



RESEARCH

IN SERVICE LABORATORIES



TECHNICAL NOTE NO. 45 - PREPARATION OF DRIED FISH SOLUBLES FROM CONCENTRATED PRESS LIQUORS ON A LABORATORY SCALE

Recent imports and subsequent use of dried fish solubles in this country have renewed interest in the possible domestic manufacture of this product. Earlier attempts by the U. S. Bureau of Commercial Fisheries to produce dry solubles by drum drying were not successful because the final product was hygroscopic. Subsequently, it was thought that a suitable product might be obtained by the use of organic solvents. Accordingly, two preliminary laboratory-scale tests were carried out on concentrated ocean perch press liquor containing 50-percent solids.

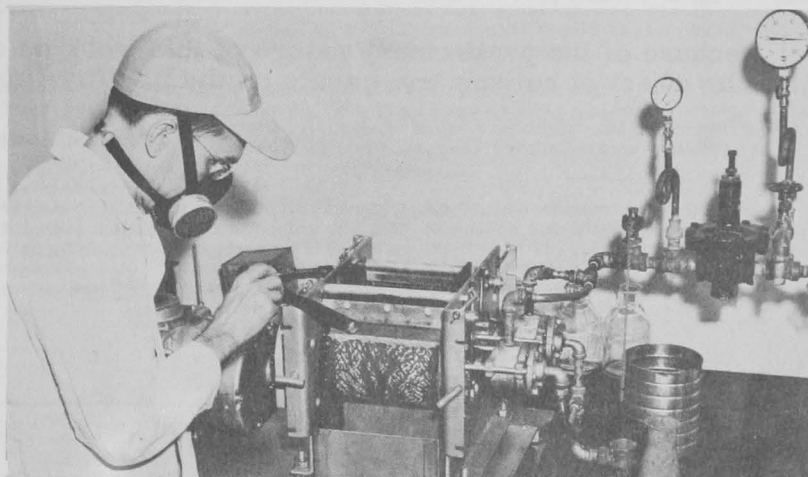


FIG. 1 - PRODUCING DRY MENHADEN SOLUBLES ON PILOT PLANT DRUM DRIER.

The first method involved distillation with ethylene dichloride. Approximately two volumes of boiling ethylene dichloride were added to the press liquor and the two components were mixed together. This mixture was then added to approximately twice its volume of boiling solvent (ethylene dichloride) in a distilling flask. Distillation was carried out under reduced pressure, provided by an aspirator pump, until the distillate was clear. The solids were separated from the ethylene dichloride remaining in the flask by filtration on a Buchner funnel, washed with fresh solvent, and then placed under vacuum at 90° C. (194° F.) to remove final traces of solvent. The total solvent used in the entire procedure was about five times the volume of the concentrated liquor.

The second method of preparing the dried solubles was a cold extraction with mixed solvents. Approximately two volumes of methanol-acetone (1:1) were added to the press liquor in a Waring blender, and then mixed for two minutes. The solvent was removed by filtration on a Buchner funnel, and the filter cake was remixed for 30 seconds with approximately two volumes of methanol-acetone (0.5:1). The solids were filtered off and remixed a third time for ten seconds with approximately one volume of acetone. The mixture was filtered and the filter cake was washed with approximately one volume of methanol. Solvent traces were removed under vacuum at 90° C. (194° F.) The total solvent used in the entire procedure was about six times the volume of the press liquor.

A proximate analysis of a sample prepared by each method is shown in table 1.

The dry solids were readily ground in a mortar to powders which differ in physical properties in that the distillation-dried material is somewhat lighter in color and stronger in odor than the extracted material. When exposed to the air the powders do not readily absorb moisture and remain free flowing.

Table I - Proximate Composition of Dried Ocean Perch Solubles Prepared by Ethylene Dichloride Distillation and by Methanol-Acetone Extraction

Method of Sample Preparation	Proximate Composition of Sample			
	Protein	Fat	Ash	Moisture
 (Percent)			
Ethylene Dichloride Distillation	77.2	1.0	20.2	3.2
Methanol-Acetone Extraction	78.0	2.3	13.6	6.4

would probably indicate that smaller volumes of solvent can be used, particularly in the extraction method where it may also be found that different ratios of methanol to acetone are more efficient, or even that a single solvent can be used. These considerations would have an important bearing upon the economics of the process.

Because of the preliminary nature of this work no effort was made to determine the effect of solvent treatments on the nutritive values of the dried solubles.

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ONE SKIPJACK TUNA TAGGED TWICE AND CAUGHT THREE TIMES

A skipjack tuna (aku) with an insatiable taste for feather lures has set some sort of record in local piscatorial circles by getting himself on the hook three times within 16 days, the last time for good. According to the Director of the Pacific Oceanic Fishery Investigations of the U. S. Bureau of Commercial Fisheries, the small 6-pound tuna was first caught on November 20 by a fisherman on the Bureau's research vessel John R. Manning off the island of Lanai. A plastic dart tag was jabbed into the back of the tuna just below his second dorsal fin and he was tossed back into the ocean "in the hope that subsequent recaptures (for which the chances are currently running about 8 in 100) may shed light on the little understood movements of this commercially-valuable species in Hawaiian waters."

Only three days later, in the same area off Lanai, the same tuna was again caught by the John R. Manning. The sea-going scientists, busy tagging tuna, were a bit surprised to find one of their subjects already outfitted with one plastic streamer, but they quickly attached a second tag and again tossed the fish back into the sea.

When the commercial smpan Dolphin fished off Lanai on December 6, and chicken feather jigs were once again on the menu, the twice-tagged tuna was again caught for the last time.