

# TECHNICAL NOTE NO. 7--RESULTS OF SOME TESTS WITH FROZEN LOBSTERS AND LOBSTER MEAT

## INTRODUCTION

Very little information is available regarding the freezing characteristics of lobsters and lobster meat. Although the quantity available for freezing would undoubtedly be quite limited due to the heavy demand for live lobsters, it may be desired at times to freeze this product on a small scale. This is evident by the inquiries on freezing of lobsters received by the Fish and Wildlife Service from locker plant operators, and manufacturers and owners of home freezers.

With this in mind, a limited study of the storage of frozen lobsters and lobster meat was made. Since the work was restricted to only a comparatively small number of samples held at only one storage temperature, it should not be construed that the results are conclusive. Possibly other methods of preparation and lower storage temperatures would alter the findings considerably.

## PREPARATION OF SAMPLES

Live lobsters and freshly-cooked lobster meat were obtained and prepared for the tests in Gloucester, Mass. Five lots were prepared for freezing, as follows:

1. Whole live lobsters. These are designated later in this report as the "uncooked" sample.
2. Whole cooked lobsters. These were live lobsters boiled for 16 minutes in salted water (1 tablespoon of salt to 1 quart of water).
3. Whole cooked lobsters. Similar to (2), which were frozen in blocks of ice after one month of storage at 0° F.
4. Cooked lobster meat packed without liquid in half-pound tin cans and hermetically sealed.
5. Cooked lobster meat packed in 1½ percent brine in half-pound tin cans and hermetically sealed.

All samples were frozen in circulating brine at a temperature of approximately 0° F., followed by storage in a room at the same temperature. The whole lobsters were given an ice glaze to retard desiccation.

It had been planned to freeze several cooked lobsters in blocks of ice at the time the samples were being prepared in order to ascertain whether a minimum of desiccation during storage would prevent changes in the texture of the meat. Because of certain difficulties this was not done at the time of freezing but was done a month later (Lot No. 3). The samples were kept ice-glazed during this interval.

All of the lots were shipped with dry ice in an insulated container to the Service's Fishery Technological Laboratory in College Park, Md., and were received in a frozen condition. The whole lobsters were then reglazed and packaged individually in heavy metal foil wrappers. All samples were held in storage at 0° F.

At monthly intervals, samples from each lot were removed from frozen storage and allowed to thaw at room temperature. Those that were uncooked were thawed, then boiled in salted water for 16 minutes, and cooled before being tested. The meat was picked from the whole lobsters and cut into pieces for palatability tests. The meat from fresh-cooked live lobsters was used as controls. All samples were designated by a code unknown to the judges at the time of testing. Members of the laboratory staff, accustomed to making taste tests, served as judges. Scores were based on the appearance, flavor, and texture of the lobster meat. A score of 85 or over is considered satisfactory.

### RESULTS AND DISCUSSION

The palatability scores obtained in the tests are given in Table 1. The frozen uncooked lobsters consistently received a satisfactory and relatively high score at each examination during the six-month period. The flavor and texture of the meat after cooking was generally considered to be quite satisfactory.

Experimental condition of sample	Lot number	Palatability Score <sup>1/</sup>					
		Storage Period (Months)					
		1	2	3	4	5	6
<u>Frozen whole lobsters</u>							
Uncooked .....	1	91	87	91	93	89	93
Cooked .....	2	74	88	84	72	82	83
Cooked (frozen in ice block) .....	3	-	-	88	-	79	83
Fresh control .....	-	79	81	67	81	96	88
<u>Frozen lobster meat</u>							
Dry pack .....	4	79	84	81	78	68	73
Brine pack .....	5	80	89	86	86	83	82
Fresh control .....	-	83	86	91	89	92	88

<sup>1/</sup>The palatability score was calculated as follows: The meat was scored on the basis of 1 to 10 points each for appearance, flavor and texture. The flavor score was doubled in order to give additional weight to this factor. The mean as a percent of these scores resulted in the value reported in the table. A score of 85 or over is considered satisfactory.

The frozen cooked lobsters received variable scores from month to month and in general were not satisfactory. The meat was often spongy and watery, and was not at all like that of fresh-cooked lobsters. The meat of the cooked lobsters frozen in blocks of ice showed no improvement over that of the cooked ones held in the usual manner.

Neither of the lots of frozen picked meat stored too well. The

meat that was frozen without added liquid (dry pack) failed to receive an acceptable score during any month of the storage period. The flavor of the meat was objectionable and the texture was described as watery and spongy. The meat frozen with added liquid (brine pack) received somewhat higher scores but in general it could hardly be considered satisfactory either. It is doubtful if this pack has very much in its favor over the dry-packed product.

In all lots, the claw meat was sometimes found to have somewhat of an off flavor, even though the body meat was all right.

Considerable variation was found in the scores for the fresh controls. This may have been due to the manner in which the live lobsters were handled.

While the frozen uncooked whole lobsters received the highest palatability scores, there is one other factor that must be considered. After cooking the whole

lobster, the meat was found to stick very tightly to the shell and was difficult to remove without breaking it into small pieces. This may or may not be objectionable, depending upon the attitude of the consumer, since the meat is very often cut into smaller pieces before being used.

**Note:** A UNITED STATES PATENT HAS RECENTLY BEEN GRANTED WHICH DEALS WITH THE FREEZING OF LOBSTERS. IT IS CLAIMED THAT THE DIFFICULTIES ENCOUNTERED IN REMOVING THE MEAT FROM THE SHELL OF LOBSTERS FROZEN ALIVE OR RAW AND THEN COOKED MAY BE OVERCOME BY A BRIEF HEAT TREATMENT PRIOR TO FREEZING. THIS TREATMENT CONSISTS OF AN IMMERSION OF THE LOBSTER IN BOILING WATER FOR AN INTERVAL OF NOT LESS THAN 15 SECONDS NOR MORE THAN 5 MINUTES, DEPENDING ON THE SHELL THICKNESS. THE HEATING PERIOD SHOULD BE ONLY OF SUFFICIENT DURATION TO PRODUCE A COOKING OF THE SURFACE OF THE MEAT NEXT TO THE SHELL BUT NOT TO COOK THE MEAT BELOW THE SURFACE. A HEATING PERIOD OF ABOUT 1-1/2 MINUTES IS SAID TO BE SUFFICIENT FOR A ONE POUND LOBSTER. AFTER HEATING, THE LOBSTER IS COOLED AND QUICK FROZEN (U. S. PATENT NO. 2,501,655 FROZEN LOBSTER METHOD, PTD. MARCH 28, 1950).

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