

# Elemental Analysis Manual

## for Food and Related Products

### Archive Notes

This is an archived file provided for historical reference purposes only. Links to sites external to this file are not maintained and have therefore been removed. For the most recent information, readers are directed to the current [EAM](#).

## 2.1 Laboratory Sample to Analytical Sample

Version 1.0 (June 2008)  
Authors: Stephen G. Capar  
Katie Egan  
Richard M. Jacobs

### Table of Contents

- 2.1.1 FOOD EDIBLE PORTION
- 2.1.2 CANDY PREPARATION
- 2.1.3 CARBONATED BEVERAGE DEGASIFICATION

### GLOSSARY

This section provides information to assist the analyst in physically preparing the laboratory sample prior to preparing the analytical sample. The purpose is to obtain the edible portion of the food and to remove dirt and other material in a manner consistent with normal consumer practices for food preparation. Care must be taken to minimize contamination from the equipment and materials used in this process.

### 2.1.1 FOOD EDIBLE PORTION

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. 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.

#### Terminology

- (1) Water—Water that meets specifications for ASTM Type I water<sup>1</sup>.
- (2) Rinse—Wash with water to remove all dirt and debris.
- (3) Drain—Remove excess liquid using a strainer, sieve, colander or other means appropriate for the product.
- (4) Tablespoon—U.S. federal law (21 CFR 101.9(b)(5)(viii)) now defines 1 U.S. tablespoon = 15 mL. Although technically a measure of liquid volume, when used for solids (*i.e.*, coffee), 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)<sup>2</sup>.

**2.1 Table 1. Preparation of Edible Portion from Laboratory Sample<sup>a</sup>**

| Food Product  | Food Preparation  |
|---|---|
| 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 and discard ends and 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 and discard outer leaves and core.                                 |
| Cantaloupe, raw/frozen                              | Remove and 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.                  |

| Food Product   | Food Preparation   |
|--|--|
| Celery, raw  | Remove and discard outer pieces that are damaged or discolored. Remove and discard thickened stem portion and leaves. Rinse each piece.  |
| Cherries, sweet, raw   | Rinse. Remove and 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 into a drip-type coffee filter. Boil the required amount of reagent 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 reagent water and pour over coffee.  |
| Collards, fresh/frozen   | Rinse fresh collards. Remove and discard stems. Drain.   |
| 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 the package directions. Refrigerate and allow to gel.   |
| Grapefruit, raw  | Peel. Remove and discard excess white membrane, and seeds.   |
| Grapes, (red/green) seedless, raw                                      | Rinse. Remove and discard stems.   |
| Juice, [orange, pineapple, grape, grapefruit], from frozen concentrate | Follow instructions on label for adding water to thawed juice concentrate. [Usually add 3 containers of water to 1 container of thawed juice concentrate.]<br><hr/> Alternative: Thaw. Do not add water.       |
| Lemonade, from frozen concentrate                                      | Follow instructions on label for adding water to thawed lemonade concentrate. [Usually add 3 containers of water to 1 container of thawed lemonade concentrate.]<br><hr/> Alternative: Thaw. Do not add water. |
| Lettuce, iceberg, raw  | Remove outer leaves and core. Wash individual leaves and drain on towels.  |
| Lettuce, leaf, raw   | Remove and 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.   |

| Food Product   | Food Preparation   |
|--|--|
| Onion, mature, raw   | Remove and discard brown outer layer and first white layer and other inedible portions.  |
| Orange, raw  | Peel. Remove and 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 and 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 and discard stem attachment.   |
| Sauerkraut, canned   | Drain.   |
| Shrimp, boiled   | Boil in water until done (about 10 minutes). Shell and de-vein.  |
| Soup, [chicken noodle; tomato, vege 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 and 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 and 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 and discard stem attachment. Leave skin.   |
| Tomatoes, stewed, canned   | Do not drain; use entire contents of can.  |
| Tuna, canned in oil  | Drain. Drain as much oil as possible.<br><br>Drain using a #10 High Density Polyethylene (HDPE) sieve. Leave product in the sieve for 2 minutes or more.   |
| Tuna, canned in water  | Drain. Drain as much water as possible.<br><br>Drain using a #10 High Density Polyethylene (HDPE) sieve. Leave product in the sieve for 2 minutes or more. |

| Food Product   | Food Preparation  |
|--|---|
| Turnip, fresh/frozen   | Rinse fresh turnips. Drain. Trim off and discard stem attachment. |
| Vegetables, mixed, frozen  | {no prep}   |
| Watermelon, raw/frozen   | Remove and discard rind and seeds.                                |
| <sup>a</sup> Based on instructions used in FDA's Total Diet Study. |   |

### 2.1.2 CANDY PREPARATION

A laboratory sample for candy products should consist of a maximum of 10, 2 lbs (0.91 kg) subsamples, preferably from the same manufacturing code. The subsamples should be sealed retail units. If the candy is packed in a sealed bag of at least 2 lbs, then the each of the 10 subsamples is a bag of candy. Otherwise, each subsample is the number of bags that provide at least 2 lbs of candy.

### 2.1.3 CARBONATED BEVERAGE DEGASIFICATION

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) ASTM D 1193-06, "Standard Specification for Reagent Water". Available from the ASTM website. (*link removed*)
- (2) Wikipedia contributors. Tablespoon [Internet]. Wikipedia, The Free Encyclopedia; 2006 Aug 15, 15:48 UTC [cited 2006 Aug 26]. Available from Wikipedia. (*link removed*)