
Standard Procedure SP 0008:2005

Method for determining the salt content of butter

1 Scope

This Standard Procedure is adapted from BS 5086-4:1985 Analysis of butter - Part 4: Method for determination of salt content. It can be used for butter or margarine containing up to 3% salt.

2 Definitions

salt

assumed to be sodium chloride. However, this method does not distinguish between sodium chloride and other chlorides such as potassium chloride.

3 Principle

The butter sample is treated with nitric acid to digest organic matter. The chloride content, taken to be sodium chloride, is reacted with excess silver nitrate solution. The remaining unreacted silver nitrate is then titrated against standardised potassium thiocyanate solution.

4 Apparatus and Reagents

- balance capable of weighing to 0.001 g
- 250 cm³ conical flask
- 1 cm³, 10 cm³ and 50 cm³ measuring cylinders
- 25 cm³ pipette and pipette filler
- 50 cm³ burette
- eye protection
- concentrated nitric acid Caution: corrosive
- 0.025 mol dm⁻³ silver nitrate solution Caution: stains clothing and skin black
- standardised 0.025 mol dm⁻³ potassium thiocyanate (See SP 0007:2005)
- 50% ammonium iron(III) sulfate solution (50g in 95 cm³ water + 5 cm³ 5 mol dm⁻³ nitric acid)

5 Procedure

- Use distilled water throughout.
- Weigh out accurately (to the nearest 0.001 g) between 0.9 g and 1.1 g of butter into a 250 cm³ conical flask. Add 1.0 cm³ water and 25.0 cm³ of 0.025 mol dm⁻³ silver nitrate solution.
- Warm the flask to melt the butter, and shake well.
- Add 10 cm³ concentrated nitric acid. Boil gently (**CARE!**) until all solids have been digested. Both the solution and the fat layer should be clear and free from solid material.
- Add 2 cm³ 50% ammonium iron(III) sulfate solution and 50 cm³ water.
- Immediately titrate with standardised 0.025 mol dm⁻³ potassium thiocyanate solution until an orange tint lasts for about 15 seconds.
- Carry out a blank test by repeating the procedure, using 1 cm³ water in place of the butter sample. (NOTE: There is no need to melt or boil the blank mixture.)
- Repeat the whole procedure with a second sample of the same butter.

6 Expression of Results

Calculate the salt content of each sample, as a percentage, using the formula:

$$\text{Salt content (\%)} = 5.84 \times (V_2 - V_1) \times C / m$$

where

V_1 is volume, in cm³, of potassium thiocyanate used to titrate the butter sample;

V_2 is the volume, in cm³, of potassium thiocyanate used to titrate the blank sample;

C is the exact concentration, in mol dm⁻³, of the standardised potassium thiocyanate solution;

m is the mass, in g, of butter used.

Calculate the average percentage salt content of the two samples.

7 Test Report

Your test report should include:

- (a) reference to this Standard Procedure;
- (b) the identity of the butter sample, e.g. brand name and type (salted, slightly salted or unsalted);
- (c) the average percentage salt content.