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Calcium Thioglycolate in Depilatories

Practical 23 - Analytical practical

Aim

To quantify calcium thioglycolate in a depilatory by the selected validated redox method.

Principle

In a suitable validated iodometric method, two thiol groups form one disulfide and consume one iodine molecule. The actual thioglycolate salt, hydration state, blank and matrix selectivity determine the reported content.

Materials and Requirements

- Selected official compound and adopted monograph
- Appropriate standardised titrant and primary-standard record
- Endpoint indicator or potentiometric system
- Qualified balance and volumetric equipment
- Controlled method and raw-data worksheet

Procedure

1. Record product, test mass, exact salt form and whether the report uses calcium-thioglycolate or thioglycolic-acid equivalents.
2. Prepare the test and matrix/reagent blanks through the adopted method, retaining other reducing-agent interference checks.
3. Standardise the iodine-related titrant or back-titrant and record the actual concentration and endpoint method.
4. Perform the approved assay on independent portions and apply the specified blank direction.
5. Calculate equivalents from the balanced reaction and convert only using the actual declared salt or acid-equivalent basis.
6. Report content, repeatability, recovery and the specification comparison.

Observations and Record

Enter actual measurements or the supplied teaching data. Record the method, material identity, conditions and units.

Preparation / attribute	Method condition	Raw measurement	Calculated result
Titrant standardisation	Record	Record	Calculate
Blank	Record	Record	Calculate
Test portion 1	Record	Record	Calculate
Test portion 2	Record	Record	Calculate

Calculations

- For direct iodine consumption: mol thiol equivalents = 2 x mol iodine consumed.
- Thioglycolic-acid-equivalent mass = mol thiol equivalents x 92.12 g/mol.

Worked Example

Illustrative net iodine consumption 5.00 mL at 0.0100 mol/L is 0.0500 mmol iodine, corresponding to 0.100 mmol thiol equivalents or 9.212 mg thioglycolic-acid equivalents.

From a 0.500 g portion this is 1.8424% w/w on that acid-equivalent basis. Do not label this percentage as calcium-salt content without the appropriate conversion.

Product controls

• Use approved alkaline-product and reactive-reagent handling. Verify interference from other reducing constituents and do not contact the preparation with skin.

Result and Interpretation

• State the endpoint and stoichiometric basis, including whether water or other correction factors are required by the monograph.

• Report replicate variability and the evidence that the method can measure the intended attribute in this matrix.

Precautions

• Use the actual standardised reagent concentration.

• Avoid endpoint overshoot and parallax.

• Select a blank with the same reagent and solvent conditions.

• Use the adopted laboratory procedure, suitable controls and the designated waste arrangements.

Viva Questions and Answers

Why standardise a titrant?

Its actual concentration can differ from the nominal preparation.

Why is stoichiometry essential?

The reagent-to-analyte mole relationship determines the mass calculation.

Why correct for the blank?

Other components may consume titrant.

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