

# WHAT'S OLD IS NEW AGAIN

## ANCIENT GRAINS



The number of pet foods and treats containing an ancient grain continues to rise as pet owners seek products that are free of traditional grains, gluten, and genetically modified ingredients. Most ancient grains are not genetically modified due to the absence of modern plant breeding and production practices, which allows them to retain characteristics of their wild ancestors. Many ancient grains also address the demand for gluten-free ingredients, such as quinoa, buckwheat, amaranth, chia, flaxseeds, millet and sorghum. The growing popularity of ancient grains is a reflection of the continuing evolution of the pet food industry. Traditional cereal-containing foods evolved to grain-free foods with potatoes and legumes. These foods are now evolving to those containing the latest on-trend ingredients like ancient grains in order to meet current consumer demands.

A variety of ingredients are called ancient grains, but many are not grains at all. True cereal grains belong to the Poaceae (grass) family and store energy as starch. Barley, sorghum, millet, and oat groats are examples of starch-containing ancient grains. Some ancient grains are pseudo-cereals because they look and function like cereal grains but they do not belong to the Poaceae family. Examples of pseudo-cereals include chia, flaxseed, quinoa, buckwheat and amaranth.

Despite the rising popularity of ancient grains and their historical use as a food staple for many people, little information is available on the nutritional composition, processing properties or animal utilization of most ancient grains. Ancient grains can supply substantial formulation flexibility for manufacturers when designing new consumer-desired products. However, their optimal utilization requires an understanding of their unique differences in nutrient composition and processing functionality. Understanding these differences is important when using ancient grains to replace traditional grains or other ancient grains in pet foods and treats.

Chia and flaxseed are appropriate for formulations requiring more protein and fat due to their noticeably higher levels of protein, fat and fiber. Both are devoid of starch, creating unique functional differences and processing requirements. In contrast, buckwheat, barley and oat groats are low in fat and high in fiber, making them appropriate for weight

management, senior and digestive health formulas. Quinoa, white millet, sorghum and amaranth have similar nutritional profiles, allowing them to be used interchangeably without affecting the nutrient profile of finished products.

The nutritional profile of ancient grains also impacts their functionality during processing. Processing variability can be assessed using a standardized cookie recipe to compare indices of dough spread and rise when flour source replaces pastry wheat flour, which serves as a control flour. Spread and rise are impacted by water-holding capacity and viscosity once flours are exposed to water and heat during processing. Higher viscosity produces more rise and less spread, while lower viscosity causes greater spread and less rise. Results of the baked cookie test show finished products needing more spread and less rise would benefit from chia, buckwheat or amaranth. In contrast, quinoa, chickpea or sorghum may be more suitable when baking or extruding standard products.

It is also important for the industry to understand the nutritional value of ancient grains when used in foods for dogs and cats. Therefore, a dog feeding study was conducted to assess quinoa, white millet, amaranth, oat groats, and rice (control) when used as the primary carbohydrate source in nutritionally complete, extruded foods. The inclusion level of each grain source was 40% in the isocaloric and isonitrogenous foods. Starch cook ranged from 85% for amaranth to 97% for quinoa, with rice at 89%. Study results showed minimal differences in the use of ancient grains by dogs, based on nutrient digestibility values and glycemic responses.

Carbohydrates are important food components for dogs and cats because their starch component supplies needed glucose and energy for the body. Carbohydrates are also important in manufacturing pet foods and treats, as starch provides important processing functionality and structural integrity of the final product. Understanding the inherent similarities and differences in nutrient composition and functional properties of ancient grains are highly important for pet food manufacturers. While ancient grains have existed for centuries, there is still new knowledge and experiences to be gained as more ancient grains continue to be used in foods and treats for today's dogs and cats.



### DR. GARY DAVENPORT, COMPANION ANIMAL TECHNICAL MANAGER

Gary is responsible for providing technical support, nutrition training, formulation services and new product development for ADM's customers in the pet food industry. He has more than 33 years of animal nutrition experience as a research nutritionist. Gary previously held positions with the IAMS Company and as a research & teaching faculty member at Auburn University, Animal & Dairy Science Department. His research interests and activities have included protein and amino acid nutrition, skin and coat health, sporting dog nutrition, nutrigenomics, hairball nutrition and successful aging. At Auburn his research and teaching focused on animal nutrition and the relationship between nutrient availability and the hormonal regulation of growth. Gary received his undergraduate and graduate degrees from the University of Kentucky. He has numerous scientific publications and granted patents.