

RESEARCH

IN SERVICE LABORATORIES

October 1951

REFRIGERATION: Freezing Fish at Sea, Defrosting, Filleting, and Refreezing the Fillets: The experimental refrigerated trawler Delaware completed test cruise No. 4. Mechanical difficulties with the refrigeration system and automatic boiler controls precluded adequate testing of the freezing operations. Inclement weather at sea limited fishing operations adding to the problems involving the mechanical systems. Repairs and alterations are being made to the refrigeration and boiler systems after which cruise No. 5 will be made to determine the freezing capacity of the refrigeration system. The fish obtained during cruise No. 4 will be used for dockside tests of the brine-freezing equipment. (Boston).

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NUTRITION: Chemical and Physical Properties of Fish and Shellfish Proteins: Many problems, such as the cause of curd formation in canned fish, browning of fish during canning, toughening of crab meat, drip formation in freezing and cold storage of fish, have not been solved owing to a lack of fundamental information as to the chemical changes which take place in fish proteins during cold storage, heating, or other processing steps. The first change to take place when fish proteins are either frozen or heated is water separation from the protein. In the case of frozen fish, at least a part of this water returns into combination with the protein on thawing. Similarly, when fish are dehydrated or dried and then rehydrated, only a part of the moisture returns to the original form. This project has as its objective the determination of the effect of such factors as the extent of grinding of fish, heat, pH, treatment with salt solutions, and freezing and cold storage upon the water retentivity of fish proteins. A better understanding of these fundamental relationships is greatly needed in order to solve some of the problems cited.

During October the effect of pH on water retentivity of frozen rockfish was determined. The thawed, ground rockfish fillets were adjusted to various pH values by the addition of sodium hydroxide or hydrochloric acid solutions and the resulting mixtures centrifuged. The water retentivity was measured by the amount of free liquid resulting. In the range of pH 0.7 to 11.4 the following results were obtained: At pH 0.7 a large amount of liquid was released on centrifuging, in fact, more than was obtained from the original fish (pH 6.9). As the acidity decreased the amount of liquid centrifuged also decreased until at pH 1.5 only a slight amount was obtained indicating maximum water retentivity at this point. With further decreases in acidity the centrifuged liquid increased in amount until at pH 5.3 water retentivity was at a minimum. Another water retentivity maximum was observed at pH 7 although the retentivity at this point was not as great as at pH 1.5. Water retentivity also reached a minimum at pH 7.5 and a maximum at pH 9.5 and greater. (Seattle)

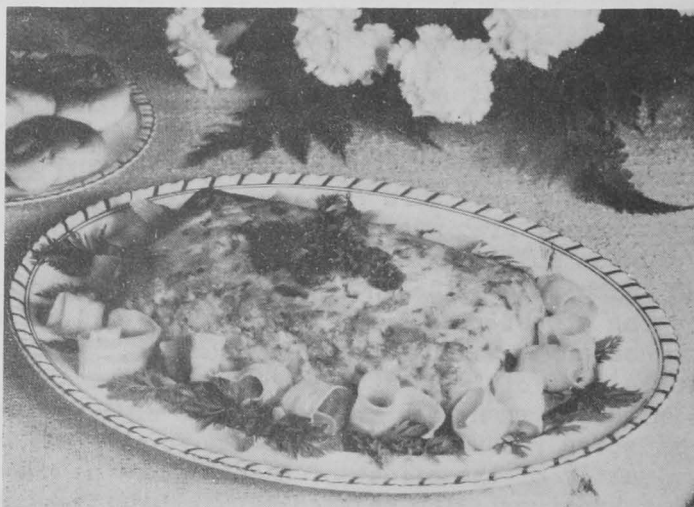
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ANALYSIS AND COMPOSITION: Composition and Cold Storage Life of Fresh-Water Fish: Little information is available on the composition of fresh-water fish and

no published information whatever is available concerning the freezing properties and cold storage life of these fish. Authentic samples of sheepshead, blue pike, yellow pike, and yellow perch were obtained in the Central States and were shipped frozen to the Seattle Technological laboratory. Chemical composition is to be determined on the various fish. The remaining samples have been placed in cold storage and will be examined periodically for their cold storage life. (Seattle).



ROSEFISH LOAF



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|-------|------------------------------|-------|---------------------------------|
| 4 | CUPS COOKED, FLAKED ROSEFISH | 1-1/2 | TEASPOONS SALT |
| 3 | CUPS SOFT BREAD CRUMBS | 3 | TABLESPOONS BUTTER OR OTHER FAT |
| 3/4 | CUP MILK | | FEW GRAINS CAYENNE |
| 2 | EGGS, WELL BEATEN | 2 | TABLESPOONS ONION, GRATED |
| 1-1/2 | TABLESPOONS PARSLEY, MINCED | 1/2 | TEASPOON CELERY SALT |
| 1 | TABLESPOON LEMON JUICE | | |

Combine all ingredients, mixing well. Place in a greased loaf pan. Bake in a moderate oven 350° F. for 40-45 minutes or until loaf is firm in the center. Unmold on a hot platter, and serve with a rich, bright-colored sauce. Serves 6.

A Fish and Wildlife Service tested recipe. This is one in the series of recipes using fishery products tested and developed in the Service's test kitchens.