

526P Decreasing water-soluble phosphorus excreted via micro-encapsulation of iron sulfate and alum added in the diet of broilers. Piterson Floradin, Frédéric Guay, and Marie-Pierre Montminy*, *Laval University, Quebec, QC, Canada.*

Soluble P is highly bioavailable to macrophytes and algae and therefore readily affects water quality. Phosphates are commonly removed from municipal and industrial wastewater by precipitation with multivalent metals. Considering the cost of this practice if apply on manure, diet supplementation with these divalent cations could be an alternative. The impact of iron sulfate and alum micro encapsulated added in broiler diet on water-soluble P (WSP) excretion and phosphorus (P) and calcium (Ca) retention was studied. Experimental diets are a positive corn soy-bean meal based control diet (C+) containing all nutrient requirements, a negative control diet (C-) with 30% less dietary non-phytate P (NPP; 0.24%) and Ca (0.48%), and 8 other diets consisting in C- supplemented with 4 levels of iron sulfate (16, 26, 36, and 46 ppm Fe) or alum (7, 12, 17, 22 ppm Al) micro-encapsulated (30% mineral compound and 70% lipid matrix). Six males broiler of 14 d-old, were assigned to 1 of 10 diets with 6 cages per diet. Birds were weighted at d 14 and 28 and total excreta were collected from d 24 to 28. Data were analyzed as a randomized complete block design with PROC MIXED of SAS. Diet did not significantly affect growth performance except a reduction of ADG ($P = 0.04$) in C- compared with C+ due to lower dietary NPP. P and Ca ingested, retained, and excreted as well as retention efficiency were not modified by the addition of iron sulfate or alum, while C+ ingested, retained and excreted more P and Ca then C- ($P < 0.001$) with similar efficiency. Iron sulfate addition showed a linear ($P < 0.01$) and quadratic ($P < 0.01$) response on the WSP excretion indicating that 26 ppm resulted in the maximum WSP reduction (-24% relative to C-) followed by 36, 46, and 16 ppm (respectively, -12, -11 and -4%). Alum supplemented diets also showed linear ($P = 0.001$) and quadratic effect ($P = 0.014$) with WSP decreases of 15, 15, 19 and 16% with the increase of the dose compared with C-. In conclusion, WSP excretion is decreased as expected and this without modifying growth performances and P retention indicating that P is insolubilized after the main absorption sites.

Key Words: water-soluble phosphorus, iron, alum, broiler