



U.S. Department of Health & Human Services



U.S. Food and Drug Administration

Elemental Analysis Manual

for Food and Related Products

The following is a section of the Elemental Analysis Manual for Food and Related Products.

For additional information and to view other sections of the manual, visit the Elemental Analysis Manual for Food and Related Products web page at

<http://www.fda.gov/Food/FoodScienceResearch/LaboratoryMethods/ucm2006954.htm>.



Elemental Analysis Manual

for Food and Related Products

2.1 Food Edible Portion

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GLOSSARY

The edible portion of most foods is obvious. However, there are foods that require special instructions for consistency in obtaining the edible portion of the laboratory sample prior to preparing the analytical sample.

2.1.1 GENERAL PROCEDURES

Under FDA's Total Diet Study, a number of special food preparation instructions have been developed. Relevant procedures from this study are listed in 2.1 Table 1 and some alternative procedures have been added. The following terminology is used in 2.1 Table 1:

Water - Water that meets specifications for [ASTM Type I water](#)¹.

Rinse - Wash with water to remove all dirt and debris.

Drain - Remove excess liquid using a strainer, sieve, colander or other means appropriate for the product.

Tablespoon - U.S. federal law (21 CFR 101.9(b) (5) (viii)) defines 1 U.S. tablespoon = 15 mL. Although technically a measure of liquid volume, when used for solids (*e.g.*, sugar), it should be measured to the flattened level of the spoon (vs. a 'heaping' or

'heaped tablespoon', which is as much as can be held in the spoon)².

2.1 Table 1 Food preparation procedures for selected foods

Product	Procedure^a
Apple, red, raw (with peel)	Rinse. Do not peel. Remove and discard stem and core.
Apricot, raw	Rinse. Do not peel. Remove and discard pit.
Apricots, canned in heavy/light syrup	Do not drain; use entire contents of can.
Asparagus, fresh/frozen	Rinse fresh asparagus. Drain.
Avocado, raw	Peel. Remove and discard pit.
Banana, raw	Peel.
Beans, green, canned	Drain.
Beans, green, fresh/frozen	Rinse fresh green beans. Remove / discard ends & fiber thread. Drain.
Beans, pinto, dry	Rinse and soak overnight according to package directions. Drain.
Beans, refried, canned	Do not drain; use entire contents of can.
Beans, white, dry	Rinse and soak overnight according to package directions. Drain.
Beef stew with potatoes, carrots, and onion, canned	Do not drain; use entire contents of can.
Beets, canned	Drain.
Broccoli, fresh/frozen	Rinse fresh broccoli. Drain.
Brussels sprouts, fresh/frozen	Rinse fresh Brussels sprouts. Drain.
Cabbage, fresh	Remove / discard outer leaves and core.
Cantaloupe, raw/frozen	Remove / discard rind and seeds.
Carrot, fresh, peeled	Rinse fresh carrots. Peel. Cut off and discard end pieces. Drain.
Cauliflower, fresh/frozen	Rinse fresh cauliflower. Remove and discard stem. Drain.
Celery, raw	Remove / discard damaged or discolored outer pieces. Remove / discard thickened stem portion and leaves. Rinse each piece.
Cherries, sweet, raw	Rinse. Remove / discard stems and pits.
Chili con carne with beans, canned	Do not drain; use entire contents of can.
Clam chowder, New England, condensed, prepared with whole milk	Add one soup can of whole milk.
Coffee, decaffeinated, from ground	Measure 1 tablespoon coffee for each cup of water in drip-type coffee filter. Boil the required amount of water and pour over coffee.
Coffee, from ground	Measure 1 tablespoon coffee for each cup of water in drip type coffee filter. Boil the required amount of water and pour over coffee.
Collards, fresh/frozen	Rinse fresh collards. Remove and discard stems. Drain.

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Corn, canned	Drain.
Corn, cream style, canned	Do not drain; use entire contents of can.
Corn, fresh/frozen	Remove corn from cob.
Cucumber, peeled, raw	Peel. Cut off and discard end pieces.
Cumber, Dill, pickles	Drain.
Eggplant, fresh, peeled	Rinse. Drain. Peel.
Eggs, boiled	Place eggs into hot boiling water and cook approximately 5 minutes until white and yolk are set. Remove shells.
Fruit cocktail, canned, in heavy/light syrup	Do not drain; use entire contents of can.
Fruit drink, from powder	Mix with water according to package instructions.
Gelatin dessert	Prepare according to package directions. Refrigerate and allow to gel.
Grapefruit, raw	Peel. Remove / discard excess white membrane, and seeds.
Grapes, (red/green) seedless, raw	Rinse. Remove / discard stems.
Juice, [orange, pineapple, grape, grapefruit], from frozen concentrate	Add water according to label. Usually 3 containers water to 1 container of thawed juice concentrate. [<i>Alternative: Thaw. Do not add water.</i>]
Lemonade, from frozen concentrate	Add water according to label. Usually 3 containers water to 1 container of thawed juice concentrate. [<i>Alternative: Thaw. Do not add water.</i>]
Lettuce, iceberg, raw	Remove outer leaves and core. Wash individual leaves and drain on towels.
Lettuce, leaf, raw	Remove / discard outer damaged leaves and core. Wash individual leaves and drain on towels.
Mushrooms, raw	Rinse. Trim off end pieces and discard.
Okra, fresh/frozen	Rinse fresh okra. Drain. Trim off and discard stem attachment.
Onion, mature, raw	Remove / discard brown outer layer and first white layer and other inedible portions.
Orange, raw	Peel. Remove / discard excess white membrane and seeds.
Peach, raw/frozen	Rinse. Do not peel. Remove and discard pit.
Peaches, canned in light/medium syrup	Do not drain; use entire contents of can.
Pear, raw (with peel)	Rinse. Do not peel. Remove and discard stem and core.
Pears, canned in light syrup	Do not drain; use entire contents of can.
Peas, green, fresh/frozen	Rinse fresh peas. Drain.
Pepper, sweet, green, raw	Rinse. Remove / discard seeds, core, and stem attachment.
Pineapple, canned in juice	Do not drain; use entire contents of can.
Plums, raw	Rinse. Do not peel. Remove and discard seeds.
Popcorn, microwave, butter-flavored	Prepare according to package directions.
Pork and beans, canned	Do not drain; use entire contents of can.


Potato, white	Rinse. Peel. Drain.
Potato, white, with skin	Rinse and scrub. Drain.
Prunes, dried	Remove seeds.
Radish, raw	Rinse. Remove / discard stem attachment.
Sauerkraut, canned	Drain.
Shrimp, boiled	Boil in water until done (about 10 minutes). Shell and de-vein.
Soup, [chicken noodle; tomato, vegetable beef, bean with bacon/pork], canned, condensed	Add one soup can of water.
Spaghetti with tomato sauce, canned	Use entire contents of can.
Spinach, fresh/frozen	Rinse fresh spinach. Remove / discard stems. Drain.
Squash, Summer, fresh/frozen	Rinse fresh squash. Drain. Cut off and discard end pieces.
Squash, Winter, fresh/frozen	Rinse fresh squash. Drain. Cut in half and remove stems and seeds. Scoop out tender flesh and mash with a fork.
Strawberries, raw/frozen	Rinse. Remove / discard stems.
Sweet potato, canned	Drain.
Tea, decaffeinated, from tea bag	Pour 1 cup boiling water over 1 tea bag in a cup. Steep for 3 minutes. Remove bag.
Tea, from tea bag	Pour 1 cup boiling water over 1 tea bag in a cup. Steep for 3 minutes. Remove bag.
Tomato, red, raw	Rinse. Remove / discard stem attachment. Leave skin.
Tomatoes, stewed, canned	Do not drain; use entire contents of can.
Tuna, canned in oil	Drain thoroughly. [<i>Using a #10 High Density Polyethylene (HDPE) sieve. Leave product in sieve for at least 2 minutes.</i>]
Tuna, canned in water	Drain thoroughly. [<i>Using a #10 High Density Polyethylene (HDPE) sieve. Leave product in sieve for at least 2 minutes.</i>]
Turnip, fresh/frozen	Rinse fresh turnips. Drain. Trim off and discard stem attachment.
Vegetables, mixed, frozen	{no prep}
Watermelon, raw/frozen	Remove / discard rind and seeds.

^a Based on instructions used in FDA's [Total Diet Study](#).

2.1.2 DEGASIFICATION OF CARBONATED BEVERAGES

Degasify carbonated beverages by ultrasonication at room temperature in a sonicating water bath for at least 30 min or until there is no further effervescence. Other appropriate means of degasification may be used.

REFERENCES

1. ASTM International (2006) Standard Specification for Reagent Water, *ASTM D 1193-06* [accessed June 11, 2014]. Available [ASTM website](#). 
2. Wikipedia contributors (2014) Tablespoon, *Wikipedia, The Free Encyclopedia* [accessed June 11, 2014]. Available [Wikipedia](#). 