beyond the US recommended level (81%), DON poses the greatest threat from US corn DDGS samples.

**Key Words:** trichothecene, deoxynivalenol, zearalenone, fumonisin, cooccurrence

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### 332 Influence of origin of the bean on the chemical composition, particle size, and color of soybean meal. Lourdes Cámara, Guillermo Fondevila, Pablo Álvarez, Diego Rodríguez, Paloma García-Rebollar, and Gonzalo Mateos*, Universidad Politécnica de Madrid, Madrid, Spain.

A total of 79 soybean meal (SBM) samples from Argentina (ARG; n = 44), Brazil (BRA; n = 18), and USA (n = 17) were collected for 2 consecutive years at arrival of the vessel to European ports to study the effects of soybean origin on the chemical composition, amino acid profile, color, particle size, and protein quality variables. The effects of soybean origin on the chemical composition (DM, ash, CP, amino acid profile by NIR, EE, CF, NDF, sucrose, raffinose, stachyose, and macro and trace minerals) and protein quality variables [KOH solubility (%), protein dispersability (PDI, %), urease activity (UA, mg N/g), trypsin inhibitor activity (TIA, mg/g DM), and heat damage index (HDI)]. In addition, the particle size distribution and the geometric mean diameter $\pm$ Log normal SD (GMD $\pm$ GSD) and color [lightness ($L^*$), redness ($a^*$), and yellowness ($b^*$)] of the samples was determined.

Data were analyzed using the Mixed procedure of SAS with origin of the beans as main factor. On DM basis, ash content was higher for the ARG meals than in the USA meals with BRA meals being intermediate ($P < 0.05$). Brazilian meals had more protein than ARG and USA meals ($P < 0.01$). EE content was higher for the USA meals than for the ARG meals with BRA meals being intermediate ($P < 0.05$). Crude fiber was not affected by the origin of the meals, in spite of the higher CP content of the BRA meals. Stachyose and sucrose were higher ($P < 0.001$) for the USA meals than for the BRA and ARG meals. The K content was higher ($P < 0.001$) for ARG meals than for the BRA and USA meals, whereas Fe content was higher ($P < 0.001$) in BRA meals than in ARG and USA meals. USA meals had more Arg, Lys, Met+Cys, and Trp per unit of protein (CP) than BRA meals ($P < 0.01$) with ARG SBM being usually in an intermediate position. As a result, the percentage of the 5 critical AA in the protein fraction was higher for the USA meals than for BRA meals. PDI, KOH, and TIA values were higher for the USA and BRA meals than for the ARG meals ($P < 0.001$). Heat damage index, a measurement of Maillard reactions, was lower for the USA meals than for the ARG meals, and lower both than for the BRA meals. Brazilian meals had higher GMD ($P < 0.001$) than the ARG and USA meals. USA meals had greater $L^*$ and lower $a^*$ values ($P < 0.001$) than BRA meals. In summary, chemical composition, protein quality, particle size, and color of the meals varied widely with the origin of the beans, which may affect the protein quality and nutritive value of SBM depending on soybean origin.

**Key Words:** early feed restriction, spices, broiler, performance

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### 334 Effects of the inclusion of xylanase and protease on growth performance and nutrient retention in broilers fed wheat or maize as the main component of the diet. Guillermo Fondevila1, Lourdes Cámara1, Vanessa Chucho1, Joan Archs1, Adam Smith1, and Gonzalo Mateos1, *Universidad Politécnica de Madrid, Madrid, Spain, 2DSM Nutritional Products (UK) Ltd, Heanor, United Kingdom.

The effects of including a xylanase (RONOZYME WX, DSM Nutritional Products) and a protease (RONOZYME ProAct, DSM Nutritional Products), individually or in combination, into the diet was studied in broilers fed either wheat or corn. There were 12 treatments organized as a 3 x 2 factorial, with 3 cereals (wheat with 11.0% CP (LPW), wheat with 12.3% CP (HPW), and corn), 2 levels of xylanase (0 or 200 ppm), and 2 levels of protease (0 or 200 ppm). Each treatment was replicated 6 times ($n = 8$ chicks). Birds were fed their respective experimental diets (96% cereal plus phytase and 4% of a N free diet) from 16 to 21 d of age. Growth performance, total-tract apparent retention of DM, organic matter, CP, and gross energy, and AMEn of the diets were measured in this period. No interactions among main effects were observed for growth performance traits. Broilers fed the corn based diet showed lower BW gain and poorer FCR ($P < 0.001$) than broilers fed the wheat based diets, probably because of the reduced indispensable AA content of the corn. However, nutrient retention and AMEn were greater for the corn ($P < 0.001$). Enzyme supplementation improved FCR (4.60 vs 4.25; $P < 0.001$ for xylanase and 4.53 vs. 4.32; $P < 0.05$ for protease as main effects). Also, both enzymes improved BW gain of the birds, but the differences were significant only with xylanase inclusion ($P <