

High Protein Bread Made Without Sugar

Bread made with a new formula is enriched with about 50 percent more protein than is supplied in bread now on the market. Moreover, the bread's concentration of lysine, an essential amino acid making up the protein, is more than tripled. Its proteins are thus nearly comparable in nutritional quality to milk

and meat proteins.

Another advantage of the formula is that it requires no sugar, a usual ingredient in bread. Almost 3 million pounds of sugar a day would be saved in this country if the sugar-free formula were used in baking an estimated 50 million one-pound loaves of white bread produced each day. Substitution of cereal malt for sugar in the formula would also reduce the cost of bread in developing countries that must import sugar.

The formula developed by cereal chemist Karl F. Finney and food technologist Merle D. Shorgen of USDA's Agricultural Research Service is applicable internationally and requires no changes in commercial breadmaking schedules or equipment. Ingredients included in the formula, however, are not readily available to those who bake bread at home.

The bread could be a principal source of protein, in developing countries and the United States, for children and adults whose diets are nutritionally deficient and who depend upon bread as a major food.

Such protein-enriched breads can also serve as a supplemental food for those who are well fed.

The need for the new bread, Mr. Finney explains, stems from the fact that wheat protein is deficient in lysine. Scientists have known that adding high levels of a protein supplement such as soy flour would improve the nutritive value of wheat flour by increasing both total protein content and the amount of lysine in the protein. Two problems, however, limited practical application of this knowledge.

Earlier attempts to supplement wheat flour with soy flour produced poor-quality bread. Loaves were small, and both crumb grain and retention of freshness were impaired. Consumer acceptability was also restricted by the excessive browning and thickness of crust associated with high-protein bread baked with formulas containing sugar.

These former shortcomings of protein-enriched bread are corrected in the sugar-free formula, which was developed at the U.S. Grain Marketing Research

Center, in cooperation with the Kansas Agricultural Experiment Station, Manhattan.

Dr. Yeshajahu Pomeranz, now director of the Center, and Mr. Finney were awarded a public patent in 1972 for a process by which high levels of protein supplement can be added to bread without impairing loaf volume, crumb grain, or retention of freshness. They found that replacing the usual 3 percent shortening with small amounts of glycolipids improved bread quality by making the wheat and soy proteins compatible.

Glycolipids are complexes of carbohydrates and fats that make up only about .3 percent of wheat flour weight but are responsible for such qualities as improved loaf volume. Subsequent studies indicated that sucrose palmitate or other purified sucroesters are fully as effective as wheat flour glycolipids.

Removal of sugar as an ingredient eliminated excessive browning and thickness of crust in bread made with the new formula. Mr. Finney explains that sugar converted from starch by cereal malt enzymes supports production of carbon dioxide for leavening the function of sugar added in the conventional formula. Barley, wheat, or triticale malts as flours or sirup may be used.

High levels of soy flour, as a protein supplement, are incorporated in the formula by replacing 10 percent of the wheat flour with soy flour and adding another 4 percent soy grits. Other variations from the usual commercial bread formula include replacing regular oxidants with ascorbic acid, as well as use of small amount of the cereal malt instead of 8 percent sugar, and 0.5

percent sucrose palmitate rather than 3 percent shortening.

Sucrose palmitate would require Food and Drug Administration clearance for use in the United States. It has been approved for general food use in Japan and for certain food uses in several European countries. Mr. Finney says an acceptable high-protein bread could be made by reducing somewhat the amount of soy flour in the formula and substituting 3 percent conventional shortening for 0.5 percent sucrose palmitate.

Equipment Company Buys Firm

Lely Independence Manufacturing, Inc., Independence, Missouri, has purchased the facilities and inventory of Clark Manufacturing Company of Independence effective May 1, 1975.

Lely, a multi-national manufacturer of farm equipment, will produce anhydrous ammonia applicators, nurse tanks, mounted and trailer sprayers, tool bars, wagons, tandem trailers and other products previously manufactured by the Clark Company. They will continue to market replacement parts for existing Clark equipment.

Allen Piatt, national sales manager, says the Lely Independence facility also will supply tillers, spreaders, rakes and other products.

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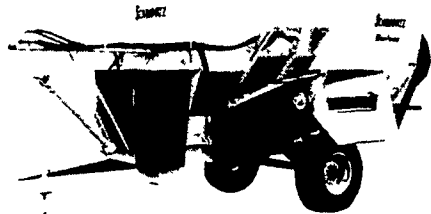
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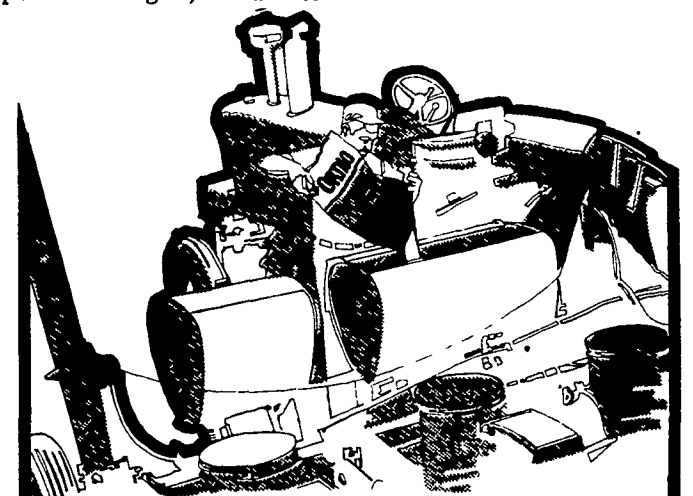
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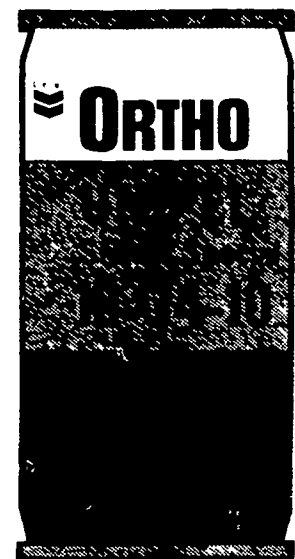
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