University of Nebraska - Lincoln
DigitalCommons@University of Nebraska - Lincoln

INTSORMIL Impacts and Bulletins

International Sorghum and Millet Collaborative Research Support Program (INTSORMIL CRSP)

2-1-2007

Sorghum Porridge: Fast Food in West Africa

INTSORMIL

Follow this and additional works at: http://digitalcommons.unl.edu/intsormilimpacts

Part of the Agricultural Science Commons, and the Agronomy and Crop Sciences Commons

INTSORMIL, "Sorghum Porridge: Fast Food in West Africa" (2007). *INTSORMIL Impacts and Bulletins.* Paper 56.
http://digitalcommons.unl.edu/intsormilimpacts/56

This Article is brought to you for free and open access by the International Sorghum and Millet Collaborative Research Support Program (INTSORMIL CRSP) at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in INTSORMIL Impacts and Bulletins by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

INTSORMIL

Sorghum Porridge: Fast Food in West Africa

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 tô 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

The panelists liked the taste, texture and color of the instant porridges and 97% said they would buy instant sorghum flour if available.

Photo courtesy of Adama Neya, INERA, Burkina Faso

INTSORMIL Report No. 10, February 1, 2007

INTSORMIL is funded by the United States Agency for International Development under Grant No. LAG -00-96-90009-00

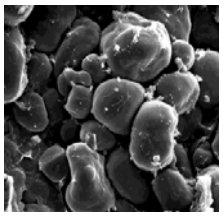
INTSORMIL Management Entity: University of Nebraska, 113 Biochemistry Hall, P.O. Box 830748, Lincoln, NE, 68583-0748, USA
Phone: (402) 472-6032 Fax: (402) 472-7978 E-mail: SRMLCRSP@UNL.EDU
Web site: http://intsormil.org

preparations of traditional foods.

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 Professsor 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 nutritious and still liquid enough for babies to eat.

Working in Dr. Hamaker’s lab at Purdue, Moustapha (photo) determined the optimum processing conditions (moisture content and processing temperature) in preparing flours from African sorghum varieties. He then carried the prepared flour to Niger to see what his countrymen thought of foods prepared from his pregelatinized flour.

Back home in Niger, Moustapha prepared thick (photo below) and thin porridges based on the pregelatinized flours of three African sorghum varieties and compared them to a conventionally prepared counterpart by

conducting a sensory acceptability assessment (taste, texture and color) in three Nigerien cities (Niamey, Kollo, and Maradi) and in one village (Dan Boulde). A total number of 161 regular consumers of thin (photo below) and thick porridges were selected as panelists. A comprehensive questionnaire was used to collect information related to socio-economic (income, willingness to buy sorghum instant porridge, size of household, food preferences, etc) and organoleptic preferences (taste, color, odor, texture and overall liking).

What was the opinion of the taste panel (photo below)? Overall preference for instant sorghum flour was higher than its comparable conventionally-prepared counterpart in every location tested. This study indicated that because of its good taste, attractive white-yellow color, smooth textural characteristics and health benefits, as well as its ready to eat food potential, the West African consumers prefer the instant thick and thin porridges over the porridges prepared by the slow, time consuming conventional manner. It was found that more than 97 % of the panelists would purchase instant sorghum flour if available.

What is next? The next step is to work with a food processor to build a commercially viable pregelatinization processing unit in Niger and develop markets for instant sorghum foods.

For further information regarding this article contact:

Bruce Hamaker, Purdue University, Food Science Bldg, 745 Ag Mall Drive,West Lafayette, IN 47907-2009, Phone: 765-, Fax: 229-494-5668, Fax: 765-494-7953, E-mail: <hamakerb@purdue.edu>, Website: http://www.foodsci.purdue.edu/ or Moustapha Moussa, INRAN, B.P. 249, Maradi, Niger, Phone: 227-41-06-85, Fax: 227-72-22-52, E-mail: <inran@intnet.ne>.