

Starches in pet food: Nutrition and processing implications

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SIGNIFICANCE AND IMPACT

Starch rich ingredients make up a significant portion of pet diets. Sources include cereals, tubers, pulses, as well as their by-products and flour products. Starches are functional ingredients in pet food processing and influence the nutrition of pets. K-State research has contributed greatly to our understanding of how extrusion and baking of starch-rich pet foods affect food characteristics and how this influences dog and cat nutrition and health.

ABSTRACT

Pet food products have been evolving in a variety of directions, but starch ingredients still make up the vast majority of those used. Despite the animal not requiring starch as an essential nutrient. These starches are composed of amylose and amylopectin in various ratios and are tightly held in starch granules. It is unlocking these granules through cooking that provides the multitude of functions to starch in pet food such as expansion, structure development, and texture plus an increase in overall nutrient and energy utilization to the extreme. Pulling back from the extent of processing may preserve some of the benefits from starch that escapes the small intestine and is fermented in the colon – the so-called resistant starch. Finding that “balance” between structure, function, and nutritional utility has been an active area of our research for the past decade. The work initially evaluated differences between extrusion and baking which revealed some impact on lipid-amylose complexes (now described as resistant starch V) in a broad group of starches such as wheat, rice and corn. Cereals such as sorghum presented new options through evaluation of milling fractions and their impact on canine utilization and bioavailability of pericarp antioxidants to the animal. Additional applications were evaluated in processing by producing crisps that could be incorporated into granola treats, and as gluten free alternatives to traditional rotary molded treats with the use of soluble animal proteins as binders. Ancient grains and legumes have also been evaluated to ascertain their impact on the process and

animal utilization. Cereals such as spelt, quinoa and sorghum have been compared directly to peas, sweet potatoes, and tapioca. The latter having implications on Dilated Cardiomyopathy in dogs and shifts to bile acid metabolism. Additional work with legume seeds such as faba beans underscore the impact of oligosaccharides on diet utilization in these starch ingredients. Finally, work has come full circle with active research to identify the relationship between the magnitude of processing and the development of resistant starch and how this impacts the fecal microbiome. Future starch ingredient research will strive to address the optimal level of processing for animal nutrition and health.