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THE PROCESSING OF ATLANTIC HERRING ROE FOR FOOD

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Introduction

Salted herring roe has been considered a delicacy in Japan for centuries. Called "Kazunoko", it is traditionally served during their New Year's feast, but in the past several decades has become part of the daily menu in restaurants and more frequently served in homes.

Up until the early 1960's the domestic herring catch provided sufficient roe for the Japanese demand. With the decline in catch at this time, together with strict import quotas of 700 tons annually, the cost of herring roe climbed sharply to around \$7/lb at the Tokyo Central Wholesale Market. In 1972, the import quotas were dropped and a large Japanese market for roe became available.

Suitability of Herring

Since the primary factor determining the roe quality is the maturity of the roe, the best time for harvesting is when the females are ready to spawn and the roe is completely matured. Herring for roe extraction must be handled carefully and transported as quickly as possible to the production site to minimize deterioration which ensues very quickly after death.

## Processing

Of prime importance in processing is the minimization of damage to the roe since cuts or breaks in it lower the grade of the finished product and may render it unmarketable. The traditional West Coast process therefore involves an initial 3 - 5 day ageing of whole herring in cold (10°C) brine (~10% w/v) to allow hardening of the roe. Removal of the roe is facilitated by this ageing and may be accomplished by several methods. One technique is to break the fish behind the head and use a squeeze-shake action to extract the roe from the carcass. Other methods employ a specially blunted knife for slitting open the belly, or simply tearing open the belly by hand. The yield of roe is approximately 8 - 10% by weight of whole herring.

In the next stage of processing the roe is placed in succession in three different brine solutions for twelve hours each. Between solutions the roe is drained for three to six hours. The first two brines have a salt concentration equivalent to seawater; the last is a saturated salt solution (~26% w/v Brine).

Following the final draining, the roe is sorted and packaged in plastic-lined cartons (120 lb roe + 18 lb dry salt) for shipment. In Japan the product is graded, the sacks removed, and the roe packaged for sale.

## Grading

Grading of herring roe is subjective (organoleptic) and the ideal product should be light yellow in color with a smooth full shape about four inches long by one inch wide. The roe must not be bitter or have any rancid oily flavor. It should be firm without being fragile or brittle.

### Alternative Processing

There are several modifications of the traditional process. One of these calls for the removal of the roe with a blunted knife from freshly caught herring without any initial ageing process. The roe is sorted, graded, and packed in 10 lb plastic-lined boxes for freezing and shipment to Japan. This permits the utilization of the herring (usually destined for fish meal production) for the manufacture of kippers.

Since the availability of herring roe is confined to a relatively short period of time when the roe is suitable for processing, roed herring may be frozen to extend the harvesting season. This has the advantage of avoiding glut and so increasing a plant's total processing capacity. Additionally, the roe removal is facilitated by freezing and subsequent partial thawing.

The herring milt is also being recovered and frozen at some plants. It is shipped to European markets where it is used as a tavern delicacy when breaded and deep fried.

A modification of the traditional (West Coast) salt curing of herring roe is being implemented at a processing plant in Nova Scotia. Five years ago trials of the traditional West Coast process were conducted at this plant using Northwest Atlantic Herring. Presumably due to the smaller roe size of Atlantic herring (and hence denser roe mass) the salt did not completely penetrate the roe and the finished product was soft in the center. This gave Atlantic herring roe a poor reputation in the market-place which has yet to be overcome. The modified process (Figure I) yields an excellent product. The top grade obtainable by Atlantic herring roe at this time is Grade 2; Grade 1 is reserved

for British Columbia roe with its larger eggs and firmer nature. The deroed fish is exported as salted knobbed herring.

Figure I - Salt Processing of Atlantic Herring Roe

