

ACIDITY

PRINCIPLE

Acidity of the sample is determined by titration of a diluted sample with sodium hydroxide to a specified pH value. Since more than one acid may contribute to acidity of the sample, the value is reported as milliequivalents of acid per unit sample weight.

SCOPE

The method can be applied to corn syrups and starch hydrolyzates, crude and refined corn sugars, light and heavy steepwater. For modified and unmodified starches use the extractables section.

SPECIAL APPARATUS

1. pH Meter.
2. Buret: A precision 10 mL buret with subdivisions of 0.05 mL or less.

REAGENTS

1. Sodium Hydroxide Solution, 0.05 *N*: Standard
2. Standard Buffers: Two buffer solutions having known pH values of about 7 and 4 are necessary (Note 1).

PROCEDURE

Follow manufacturer's instructions in standardizing pH meter with standard buffer solutions at about pH 7 and 4.

For Dry Samples:

If necessary, grind sample completely through a laboratory cutting mill to 20 mesh or finer, taking precautions to prevent significant loss of moisture, and mix thoroughly.

METHOD PARAMETERS TABLE

Sample Type	Sample Weight (g)	Purified Water mL	pH Endpoint	Notes
Corn Syrup	100	150	6.0	1,2
Corn Sugar	50	200	6.0	1,2
Corn Starch	10	100	8.3	
Steepwater	1	200	8.3	1,2

Weigh approximately to the nearest 0.001g. the specified amount of sample into a 400 mL beaker and dissolve or dilute with specified amount of purified water.

For Dry Samples:

Cover container and agitate continuously at a moderate rate for 30 minutes. Gravity filter (Note 2) through a filter paper into a clean and dry flask and discard the first 25 mL. Pipet 50 mL of the filtrate into a clean 400 mL beaker.

For All Samples:

Immerse the pH electrodes in the solution and, while stirring gently, titrate with the standard sodium hydroxide solution to specified pH.

Perform a blank determination on the specified amount of purified water, titrating with the standard sodium hydroxide solution to the specified pH endpoint (Note 3).

CALCULATION

$$\text{Acidity (meq/g)} = \frac{[\text{Sample Titer (mL)} - \text{Blank Titer (mL)}] \times \text{Normality}}{\text{Sample Wt. (g)}}$$

For Dry Samples:

$$\text{Acidity (meq/g, as is)} = \frac{\text{mL NaOH} \times \text{NaOH Normality} \times 100 \text{ mL}}{\text{Sample Wt. (g)} \times 50 \text{ mL}}$$

NOTES AND PRECAUTIONS

1. Both liquid and dry stock buffers are available commercially and can be used with confidence when handled according to supplier's instructions.
2. In the case of pregelatinized starches and others having a substantial concentration of solubles, reduce the sample weight to avoid an excessively high viscosity, do not filter, titrate entire sample and adjust calculation accordingly.
3. The blank determination is used to correct for dilution and impurities in the water. This correction is especially significant for crystalline sugars.

METHOD HISTORY

Combined the Acidity methods for Corn Starch (Unmodified) (B-2), Corn Syrup (E-2), Corn Sugar (F-2), and Steepwater (J-4) on 4-15-2010.

Corn Starch (Unmodified), Acidity (B-2), Date of Acceptance 5-23-1955, Revised 4-01-2009.

Corn Syrup, Acidity (E-2), Date of Acceptance 8-25-1952, Revised 4-01-2009.

Corn Sugar, Acidity (F-2), Date of Acceptance 11-15-1958, Revised 3-29-2006.

Steepwater, Acidity (J-4), Date of Acceptance 5-21-1963, Revised 3-08-2004.