

Utilization of sorghum distillers dried grains in extruded and steam pelleted shrimp diets

Akinbode A. Adedeji^{1,2}, Yangen Zhou³, Xiaoyun Fang³, D. Allen Davis³, Adam Fahrenholz⁴ & Sajid Alavi^{*1}

¹Department of Grain Science and Industry, Kansas State University, Manhattan, KS, USA

²Department of Biosystems and Agricultural Engineering, University of Kentucky, KY, USA ³School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn University, Auburn, AL, USA

⁴Department of Poultry Science, North Carolina State University, Raleigh, NC, USA

Correspondence: S Alavi, Kansas State University, Manhattan, KS-66506, USA. E-mail: salavi@ksu.edu; Phone: 785-532-2403; Fax: 784-532-4017

Abstract

Use of distillers dried grain with solubles from sorghum (sDDGS) was studied with respect to processing and physicochemical quality of shrimp feed, followed by growth trials with *Litopenaeus vannamei* (Pacific white shrimp). Shrimp diets with 0, 10, 20, 30 and 40% sDDGS inclusion, as a replacement for soybean meal, were produced using extrusion and steam pelleting. Bulk density of extruded feed (0.53–0.58 gcm⁻³) was lower than that of pelleted feed (0.61–0.65 gcm⁻³), although sDDGS level did not have an impact. Finished diets were 100% sinking, with some exceptions in the case of extruded feed. Pellet durability index (89.4–96.3%) had an increasing trend up to 20% and 30% sDDGS for extruded and pelleted diets, respectively. Extruded feed had higher degree of gelatinization than pelleted feed, although proportion of gelatinized starch generally decreased with sDDGS level. Water stability (76.2–91.6%) was higher for extruded feed as compared to pelleted feed, and remained unchanged or decreased with sDDGS level. The extruded and pelleted diets were evaluated in two growth trials with *L. vannamei* for duration of 9 and 6 weeks in 40 and 60 tanks (initial weight 0.36–0.38 g; 10 shrimps per tank), respectively. Significant differences were not observed in final mean weight and survival with respect to sDDGS level, indicating that up to 40% of this novel protein source can be used in feed formulations without affecting the performance of *L. vannamei*. Comparison of extruded feed with pelleted feed for impact on mean weight and feed conversion ratio did not yield conclusive results.