**267 Determining starch gelatinization from grains collected at various locations within the extrusion process.** A. D. Yoder[1,*], M. B. Muckey[1], C. R. Stark[1], H. H. Stein[2], C. K. Jones[1], *[1]Kansas State University, Manhattan, [2]University of Illinois at Urbana-Champaign, Urbana*.

Starch gelatinization during feed manufacturing is recognized to improve starch digestibility in monogastric animals. One way to measure starch gelatinization is to evaluate the percentage of cooked starch (CS), or the quotient of the percentage of gelatinized starch (GS) in a sample divided by total starch (TS) in that sample. True starch gelatinization is thought to occur at temperatures above 70°C and moisture above 25%, parameters that are met during the extrusion process. Different types of grains absorb thermal energy and moisture at different rates, leading to differences in starch gelatinization, particularly at different points of the extrusion process. The objective of this experiment was to compare the percentage of cooked starch across different cereal grains at various stages of the extrusion process. Grains (corn, sorghum, and wheat) were ground via hammermill to 300 μm ± 50 and extruded in a pilot-scale extruder. Samples were analyzed for moisture, CS, GS, and TS. Data were analyzed as a 3 × 4 factorial with the 3 cereal grains and 4 locations in the extrusion process (initial, conditioner, after extrusion die, and after dryer) using the GLIMMIX procedure of SAS version 9.4 (SAS Inst. Inc., Cary, NC). The interaction between grain and location impacted ($P < 0.0003$) moisture, GS, and CS but not ($P = 0.249$) TS. The main effects of both grain type and extrusion process step impacted ($P < 0.05$) all response criteria. Although there were no initial differences ($P > 0.05$) in CS among grains, sorghum had greater ($P < 0.05$) CS than corn in samples obtained from the conditioner, with wheat being intermediate (22.7, 26.6, and 24.4% CS for corn, sorghum, and wheat, respectively). However, wheat had greater ($P < 0.05$) CS than corn or sorghum in samples collected immediately after the extruder (91.8, 90.3, and 95.8% CS for corn, sorghum, and wheat, respectively). In dried, extruded samples, CS was greatest ($P < 0.05$) in wheat followed by corn and then sorghum (90.8, 88.1, and 93.5% CS for corn, sorghum, and wheat, respectively). These findings demonstrate that, as expected, starch is cooked during the extrusion process, but the magnitude of this cook at different steps is variable in different grains. There is less potential for starch cook in sorghum than in wheat, with corn being intermediate. These data suggest that extruded wheat may have greater starch digestibility than sorghum, but additional research is needed to confirm this effect.

**Key Words:** cooked starch, extrusion, gelatinized starch
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