

# White Paper: Premium Cassava Flour—A New Generation GMO-Free, Gluten-Free, Grain-Free Extrusion Ingredient

The last few years have seen the rise of gluten-free, non-GMO and grain-free products for human and petfood consumption. The better-for-you movement has taken root in the consumer food industry. With the humanization of petfoods products, this has also spurred development of premium petfoods that fall within this specialty category. There are few ingredients in the toolbox of formulators that will fit these specifications and provide both the functionality and versatility for innovation within this category. One of them is the proprietary flour exclusively available from American Key Food Products (AKFP): premium cassava flour.

## What is Cassava Flour?

Cassava, also commonly known as yucca or manioc, is a perennial woody shrub with an edible root that grows in tropical and subtropical areas of the world. While many food professionals are familiar with and have used tapioca starches and like derivatives, very few know that tapioca's raw material is the root of the cassava plant.

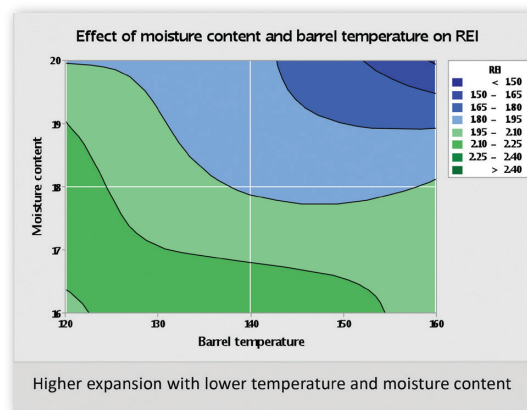
Tapioca or cassava starch is produced by the extraction of only the starch component of the root. Cassava flour, on the other hand, requires the processing of the whole peeled root. AKFP developed a special flour that was different from the various flours indigenous to cassava-growing countries. It was designed to work well in gluten-free baking and extrusion applications.



## What Makes Premium Cassava Flour Special?

Premium cassava flour takes on most of the desirable characteristics of tapioca starch, including low gelatinization temperature, paste clarity, good viscosity, bland or neutral flavor and is relatively freeze-thaw stable. It has low levels of reducing sugars, which helps to minimize acrylamide formation. The special production process also allows for the retention of 7% dietary fiber that enhances the nutritional profile of the flour.

AKFP collaborated with Rutgers University to look into this flour's extrusion properties. In two (2) studies (Karwe, 2014; Karwe and Salvi, 2015), premium cassava flour was analyzed by itself and also compared with potato flour/flakes. When tested under various extrusion conditions, it was concluded that higher expansion, as measured by the Radial Expansion Index (REI), was obtained at lower temperature and lower moisture content.



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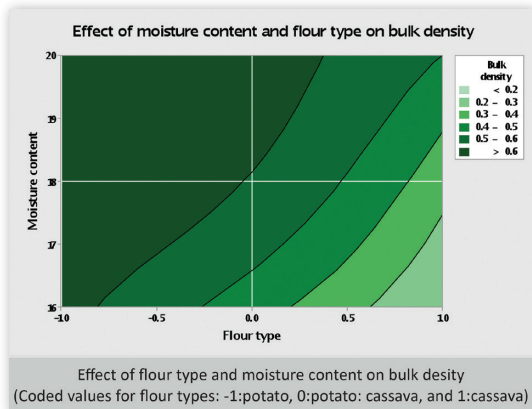


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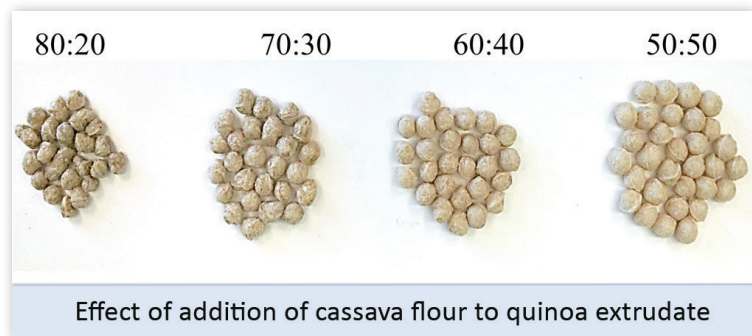
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When compared with potato flakes (the larger-sized version of potato flour), a bag of 100 grams of extrudates from premium cassava flour can be as much as 3.25 times bigger than a similar bag of extrudates from potato when extruded under the same conditions. This demonstrates the lower bulk density that can be achieved with cassava flour.



A separate study (Chandran, 2015) delved into the merits of premium cassava flour as an extrusion aid. The addition of cassava flour to an extrudate made from quinoa flour, which does not extrude well but is valuable for its protein content, measurably improved the expansion and texture of the extrudate.

**American Key Food Products (AKFP)** is a B-to-B distributor of specialty food ingredients. Our customers range from Fortune 500 multinational companies to medium-sized food and petfood manufacturers and co-packers. We provide potato, cassava (tapioca), and pea-based flours, starches and other derivatives that offer the functionality, performance and quality you require. These include traditional ingredients with unique functionalities, as well as innovative non-GMO, gluten-free or clean-label ingredients for applications that meet the increasing demands from health-and-wellness conscious global consumers.

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