

ACCURACY OF NET-WEIGHT DETERMINATIONS FOR FROZEN GLAZED HALIBUT STEAKS

By Max Patashnik*

ABSTRACT

A check was made on the accuracy of the net-weight determination for frozen glazed halibut steaks as ascertained by the method given in the current U. S. Standards for Grades of Frozen Halibut Steaks; and the possibility of simplifying the method was investigated.

INTRODUCTION

Accurate methods of evaluating quality are essential in developing and applying U. S. Standards for grades of fishery products. Periodically, official methods used in these standards are retested for accuracy and possible improvement. Inquiries into the accuracy of the method for determining net weight of frozen glazed halibut steaks were recently received at the Seattle Technological Laboratory. This method (based on the deglazing of frozen steaks according to the procedure given in the current U. S. Standards for Grades of Frozen Halibut Steaks, March 1959) was accordingly reevaluated.

In preparing frozen halibut steaks, the processor usually cuts them from frozen, dressed, glazed whole halibut and glazes the individual steaks with ice by dipping them briefly in cold water. The glaze, which serves as a protection against dehydration during subsequent storage and distribution, consists of a surface covering of ice that varies in thickness and may or may not have chemical additives incorporated in it. In setting the fill weight of the package (net weight plus glaze weight), the processor makes an allowance for the weight of the glaze (pre-existing skin glaze plus added surface glaze) in order to conform to the declaration of net weight on the label. The inspector, in applying the Federal grade standard, must check the net weight in order to determine compliance.

The objectives of the present study therefore were (1) to check the accuracy of the net-weight determination for frozen glazed halibut steaks, using the official percentage-glaze method, and (2) to consider the possibility of simplifying the method.

CHECK ON ACCURACY

DESCRIPTION OF OFFICIAL METHOD: The method, as published in the U. S. Standards for Grades of Frozen Halibut Steaks, consists essentially of the following steps:

- (1) Weigh the steaks with the glaze intact, which gives C, the gross weight.
- (2) Thaw the glaze from the surfaces of the steak with flowing tap water.
- (3) Wipe off the excess water from the surface with a single paper towel.
- (4) Weigh the deglazed steaks, which gives D, the net weight.
- (5) Calculate the percentage glaze as $\frac{C-D}{D} \times 100$.

EXPERIMENTAL: To test the accuracy of the method, we prepared glaze-free frozen halibut steaks of known weight and glazed them. The glaze was then thawed off and the steaks were reweighed. The difference in weight was considered to be the error in the method.

*Chemical Engineer, Technological Laboratory, U. S. Bureau of Commercial Fisheries, Seattle, Wash.

Details of the procedure were as follows: Unglazed frozen dressed halibut were cut by bandsaw into steaks of varying size, scraped clean of sawdust, and weighed immediately, which gave the true net weight, T. The frozen steaks were then ice-glazed by being dipped into cold fresh water. From 2- to 12-percent glaze by weight of the individual steak was added, and the steaks were stored at 0° F. until tested. In a series of tests at intervals of time the glazed steaks were deglazed and weighed (actual net weight, D) according to the official method. This work was done by four analysts, using steaks that varied in size and in percentage of glaze.

The percentage error in the determination of true net weight was calculated as follows:

$$\frac{(\text{actual net weight} - \text{true net weight}) \times 100}{\text{true net weight}} = \frac{(D - T) \times 100}{T}$$

RESULTS AND DISCUSSION: The data are shown in tables 1 and 2. Table 1 lists the average percentage error for series A, B, and C. Table 2 lists the range of the maximum and minimum individual values for experimental series A, which gives an indication of the variability of individual values.

Table 1 - Average Percentage Error in the Determination of True Net Weight

Series	Experiment	Total Steaks	Range in Steak Weights	Range in Amount of Glaze	Average Error in True Net Weight as Found by Analyst:			
					A	B	C	D
	No.	No.	Grams	Percent	Percent	Percent	Percent	Percent
A	1	50	177-286	2.1-12.5	-0.2	-0.1	-0.1	-
	2	50	175-283	2.0- 5.8	+0.4	+0.2	+0.3	-
	3	50	91-343	4.5- 7.8	0.0	-0.2	-	-
	4	1/38	86-225	4.1- 7.5	-0.2	+0.1	-	-
B	5(a)	9	102-168		-	-	-	+0.9
	(b)	16	82-157		-	-	-0.6	-
	6(a)	32	160-371		-	-	-	+0.7
	(b)	19	200-339	2.9- 9.9	-	-	0.0	-
	7	29	108-226		-	-	+0.2	-
	8	52	107-228		-	-	-	+0.1
C	9	50	97-239		-	-	+0.2	-
	10(a)	9	2/125-284	glaze free	-	-	+0.2	-
	(b)	9	3/125-284	"	-	-	-0.3	-
	(c)	9	4/125-284	"	-	-	-0.4	-

1/In experiment 4, analyst A tested 6 steaks; analyst B, 32 steaks; the steaks were equally divided in experiments 1, 2, and 3.
 2/These glaze-free samples were stored for 4 months at 0° F. in polyethylene bags till slightly dehydrated. They were deglazed in accordance with the standard procedure.
 3/Each steak from experiment 10(a) was given seven successive 10-second thawing exposures to 50° -F, running water at 1-minute intervals until they were almost completely thawed. They were then weighed after removal of excess surface water.
 4/Each steak from experiment 10(b) was frozen overnight, and the procedure for 10(b) was repeated.

Series A: In this first series of tests on 188 steaks by three analysts, the average values ranged from +0.4 to -0.2 percent of true net weight. All the individual values (table 2) were within the range of +1.3 to -1.3 percent of the true net weight, and 95 percent of the individual values were within the range of +1.0 to -0.9 percent of the true net weight.

Table 2 - Range of Individual Values for Percentage Error in the Determination of True Net Weight

Series	Experiment	Total Steaks	Range of Error in True Net Weight		Remarks
			All Individual Values Are Within:	95% of Individual Values Are Within:	
	No.	No.	Percent	Percent	
A	1	50	-1.3 to +0.7	-0.9 to +0.5	Data obtained by 3 experienced analysts.
	2	50	-0.7 to +1.3	-0.4 to +1.0	
	3	50	-0.8 to +0.5	-0.6 to +0.5	Data obtained by 2 experienced analysts.
	4	38	-1.0 to +0.4	-0.6 to +0.5	

Series B: In this second series of tests (2 years later) on 207 steaks by two analysts without trial practice, the average values ranged from -0.6 to +0.9 percent from true net weight. With further practice, the analysts improved their techniques, and the average differences from true net weight were 0.2 percent or less for the last four experiments in this series.

Series C: In the third series of tests (4 months after series B) on a lot of nine unglazed steaks stored for 4 months at 0° F. to observe the effect of slight dehydration (simulated short retail storage), an experienced analyst obtained an average value of +0.2 percent of true net weight. To observe the effect of excessive thawing, we subjected these same steaks to seven successive 10-second exposures to running water (50° F.) at 1-minute intervals until they were almost completely thawed. The average error in true net weight was -0.3 percent. The same steaks were frozen overnight and again given seven successive 10-second exposures to running water. The average error in true net weight was now found to be -0.4 percent. Thus, slight dehydration of the sample or overthawing of the sample do not introduce serious errors in the method under test.

POSSIBILITY OF SIMPLIFYING THE METHOD

Various steps in the procedure were examined for possible improvement or simplification.

FLOW RATE AND TEMPERATURE OF DEGLAZING WATER: In the removal of the glaze from halibut steaks, the official method specifies a rate of flow of 3 quarts per minute and the use of tap water at 50° to 60° F.

Variations in temperature and in rate of flow of the water had no significant effects, indicating that strict adherence to this part of the procedure is not necessary.

DEGREE OF DEGLAZING AND WIPING OFF OF EXCESS WATER: The official method specifies that deglazing be continued until "all glaze is removed from cut flesh surface, as evidenced by absence of slick feel to finger," and that the analyst should "rapidly remove excess water with single paper towel."

Slight to moderate overthawing of the steak surface during deglazing had no significant effect, provided that the excess water was gently wiped off with a single paper towel. It should be remembered in carrying out this step that the surface of the thawed steak is like a wet sponge. Vigorously blotting each steak with a new dry towel will remove fluid from the meat, thereby giving a smaller actual net weight.

The following two alternative modifications in the method of removing excess water from the March 1959 published method were tested:

(a) Gently wipe off the excess water with a single paper towel that is saturated with moisture. (Use of the moisture-saturated towel avoids the possible blotting action of a dry towel.)

(b) Shake off the excess water. In this step, hold the steak lightly and then vigorously shake it 6 times through a 1-foot arc. (In using this modification, slightly overthaw the steak surface rather than underthaw it.)

The two alternative methods gave equivalent results, though the shaking method was slightly faster and simpler. The difference, however, was not sufficient to justify a recommendation of one over the other.

CONCLUSIONS

(1) In a test of the official method for determining the average net weight of frozen glazed halibut steaks, results were within ± 1.0 percent of the true net weight.

(2) Variation in temperature and rate of flow of thawing water for removing glaze in the official method and moderate overthawing of the steak surface had no significant effects, indicating that strict adherence to this part of the procedure is not necessary.

Careful removal of excess water from the surface of the deglazed steak was the key operation. To obtain best results, the analyst should gently remove surface water, either by

use of a moisture-saturated paper towel, avoiding vigorous blotting with a dry paper towel, or by holding the partly thawed steak lightly and shaking it six times through a 1-foot arc.

LITERATURE CITED

U. S. DEPARTMENT OF THE INTERIOR

1959. United States Standards for Grades of Frozen Halibut Steaks. (March) (First Issue), 4 pp.



VARY YOUR MENUS BY SERVING DEVILED CLAMS

Many traditions in the United States have grown up around the serving and eating of clams. Annual clam eating contests are held in various coastal regions of the country. The connotations of the term "Clambake" have extended the use of that word far beyond its original meaning. Few controversies, in cooking circles at least, have more participants than that which centers on the proper way to prepare clams.



It is not only the fine distinctive flavor that recommends clams as a food; they are also an excellent source of the "protective" nutrients, including proteins, minerals, and vitamins.

Clams may be purchased in three forms: in the shell, shucked, and canned. On the Atlantic coast, the marketed species are the hard, soft, and surf clams. On the Pacific coast, the most common market species are the butter, littleneck, razor, and pismo clams.

Although clams are served most often in chowders, steamed, raw on the half shell, or at clambakes, there are many other good ways to serve them. One of these which the home econ-

omists of the Bureau of Commercial Fisheries, United States Department of the Interior, recommend serving is "Deviled Clams".

DEVILED CLAMS

1 pint clams or 2 cans (7 ounces each) clams	$\frac{1}{4}$ teaspoon thyme
$\frac{1}{2}$ cup chopped celery	3 drops tabasco
2 tablespoons chopped onion	1 tablespoon chili sauce
1 clove garlic, finely chopped	1 egg, beaten
$\frac{1}{4}$ cup butter or other fat, melted	$\frac{1}{2}$ cup cracker meal
1 tablespoon flour	2 tablespoons chopped parsley
$\frac{3}{4}$ teaspoon salt	2 tablespoons butter or other fat, melted
$\frac{1}{4}$ teaspoon pepper	$\frac{1}{2}$ cup dry bread crumbs

Drain clams. Chop. Cook celery, onion, and garlic in butter until tender. Blend in flour and seasonings. Add clams and cook until thick, stirring constantly. Stir a little of the hot sauce into egg, add to remaining sauce, stirring constantly. Add meal and parsley. Place in 6 well-greased individual shells or casseroles. Combine butter and crumbs. Sprinkle over top of deviled clams. Bake in a hot oven, 400° F., for 10 minutes or until brown. Serves 6.