

PRACTICAL WORK - FOOD BIOCHEMISTRY
DETERMINATION OF WATER CONTENT BY OVEN DRYING METHOD

1. GENERAL INFORMATION

Title: Determination of Water Content in Two Food Products by Gravimetric Method

Level: Semester 5

Field: Food Biochemistry

2. LEARNING OBJECTIVES

- Master the protocol for determining water content by oven drying
 - Compare the water content of two foods with different textures
 - Understand the importance of sample preparation
 - Calculate and interpret experimental results
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3. PRINCIPLE OF THE METHOD

The gravimetric method by oven drying involves subjecting a food sample to a temperature of 105°C until a constant mass is obtained. The measured mass loss corresponds to the evaporated water.

Calculation Formula:

$$\% \text{ H}_2\text{O (wet basis)} = [(M_2 - M_3) / (M_2 - M_1)] \times 100$$

Where:

- **M₁** = Mass of empty capsule (g)
 - **M₂** = Mass of capsule + wet sample (g)
 - **M₃** = Mass of capsule + dry sample (g)
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4. REQUIRED MATERIALS

4.1. Laboratory Equipment

- Ventilated oven set at 105°C ± 2°C
- Analytical balance (precision 0.1 mg)
- Aluminum capsules (2 per pair)
- Desiccator with silica gel

- Metal tongs
- Spatulas
- Timer

4.2. Food Products

- **Food 1:** Fresh carrot
- **Food 2:** Sandwich bread

5. DETAILED EXPERIMENTAL PROTOCOL

Step 1: Sample Preparation 15 minutes

For the carrot:

- Wash and peel a fresh carrot
- Grate finely to homogenize the sample
- Work quickly to avoid dehydration

For the bread:

- Remove the crust
- Cut the crumb into small 2-3 mm cubes
- Mix to uniformize

Step 2: Capsule Preparation 45 minutes

1. Carefully clean two aluminum capsules
2. Identify them: "C" for carrot, "B" for bread
3. Place the capsules in the oven at 105°C for 30 minutes
4. Transfer them to the desiccator for cooling (30 minutes)
5. Weigh each empty capsule and record:
 - M_1^c = mass of carrot capsule
 - M_1^b = mass of bread capsule

Step 3: Weighing of Wet Samples 10 minutes

1. Place approximately 3 g of grated carrot in capsule "C"
2. Place approximately 2 g of bread in capsule "B"
3. Weigh quickly and record:
 - M_2^c = capsule + wet carrot

- M_2^b = capsule + wet bread

Step 4: Oven Drying 4 hours

1. Place the **open** capsules in the oven at 105°C
2. Record the start time of drying: _____ h
3. Let dry for 4 hours

Step 5: Final Weighing 45 minutes

1. After 4 hours, remove the capsules with tongs
2. Place them immediately in the desiccator (45 minutes)
3. Weigh the cooled samples and record:
 - M_3^c = capsule + dry carrot
 - M_2^b = capsule + dry bread

6. RESULTS TABLE

Measurements	Carrot	Bread
M_1 - Mass of empty capsule (g)		
M_2 - Mass of capsule + wet sample (g)		
M_3 - Mass of capsule + dry sample (g)		
Mass of evaporated water ($M_2 - M_3$) (g)		
Initial sample mass ($M_2 - M_1$) (g)		
% H ₂ O (wet basis)	_____	_____

7. QUESTIONS AND INTERPRETATION

1. **Ranking:** Which food has the highest water content?
2. **Consistency:** Is this result consistent with the texture of the foods?
3. **Preparation:** Why is it important to grate the carrot finely?
4. **Sources of error:** What are the main possible sources of error?

8. CONCLUSION

Write a summary conclusion comparing the two foods and explaining the impact of their water content on:

- Their texture

- Their preservation
 - Their nutritional value
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9. SAFETY AND PRECAUTIONS

- Wear a lab coat and protective gloves
 - Use tongs to handle hot capsules
 - Never open the desiccator before complete cooling
 - Clean the work station after handling
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Pair Name:-

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