FISH FLOUR IS PRIMARILY A PROTEIN CONCENTRATE-- NOT A SUBSTITUTE FOR GRAIN FLOUR

"Can fish flour be used as a high protein flour in baking?" "Could fish flour be used as a replacement for flour in thickening gravies and soups?" "Would fish flour be more nourishing than whole wheat flours?" "Just how can fish flour be used in cooking?" "Is fish flour really a flour?" These kinds of questions are constantly being asked of the research staff of the U. S. Bureau of Commercial Fisheries' Technological Laboratory in College Park, Md., where research is currently being conducted on the nutritive value of fish flour.

First, let us consider the food that is commonly termed flour, or all-purpose flour, and its general functions in cooking. Flour is a milled product of wheat (although other flours may be produced from other cereal grains such as rice, barley, rye, or corn). All-purpose wheat flour is composed of 76.1 percent carbohydrate, primarily in the form of starch; 10.5 percent vegetable protein; 0.4 percent ash; 1.0 percent fat; and 12.0 percent water1/. The hydrative, adhesive, and gel-forming properties of the starch of flour account for the primary functions of flour in food preparation. Through these properties (1) soups and sauces may be thickened, (2) molded gels such as puddings may be formed, (3) the framework of such baked products as muffins, breads, biscuits, and cakes may be formed, and (4) other foods such as flaked fish may be cemented together to form croquettes, etc. The formation of the frame work of the more firm baked products, such as bread, is enhanced by the elastic and extensible properties of the vegetable protein glutenin, which comprises about 60 percent of the total protein of flour.

Now let us consider the properties of fish flour and how these might function in food preparation. In general, fish flour is a product prepared by defatting, drying, and milling by a variety of methods a whole fish, fish fillet, or fishery byproduct. It is white or tan in appearance, very powdery in consistency, usually odorless, and is either flavorless or possesses a nutty flavor. A mild odor and flavor of fish is obtained if small quantities of residual fat are retained in processing--a desirable characteristic for certain purposes. Fish flour is composed of 70-95 percent animal protein; 2-25 percent ash, mostly calcium and phosphorous; 3-12 percent water; and negligible quantities of carbohydrate and fat. The specific physical characteristics and chemical composition of any particular fish flour are a function of the raw material and the method of processing utilized. But, satisfactorily prepared, fish flour should contain all the quality protein, and important dietary minerals and vitamins contained in the fresh, raw fish. Fish flour would primarily be used as an animal protein and/or calcium and phosphorous supplement of processed foods to improve their nutritive value. Such processed foods might include breads, cookies, crackers, breakfast foods, cake and pancake mixes, macaroni products, baby foods, dietetic foods, and perhaps even flour itself--all-purpose flour, that is.

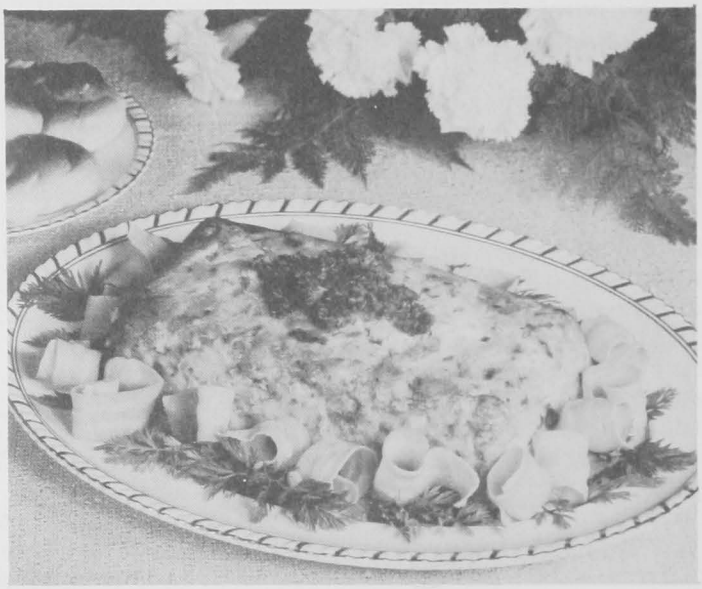
1/ Percentages obtained from Composition of Foods, USDA Agriculture Handbook No. 8, Miscellaneous Publication 572, June 1950.

Fish flour might also be used as the meat base in dehydrated or prepared soups, sauces, and gravies.

So, fish flour does not contain any of the factors in common flour that give this latter product its specific properties in food preparation. Fish flour, instead, is primarily a potentially valuable animal protein concentrate with unique nutritional properties for use in food preparation. The term "flour" as applied to this fish protein is perhaps unfortunate and misleading, since fish flour is not really a flour at all.

HALIBUT

Halibut are principally harvested in the North Pacific waters off the coasts of Washington, British Columbia, and Alaska. Smaller amounts of halibut are taken off the North Atlantic coast.



Halibut is the largest of the flatfishes ranging in size commercially from 5 to 80 pounds. This large, firm, and flavorful fish is one of the most highly prized of all white-meated fish and may be prepared by any of the basic cooking methods such as frying, baking, broiling, boiling, and steaming.

Halibut is available the year around in all parts of the United States, mainly as frozen steaks. Steaks are the cross-section slices of dressed fish containing a cross section of the backbone. Chunks and fillets are other forms in which halibut may be purchased.

As a different way of serving halibut, the home economists of the U. S. Bureau of Commercial Fisheries recommend "Baked Halibut Loaf."

BAKED HALIBUT LOAF

1 pound halibut steaks or fillets
1 quart boiling water
1 tablespoon salt
1 chicken bouillon cube
$\frac{3}{4}$ cup boiling water
$1\frac{1}{2}$ cups soft bread cubes
$\frac{1}{2}$ cup chopped celery
1 tablespoon chopped parsley
$\frac{1}{2}$ cup coffee cream
1 teaspoon grated onion
1 teaspoon salt
Dash pepper
2 teaspoons lemon juice
2 eggs, beaten

Place steaks in boiling salted water. Cover and return to the boiling point; simmer for 10 minutes or until fish flakes easily when tested with fork. Drain. Remove skin and bones. Flake. Dissolve bouillon cube in boiling water. Combine all ingredients. Place in a well-greased loaf pan, 9 x 5 x 3 inches. Bake in a moderate oven, 350° F., for 1 hour or until loaf is firm in the center. Serves 6.