

ANNUAL REPORT  
COMPREHENSIVE RESEARCH ON RICE  
January 1, 2001 - December 31, 2001

PROJECT TITLE: Rice Utilization and Product Development

PROJECT LEADER: Wallace H. Yokoyama,  
USDA, Western Regional Research Center,  
800 Buchanan St., Albany, CA 94710

PRINCIPAL UC INVESTIGATORS:  
Charles F. Shoemaker  
Department of Food Science and Technology

LEVEL OF 2000 FUNDING: \$35, 000

OBJECTIVES AND EXPERIMENTS CONDUCTED BY LOCATION TO ACCOMPLISH  
OBJECTIVES:

1. Oryzanol and other rice phytosterols:

Our research on the extraction and evaluation of rice phytosterols to reduce plasma cholesterol is in progress. We have extracted 500 lbs of stabilized rice bran. The defatted rice bran was used in a study to determine the bioavailability of flavonoids and other antioxidants that are not in the lipid fraction of the cereal to reduce atherosclerotic lesions in hamsters. This study is in progress and will end about March 2002. Due to problems with the quality of an ingredient in this study, the progress of the study was slowed due to the trial and error substitution of ingredients to pinpoint the ingredient responsible for weight loss in the test animals. The ingredient was identified and replaced by the supplier. We continue to extract and test the extracted lipid fraction for the activity of the major and minor phytosterols in hamsters and arthropods.

SUMMARY OF 2000 RESEARCH (MAJOR ACCOMPLISHMENTS) BY OBJECTIVE:

1. Texture and genetic variation in two closely related japonica varieties:

Rice breeding often utilizes the cross between an agronomically useful California variety with a variety with potentially desirable characteristics from another foreign location. In this study we examined the variation in textural traits between California 89Y103 and Hitemobore. The rice was grown at the California experiment station in Biggs. We examined 26 samples of diploid halves from the 00 crop year as well as the parents from the 99 and 00 crop years. We examined the textural properties by viscoamylography and determined the amylose content. The genetic background was determined by the USDA rice lab at UC Davis. A summary of the textural data is shown below.

	26 DH Progeny	99,00- Hitomebore	99,00- 89Y103
Amylose content	15.1-16.5%	15.4,15.6	16.5,16.6
Pasting temperature	64.9-67.7°C	64.8,64.1	67.0,67.1
Gelatinization temperature	85.7-89.2°C	86.5,83.9	86.9,86.0
Peak temperature	92.3-94.7°C	92.2,91.4	92.9,92.7
Peak time	274-287s	273,269	277,276
Peak viscosity	0.26-0.44 Pa.s	0.6,0.6	0.5,0.5
Trough viscosity	0.18-0.27 Pa.s	0.3,0.3	0.3,0.3
Cooking viscosity	0.19-0.30Pa.s	0.4,0.3	0.3,0.4
Final viscosity	0.36-0.56 Pa.s	0.6,0.6	0.6,0.6

## 2. Grant proposal to develop high soluble fiber synthetic rice for diabetics

Diabetes is a major health problem in the U.S. related to obesity. Diabetes is also increasing in Japan and Asia. A proposal was submitted to USDA for a special international research development grant to increase collaboration between U.S. agricultural scientists and food and agricultural scientists in Japan and China. The research will develop rice-like product from rice flour and soluble fiber that will aid in retarding type II diabetes. A major U.S. food company will supply the soluble fiber. The basic formulation and process work will be conducted at USDA, Albany, the synthetic rice based on USDA formulation/process will be manufactured by Japan National Food Research Institute and the human subject testing will be conducted in Beijing, China with oversight by human nutrition scientist from USDA, Beltsville, MD.

## 3. Evaluation of antioxidant properties of sprouted rice

Sprouted cereals are popular in Europe and Asia as sources of health promoting phytochemicals. A shelf stable slightly sprouted rice product from Japan that is thought to have enhanced nutritional properties is being evaluated using our high LDL cholesterol hamster model. We are comparing the sprouted rice with brown unsprouted rice as the control. Antioxidants in the test diets will reduce aortic lesion formation. This study may be for a product with a small market in the U.S. but will contribute to the overall healthy image of rice and rice products.