Hanna Titration Procedure

Salt and Acidity in Acidified Foods

Description

This method is for the determination of the percent salt (NaCl) and acidity in acidified foods by linked titration. The titration for salt will proceed first, followed by acidity. The results are expressed as % sodium chloride (NaCl) and % acidity respectively.

Reference

Official Methods of Analysis of AOAC INTERNATIONAL (2011) 18th Ed., AOAC INTERNATIONAL, Gaithersburg, MD, USA, Official Method 971.27. Official Methods of Analysis of AOAC INTERNATIONAL (2011) 18th Ed., AOAC INTERNATIONAL, Gaithersburg, MD, USA, Official Method 942.15B.

Electrodes

- HI5148B Silver Billet Combination Electrode for Halide Titration
- HI1131B Refillable Combination pH Electrode

Reagents

- HI70456 0.1N silver nitrate
- HI7072 KNO_3 fill solution
- HI70456 0.1 N sodium hydroxide
- HI70300L storage solution
- HI7082 KCl fill solution
- HI7004L 4.01 pH buffer solution
- HI7007L 7.01 pH buffer solution
- HI7010L 10.01 pH buffer solution
- Deionized water (DI)

Accessories

- 150 mL beakers
- Analytical balance
- Sample spatula

Electrode Preparation

Silver Billet Combination Electrode for Halide Titration

- Before first use, empty the electrode.
- Rinse the inside of the electrode with deionized (DI) water.
- Fill the electrode with KNO3 electrolyte solution.
- Connect the silver billet electrode to Board 1 of the titrator.

pH Electrode

- Ensure that the pH electrode has been stored with storage solution, and that the KCl electrolyte is less than one inch from the fill hole.
- Connect the pH electrode to Board 2 of the titrator.
- Calibrate the pH electrode.
  - o Press "Mode" and then "Analog Board 2".
  - o Press "pH 2" to access the pH mode.
  - o Press "pH Calibr" to enter pH calibration mode.
  - o Pour 50mL each of pH 4.01, 7.01, and 10.01 buffer solutions into clean 150 mL beakers.
  - o Use the "Next Buffer"/"Previous Button" buttons to select the pH 4.01 solution.
  - o Remove the fill hole cap on the electrode.
  - o Immerse the electrode, temperature probe, and propeller stirrer in the pH 4.01 solution.
- Once the reading has stabilized, press "Accept" to update the calibration.
- Repeat this procedure for the pH 7.01 and pH 10.01 solutions.
- Press "Escape" to accept and exit calibration mode.
- View pH GLP data.
  - o Press "pH Setup".
  - o Use the Down Arrow to scroll down to "pH GLP Data". Press "pH GLP Data".
- Press "Escape" to exit the pH GLP Data.
- Repeat this procedure for the pH 7.01 and pH 10.01 solutions.
- Press "Escape" to accept and exit calibration mode.

NOTE: Acceptable GLP ranges would be:
Slope 85% - 105%, Offset +/- 30 mV

Titrator Preparation

- Check that the Silver Billet Electrode is connected to Board 1 and that the pH electrode is connected to Board 2.
- Install a 25 mL burette filled with 0.1M silver nitrate on pump one. For determination of the exact concentration of the titrant, standardize with sodium chloride according to method HI0202EN.
- Install a 25 mL burette filled with 0.1M sodium hydroxide on pump two. For determination of the exact concentration of the titrant, standardize with potassium hydrogen phthalate (KHP) HI00017EN.

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Sample Preparation

Sample preparation depends on the expected concentration and sample type. Use weight-based analysis for viscous/thick samples, and volume-based measurements for brines and low-viscosity samples.

Sample Size	Volume	Weight
Low Range (~0.0-3.0% Acidity)	2 mL	2 g
High Range (~3.0-6.0% Acidity)	1 mL	1 g
Low Range (~0.0-3.0% Sodium Chloride)	2 mL	2 g
High Range (>3% Sodium Chloride)	1 mL	1 g

Analysis by Volume

- Pipette sample into a clean 150 mL beaker.
- Fill the beaker to the 100 mL mark with deionized water.

Analysis by Weight

- Place a clean 150 mL glass beaker onto a balance and zero the balance.
- Weigh the sample and record the exact value.
- Fill the beaker to the 100 mL mark with deionized water.

Analysis

Salt by Volume and TA by Volume

- Press "Select Method" to choose "Salt by Volume" or "Salt by Weight" based on your analysis type (by weight or by volume).
- Place your beaker under the stirrer assembly and submerge the electrodes and the temperature probe.
- Press "Start".
- Enter the exact analyte size. Use the keypad to enter the exact mass or volume and press "Enter" to start the analysis.
- At the end of the titration, when the equivalence point is reached, "titration complete" will appear with the result. The result is expressed as % sodium chloride.
- The next titration, "TA by Volume" or "TA by Weight", will start automatically.
- At the end of the titration, at pH 8.2, "titration complete" will appear with the result. The result is expressed as % acidity.
- Both the % sodium chloride result and the % acidity result will be on the screen at the same time.