

Determination of Acid Value of an Oil

Practical 03 | Pharmaceutical Organic Chemistry II

Aim

To determine Acid Value of an Oil, and interpret the recorded observations.

Principle

- The acid value is the mass of potassium hydroxide, in mg, required to neutralize free acids in 1 g of oil.
- A standardized titrant reacts with the analyte according to a defined stoichiometric relationship.
- The calculation must distinguish direct titration from a blank-corrected or back-titration procedure.

Materials and Apparatus

- Assigned oil, specified standardized reagents, blank reagents and oil-value glassware.
- Assigned test material, standardized titrant, specified solvent and indicator or endpoint detector.
- Burette, pipette, volumetric flask, conical flask and analytical balance.

Method

1. Identify the analyte form, the reaction and the endpoint specified for the exercise.
2. Document titrant concentration or factor and prepare a reagent blank where the method requires one.
3. Measure the prescribed test portion and dissolve or treat it by the assigned analytical method.
4. Titrate to the specified endpoint while recording initial and final burette readings.
5. Repeat the determination with independently measured portions and retain all readings.
6. Apply blank, dilution and stoichiometric corrections before reporting the result.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Oil mass	_____
Titrant concentration	_____
Blank volume	_____
Test volumes	_____
Calculated oil value	_____

Calculations and Interpretation

- Acid value = $(V - B) \times N \times 56.1 / W$, in mg KOH/g.
- V and B are test and blank volumes in mL; N is titrant normality; W is oil mass in g.

Worked Illustration

Illustration: W = 2.00 g, V - B = 1.00 mL and N = 0.100 eq/L give acid value = $1.00 \times 0.100 \times 56.1 / 2.00 = 2.81$ mg KOH/g.

The values in this illustration are for calculation practice.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Condition volumetric apparatus and avoid burette-tip air bubbles.
- Use the endpoint and solvent assigned to the analyte; do not transfer a factor from another salt or hydrate.
- Keep direct and back-titration signs consistent and report concordance.

Viva Questions

1. Why standardize a titrant?

Its actual concentration may differ from its nominal preparation concentration.

2. Why perform a reagent blank?

It measures reagent or solvent consumption unrelated to the analyte.

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