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# Standard Procedure SP 0007:2005

## Method for preparing a titration reagent

### 1 Scope

This Standard Procedure is adapted from BS 5086:1985 Analysis of butter - Part 4: Method for determination of salt content. It can be used to prepare and standardise a solution of potassium thiocyanate for use in **SP 0008**.

### 2 Definitions

*standardise*

to determine the exact concentration of a solution

### 3 Principle

A known mass of potassium thiocyanate is dissolved to give a known volume of solution of approximately the required concentration. The exact concentration is determined by titration against a standardised solution of silver nitrate.

### 4 Apparatus and Reagents

- balance capable of weighing to 0.01 g
- 250 cm<sup>3</sup> beaker
- 250 cm<sup>3</sup> volumetric flask
- stirring rod
- 1 cm<sup>3</sup>, 10 cm<sup>3</sup> and 50 cm<sup>3</sup> measuring cylinders
- 25 cm<sup>3</sup> pipette and pipette filler
- 50 cm<sup>3</sup> burette
- 250 cm<sup>3</sup> conical flask
- eye protection
- potassium thiocyanate
- standardised 0.025 mol dm<sup>-3</sup> silver nitrate solution Caution: stains clothing and skin black
- approximately 5 mol dm<sup>-3</sup> nitric acid Caution: corrosive
- 50% ammonium iron(III) sulfate solution (50g in 95 cm<sup>3</sup> water + 5 cm<sup>3</sup> 5 mol dm<sup>-3</sup> nitric acid)

### 5 Procedure

- Use distilled water throughout.
- Weigh out 0.60 ± 0.05 g potassium thiocyanate into a 250 cm<sup>3</sup> beaker. Add about 50 cm<sup>3</sup> water and stir gently to dissolve. Pour into a 250 cm<sup>3</sup> volumetric flask.
- Add a further 50 cm<sup>3</sup> of water to the beaker to dissolve any remaining potassium thiocyanate. Transfer to the flask.
- Rinse the beaker into the flask with a further portion of water.
- Make up to the mark, stopper and mix well. This gives an approximately 0.025 mol dm<sup>-3</sup> solution.
- Pipette 25.0 cm<sup>3</sup> of 0.025 mol dm<sup>-3</sup> silver nitrate solution into a 250 cm<sup>3</sup> conical flask. Add 25 cm<sup>3</sup> distilled water, 5 cm<sup>3</sup> of 5 mol dm<sup>-3</sup> nitric acid and 1 cm<sup>3</sup> of 50% ammonium iron(III) sulfate solution.
- Titrate with the potassium thiocyanate solution until an orange tint lasts for about 15 seconds.
- Repeat the titration. Calculate the average of the two volumes of potassium thiocyanate needed.
- Label the flask and keep the potassium thiocyanate solution for SP 0008.

### 6 Expression of Results

Calculate the concentration C of potassium thiocyanate using the formula:

$$C = 25 \times 0.025 / V$$

where

C is the concentration in moles per cubic decimetre;

V is the average volume of potassium thiocyanate needed in the titration.

NOTE: If the concentration of the standardised silver nitrate is not exactly 0.025 mol dm<sup>-3</sup>, replace 0.025 in the formula with the correct concentration value.

### 7 Test Report

Your test report should include:

- (a) reference to this Standard Procedure;
- (b) the concentration of potassium thiocyanate as determined by the procedure.