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PRODUCTION OF SALMON EGG OIL  
by

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This laboratory has received several inquiries from the various fish packing houses in the vicinity of Astoria concerning a method for producing salmon egg oil which is adaptable to commercial salmon packing. The deeply colored egg oil is prized as a blending oil for packing quality salmon. The oil content of salmon eggs varies with the locality in which the fish are caught, season, and the maturity of the eggs and various other factors. This variation is from 7.0 to 15.0 per cent.

The presence of large amounts of protein which is readily coagulable by heat and precipitated by dilution with water, complicates the commercial production of salmon egg oil. Other factors to be taken into consideration are the high lecithin content of the eggs which causes troublesome emulsions to form and the egg shell which frequently causes difficulty by floating and thus mixing with the oil layer.

After considerable laboratory and plant experimentation, the following method has been devised and is recommended for commercial production of salmon egg oil.

Method of Making Salmon Egg Oil

The eggs are crushed by running through a food grinder of sufficient capacity to meet the needs of the packer. A very satisfactory crusher can be made from two 3-inch adjustable iron rollers, set approximately 1/8" apart, with the surfaces cut with 1/16" threads. The rolls are powered by an electric motor and rotate in opposite directions. The ground egg mass can be passed through a coarse screen to remove the shells, or it may be run directly into a 1 to 5% solution of common salt at a temperature of about 130°F. The final amounts should approximate one part of egg to two parts of salt solution by weight. The mixture is stirred slowly by hand with a paddle, or slowly and intermittently agitated with a power stirrer. It is necessary that mixing should not be vigorous since air will be drawn into the solution causing emulsions to form and the egg shells to float. After stirring for about 5 minutes the mixture is allowed to stand and the oil to separate. If the eggs

are quite cold, causing a considerable drop in temperature of the solution, it may be necessary to warm the mixture slightly, since the oil separates more readily at higher temperatures. This warming may be accomplished advantageously by means of a steam-jacketed kettle or tank with steam coils, using constant slow agitation during the heating process. Blowing live steam into the solution is not to be recommended. A cover over the processing tank will aid in maintaining the temperature of 130°F. and preventing a filmy deposit of stearin (a natural constituent) from forming on the surface of the oil.

In about two hours the oil will be almost completely separated and it may then be run off to a smaller processing tank before being led into the separator or centrifuge. Occasionally it has been found necessary to screen the oil if it is contaminated with egg shells or coagulated protein before separation. This step will depend largely on the type of centrifuge employed. The oil with very little solution may then be heated to about 180°F. and the rich red oil can then be separated. Frequently it may be advantageous, especially if the quantity of egg oil is small, to add plain salmon body oil to the preheating tank, which cuts to a minimum the waste of the valuable egg oil and then the mixture of oils is finally centrifuged.

This procedure can be utilized on frozen eggs if salt solution is used during the thawing process. There is one precaution that is to be observed always when working with salmon eggs -- never use water, always a solution of salt, as salt will prevent precipitation and spontaneous coagulation of the egg protein.

In storing salmon egg oil, the same principles apply as with other fish oils. Clean containers, free from rust, the oil free of water and organic material, and the containers well filled, stored at approximately 37°F. will keep rancidity and decomposition at a minimum.

This publication is the result of investigations conducted by the Seafoods Laboratory at Astoria, Oregon, a branch of the Food Industries Department, Oregon Agricultural Experiment Station, Corvallis. Studies such as these are being conducted for the benefit of the industry and the public.