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Food Technology and Product Development

The Food Processing and Product Development Team (FPD) has a unique combination of expertise and facilities that link food production processing and product development to human nutritional needs and consumer food choices. The challenge for FPD is to develop new processes and acceptable value added products from crops that will enhance the diets of NASA's astronauts and consumers on Earth. FPD conducts both basic and applied research based on two overall objectives that relate to food, nutrition and health: (1) to contribute to the development of palatable, acceptable, yet nutritionally-sound foods and beverages; and (2) to contribute to the understanding of sensory perceptions and consumers food choices. FPD has worked with outstanding graduate and undergraduate students, and interdisciplinary colleagues to develop a strong research program that bridges the disciplines of food product development, sensory science, consumer research, engineering, chemistry and nutrition.

Research activities focus on the biochemical, physical and sensory processes for converting the sweetpotato and peanut into consumer acceptable food products.

SOME RESEARCH ACCOMPLISHMENTS:

Macroscopic and Sensory Evaluation of Bread Supplemented with Sweetpotato Flour. The macroscopic and sensory properties of bread supplemented with 50%, 55%, 60% and 65% sweetpotato flour were evaluated. Moisture contents of the breads fluctuated during storage. Protein value was highest for the bread supplemented with 50% sweetpotato flour. Carbohydrate contents ranged from 18.2% to 24.4%. Beta-carotene contents and loaf volumes were highest in the breads supplemented with 65% and 50% sweetpotato flour, respectively. Twelve perceived sensory attributes, which could be used to differentiate the appearance, texture, and flavor of sweetpotato breads were generated.

Sensory Characterization of a Ready-to-Eat Sweetpotato Breakfast Cereal. Raw sweetpotato roots were processed into flour, which was used to formulate a ready-to-eat sweetpotato breakfast cereal (RTEBC). Twelve trained panelists evaluated the sensory attributes of the extruded RTEBC using descriptive analysis. The samples were significantly different (P < 0.05). Physical Properties and Sixth Graders' Acceptance of an Extruded Ready-to-Eat Sweetpotato Breakfast Cereal. Ready-to-eat sweetpotato breakfast cereals (RTEBCs) were made from varying levels of sweetpotato flour (SPF), whole-wheat bran (WWB), and extrusion cooking. Moisture, protein and ash contents were lower in the 100% SPF than the 100% WWB. Carbohydrate, beta-carotene and ascorbic acid contents were higher in the 100% SPF. Fat, thiamin, riboflavin contents, bulk densities and the water absorption index were similar for all cereals. The 100% WWB had the lightest color and most fibrous morphology. Extruded RTEBC containing 100% and 75/25% SPF/WWB were

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well-liked and acceptable to sixth graders, but the 100% WWB was unacceptable.

CURRENT RESEARCH TOPICS:

- Characterization and quantification of volatiles emitted from a model sweetpotato bread;
- Effect of dough enhancers on sweetpotato bread;
- Isomerization of a sweetpotato starch syrup;
- Biochemical and sensory properties of eight cultivars of hydroponically-grown carrots;
- Composition and properties of bulk ingredients made from three cultivars of sweetpotatoes;
- Physicochemical and viscometric properties of sweetpotato starch syrup;
- Effects of filtration and centrifugation on a sweetpotato beverage; and
- College students' perceptions of a sweetpotato beverage

NUTRITION RESEARCH

Our research program in nutrition has focused on the relationship among diet, nutrition and cancer prevention among African American the United States, African Americans (AA) have the highest cancer incidence and the lowest survival rates. The reasons for the disparity cancer incidence and mortality rates among this population group have not been clearly elucidated, but dietary factors are implicated. T research program aims to better describe and understand the dietary habits, and the barriers, which prevent AA from adopting eating habits consistent with the dietary guidelines. The findings could be utilized to guide the development of community-based, culturally-specific, cancer risk reduction nutrition intervention strategies that would better meet the needs of AA, inform policy and funding decisions for cancer risk reduction programs for the diverse AA population.

Our recently published study has helped to clarify the dietary patterns of a subgroup of the diverse African American population. It was found that most of the participants were fearful of cancer, associating it with death. Stress, genetics, and pesticides in vegetables were given as major causes of cancer. Fatalism towards cancer pervaded among a few participants. Male participants did not believe that diet factors could be helpful in cancer prevention, while the females believed fried, fatty, smoked and fast foods could lead to cancer. Factor perceived as influencing food choices included money, cultural traditions and social class. Cultural tradition was perceived as the major barrier to changing food habits. Frying, stewing, grilling, boiling and fermenting were the most common food preparation methods reported. Perceptions regarding dietary practices, nutrition and cancer among Sudanese-Americans, some of which might have been overlooked were identified. Response options, components to questions, and actual questions for a pre-conceptualized diet, nutrition a cancer-related questionnaire to be used on Sudanese-Americans were generated.

Ongoing is the study of the dietary knowledge, attitude and beliefs about cancer among 1200 college students, low income, urban, and African Americans.

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