

WESTERN REGIONAL RESEARCH CENTER

COMPREHENSIVE RESEARCH ON RICE\*  
ANNUAL REPORT

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PROJECT TITLE: Rice Utilization and Product Development

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PROPOSAL OBJECTIVE: To carry out research work on California short, medium and long grain rices that ultimately will lead to new products for domestic and foreign markets.

RESEARCH OBJECTIVES

1. Reduced stickiness in California rices.

Develop commercially viable methods of reducing stickiness of California rices to improve their acceptance as Table Rices in the United States.

2. Quick-cooking brown rice.

3. Development of rice-soy-milk product.

SUMMARY OF CURRENT YEAR'S WORK

1. Rice stickiness. Steaming conditions were tested varying paddy moisture at the start of steaming from 14 to 26% moisture, steaming time from 0 to 14 minutes, and pressure from 13 to 32 psig. Two minute steaming of 14% moisture paddy increased moisture content to 22%. Paddy was cooled 15 seconds in fluidizing air, losing 3% moisture. Drying was completed on trays in a low humidity room. Treated, dried, and hulled samples were milled on a McGill No. 3 using a 7000 g weight and two successive

\*This proposal should be considered in conjunction with that from Dr. Luh, University of California, Davis. 74

30 second millings. Increasing steam pressure and time, and increasing paddy moisture, all had the effect of improving head yield but also increased yellowness. The most rapid reduction in stickiness occurred at low paddy moisture and high steam pressure. Steamed samples dried to 10% moisture had high milling resistance and good head yield. At higher milling moistures, more bran is removed by the standard milling procedures and head yield decreases sometimes sharply. Stickiness increases with increased degree of milling, while yellowness decreases.

2. Brown rice. A quick-cooking brown rice has been developed using the centrifugal-fluidized-bed concept. The product can be prepared for consumption in one quarter the time normally required for raw brown rice. Protein, vitamin, and mineral contents were comparable to raw brown rice and higher than the equivalent values for white rice. Calrose and Colusa brown rices were successfully tested.
3. Rice-soy-milk product. Formulations of rice-soy-milk at four levels of non-fat dry milk have been carried out as shown below. The rice component consists of precooked (extruded) then reground rice broken, the soy component is toasted defatted soy flour. A computer program has been developed at WRRRC to predict protein quantity and quality, and final formulated ingredient cost, based upon composition and cost of the ingredient components. Specifications for ASCS purchase as a weaning food under PL 480, and promotion of the product within Washington is underway.

Processed Rice Flour	63.0	61.1	59.2	57.3
Toasted Soy Meal	23.7	20.6	17.5	14.4
Non-Fat Dry Milk	5.0	10.0	15.0	20.0
Stabilized Soy Oil	5.5	5.5	5.5	5.5
Mineral Premix	2.7	2.7	2.7	2.7
Vitamin Premix	0.1	0.1	0.1	0.1

#### PUBLICATIONS

Nishita, K. D., and M. M. Bean. Rice Bread Quality as Affected by Storage of Rice Flour and Rice Bread Mix. Both presented at Intern. Cereal and Bread Congress, Winnipeg, Manitoba, Canada, September 19, 1978.

Nishita, K. D., and M. M. Bean. Physico-chemical Properties of Rice in Relation to Rice Bread. Ms. #2385, accepted for publication in Cereal Chemistry, September 1978. Abstract published in Cereal Foods World 23(11): 675 (1978).

Lorenz, K., and Saunders, R. M. Enzyme activities in commercially milled rice. Cereal Chem. 55: 77 (1978).

Shepherd, A. D. Laboratory polisher for small samples of rice or other grain.

Fellers, D. A., Mossman, A. P., and Deissinger, A. E. Steam treatment of paddy as a means of reducing stickiness.

Nishita, K., and M. Bean. Rice flour quality for baking.

Betschart, A. A., Hanamoto, M. M., and Saunders, R. M. Protein concentrates from rice bran as ingredients in wheat breads.

Roberts, R. L., Carlson, R. A., and Farkas, D. F. Use of a continuous centrifugal fluidized bed drier for production of quick cooking rice products.

Roberts, R. L. Composition and taste evaluation of rice milled to different degrees.

Last six papers presented at the 17th Rice Technical Working Group meeting, College Station, Texas.