

Method for Determining Almonds In Chocolate Candy

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Almonds are required at 20% by weight in the type VII enriched sweet chocolate candy as described in the military specification "Candy and Chocolate Confections", MIL-C-10928E. Since the U.S. Army Natick Laboratories is responsible for developing end item requirements that can be measured quantitatively, a method was developed to assay almonds in the finished chocolate candy.

A literature search in *Chemical Abstracts* from 1971 back to 1917 did not reveal any published method for analyzing chocolate candies for almond content.

EXPERIMENTAL

Diced, roasted almonds (medium size) were obtained from the California Almond Growers Exchange, Sacramento, CA 95808. Ten samples of chocolate disks were prepared containing exactly 5.70 g. almond pieces (based on calculation of 20% level of the 28.35 g. candy). The metal molds containing the disk candies were then placed in a 3 mil poly bag and heat sealed. They were frozen at -29°C for 2-3 hours to facilitate removal of the product from the molds. Then the candies were removed from the molds inclosed in the bag, and transported to a 72°F. room regulated at 10% relative humidity to reduce the likelihood of condensation. The individual candies (sample) were hermetically sealed in 401 x 411 cans prior to analysis. Before chemical assay each disk was removed

from the can, broken and placed in a 400 ml beaker containing 300 ml distilled water. The beaker and contents were then heated to 95°C. and stirred for 15 minutes using a heated magnetic stirrer. The almond pieces, being more dense than the aqueous/fat suspension, settled and were poured onto a specially made tared screen (boat) measuring 3½" x 1½" with sides measuring ¾" high. The screen was a 32 mesh stainless steel with 0.010 inch wire diameter, 0.54 min. width of opening (46.5% open area). The collected almond pieces were then washed with hot water. The almonds (contained in the tared screen boat) were placed in another tared aluminum dish and dried to constant weight in a vacuum oven for at least 16 hours at 70°C.

The amount of almond pieces (on a dry weight basis) was determined directly by weighing and subtracting the tare weights of both the boat and aluminum dish.

Commercial samples were then checked following the same assay procedure.

RESULTS

Mean recovery from chocolate disks of pre-weighed almonds was 99.5% ± 3.8, as shown in TABLE 1. Using a paired t-test on the weight of added and recovered almonds, no significant difference at the 5% level of confidence, was found.

TABLE I

Recovery of Almonds from Sweet Chocolate Disks

Added (g)	Recovered (g)	% Recovery (As Is)
5.70	5.60	98.3
5.70	5.40	94.7
5.70	5.59	98.1
5.70	5.80	101.8
5.70	5.80	101.8
5.70	5.91	103.7
5.70	5.67	99.5
5.70	5.48	96.1
5.70	6.10	107.0
5.70	5.36	94.0
57.0000	56.7100	TOTALS 995.0
5.7000	5.6710 ^{1/}	MEANS 99.5±3.8

^{1/} Not Significant at 5% level using a paired t-test.

Determination of almonds in commercially produced sweet chocolate disks is reported in TABLE II. If these samples are typical of the production, approximately 5%, chiefly chocolate, is given away. Almond content, however, is on the average below that required.

TABLE II

Almonds in Commercial Sweet Chocolate Disks
MIL-C-10928E

Candy (g)	Almonds Recovered (g)	Almonds %
31.7145	6.6440	20.31
29.5485	5.7420	19.43
28.4500	5.0438	17.73
30.5953	6.0953	19.92
28.1443	5.4223	19.27
29.2708	5.3374	18.23
29.0783	4.7689	16.40
32.7533	5.9112	18.05
30.1442	6.1627	20.44
28.9505	5.6190	19.41
MEANS	29.8650±1.3866	18.92±0.62

Initial moisture content correction was not found to be necessary since roasted almonds normally contain a moisture content in the range of 0.97–1.39% before they are added to candy (Harris *et. al.* 1971).

REFERENCES

- Harris, N.E., Westcott, D. E. and Henick, A. S. 1972. Rancidity in Almonds: Shelf Life Studies, *Journal of Food Science*, 37, 824.
- MIL-C-10928E 1973. Military Specification, Candy & Chocolate Confections. U.S. Government Printing Office, Washington, D.C.

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Editor's Note: As no reference has been made in literature searches for determining almonds in chocolate, the U.S. Army Natick Laboratories of the Department of the Army asked the "MC" to publish the above data. We are happy to do so.

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