Sorghum Porridge: Fast Food in West Africa

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Sorghum porridge, sold as a fast food on the streets of the West African village of Dan Boulde, Niger? That is the goal of Purdue cereal chemist Bruce Hamaker and his graduate student Moussa Moustapha. Yes, these scientists are developing a process to speed up the arduous process of food preparation, such as the traditional West African tó from sorghum flour.

Why an instant sorghum food? The process of preparing many of the traditional foods is time consuming. West African women have many duties and don’t have the energy to spend hours preparing a meal after a day of weeding in the fields. What can be done? Instant foods! In addition to saving time and labor for women, an instant sorghum based food can be sold by street vendors and consumed on the street. It also increases the demand for locally grown sorghum which in turn lessens the need for foreign exchange to import wheat.

So what is Dr. Hamaker’s strategy to meet the labor and health demands of the West African population and at the same time to contribute to the economic health of West African countries? Among several strategies in Dr. Hamaker’s arsenal, one is to develop “pregelatinized” sorghum flour which can be used in instant porridges.

The panelists liked the taste, texture and color of the instant porridges and 97% said they would buy instant sorghum flour if available.
Sorghum is a dietary staple for millions of people living in the semi-arid tropics of West Africa where it is the main source of carbohydrates and proteins and sustains the lives of the poorest rural people. In addition, sorghum is a gluten-free food and is therefore safe for persons with celiac disease. “About one in 250 people is gluten-intolerant,” according to Jeff Dahlberg, research director for the National Grain Sorghum Producers. Sorghum could take the place of wheat for these people.

Thus, there is a need to increase the utility of sorghum as a human food and pregelatinization may hold the key. What is pregelatinization? This refers to a process by which sorghum flour is gelatinized prior to sale to consumers. Pregelatinization speeds up the food preparation process because the flour only requires reconstitution in warm water before consumption and thus saves a great deal of time in meal preparation.

What does pregelatinization do? Gelatinization is the irreversible disruption of the crystallinity of the starch granule (see photo of starch granule) and it occurs when starch is heated in the presence of water above around 60°C. So, when a starch is pre-cooked, it can then be used to thicken cold foods without going through the cooking process again. This is referred to as a pregelatinized starch. The heat in the pregelatinization process modifies the starch resulting in the desired texture and taste of the prepared food.

Foods prepared from pregelatinized flours have increased digestibility. An added plus is that pregelatinized extruded flour is cheaper to transport, easier to handle and can be stored for a long time because it is less susceptible to microbial spoilage. Thus, the pregelatinization process is gaining more interest as a new processing route for ready to eat (RTE) foods.

The INTSORMIL program, in West Africa, in collaboration with Dr. Hamaker’s lab at Purdue focuses on the goal of commercializing high quality sorghum and millet. Training of West African scientists, like Moustapha Moussa, is one way for Dr. Hamaker (photo) to achieve his goal. Moustapha, a scientist at the Nigerien Institute of Agricultural Research (INRAN) in Niamey where he collaborates with Professor Hamaker, came to Purdue in 2004 as an INSTORMIL sponsored student to conduct a M.S. thesis on the preparation and acceptance, by his Nigerien countrymen, of pregelatinized sorghum flour-based instant porridges.

Thick and thin porridges are the most popular foods made from sorghum grain in West Africa but take time to prepare. Generally, thick porridges (tô) are ‘solid’ and can be eaten with the hand, while thin porridges (koko) are ‘fluid’ and are amenable to drinking from a cup or eaten with a spoon. These porridges are particularly useful for the formulation of weaning foods for infants because of their high energy density and are highly nutritional and still liquid enough for babies to eat.

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