn't play a role on phytase uplift of the P digestibility of SBM. Briefly, at low Ca, dietary phytase increased the P digestibility from 40.2% to 70.8%; at high Ca, dietary phytase increased the P digestibility from 29.4% to 64.3%. In summary, the increase of dietary Ca but not nPP levels significantly decreased P digestibility of SBM. The addition of CIBENZA® PHYTAVERSE® at 500 U/kg significantly increased P digestibility of SBM by 32.7%, which was not impacted by increasing dietary Ca or nPP levels.

**Keywords:** phytase, phosphorus digestibility, SBM, calcium, non-phytate phosphorus