DRY WEIGHT DETERMINATION OF TISSUES

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ABSTRACT

Tissue contaminant levels are reported per unit of dry weight. Aliquots of field collected wet tissues are oven dried in the laboratory to a constant weight. The following method describes the procedure by which percent moisture in tissues is determined.

1.0 INTRODUCTION

An aliquot of approximately 1 to 2 g of homogenized wet tissue is dried at 105°C to a constant weight. The weight of the dried aliquot is the dry weight of the sample. Percent moisture is determined by calculating the amount of weight lost during the drying procedure.

2.0 APPARATUS AND MATERIALS

2.1 EQUIPMENT

- Balance, top loading, tare capacity to 300 g, capable of weighing to 1 mg
- Calibrated weights, certified
- Oven, electric convection, capable of maintaining stable temperatures of at least 200ºC
- Desiccator, cabinet style
- Spatulas, stainless steel
- Beakers, glass 10 mL
- Waring industrial blender, titanium blades and Teflon rings

2.2 REAGENTS

- Water, deionized and activated-carbon filtered, organic free
- Acetone, pesticide grade or equivalent purity
- Methanol, pesticide grade or equivalent purity
- Dichloromethane, pesticide grade or equivalent

3.0 PROCEDURE

Frozen tissue samples are thawed at room temperature. Bivalves are shucked using clean, solvent rinsed stainless steel utensils. Samples are processed in a contaminant-free work area. The samples are homogenized in a Waring Industrial Blender that has been outfitted with titanium blades and Teflon rings. All equipment used to process tissues is cleaned with Micro® soap and solvent rinsed to remove all traces of organics.

Dry weights are determined by placing sample aliquots in 10 mL, pre-weighed, clean, dry beakers. Beakers are pre-dried in an oven at 105ºC and cooled in a desiccator. Once the beakers have cooled for a minimum of 30 minutes, the weight of the empty beaker is recorded to the nearest 1 mg. Approximately 1 to 2 g of thawed, thoroughly homogenized sample is placed into a labeled beaker using a solvent rinsed stainless steel spatula. The weight of the beaker plus wet sample is recorded to 1 mg. Tissue samples are dried in a 105ºC oven for at least 24 hours followed by cooling in a desiccator for at least 30 minutes prior to weighing. Samples and beakers are weighed to the nearest 1 mg. Samples are placed back into the oven and dried for another 24 hours at 105°C, cooled in a desiccator and weighed. This cycle is repeated until successive weight differences are less than 4%.

4.0 QUALITY CONTROL (QC)

All reagents are verified to be contaminant free. All equipment and glassware used are thoroughly cleaned by solvent rinsing or combustion at 400°C. The calibration and accuracy of balances, weights, and thermometers are checked daily. The calibration and accuracy of balances, weights are verified yearly by an independent source. All samples are shipped and received under chain-of-custody. A sample is analyzed in duplicate with each batch of 20 samples or fewer.

5.0 CALCULATIONS

5.1 PERCENT DRY WEIGHT

$$\text{Dry Wt.}\,\% = \frac{(\text{Beaker Wt.} + \text{Dry Wt.}_{\text{sample}}) - (\text{Beaker Wt.})}{(\text{Beaker Wt.} + \text{Wet Wt.}_{\text{sample}}) - (\text{Beaker Wt.})} \times 100$$

5.2 DUPLICATE SAMPLE ANALYSES

$$RPD = \frac{\left|\left(\text{Dry Wt.}_{\text{sample1}} - \text{Dry Wt.}_{\text{sample2}}\right)\right|}{\left(\frac{\left(\text{Dry Wt.}_{\text{sample1}} + \text{Dry Wt.}_{\text{sample2}}\right)}{2}\right)} \times 100$$