pH (Paste)

PRINCIPLE

pH is a measure of active acidity or alkalinity of solutions as contrasted with the titratable acidity or alkalinity. The pH value of a sample solution is determined by measuring the potential difference between two immersed electrodes.

SCOPE

This procedure is generally applicable to dextrins, modified and unmodified starches which are gelatinized when a sample slurry is heated in a boiling-water bath.

SPECIAL APPARATUS

1. pH Meter: An instrument with both pH and millivolt (mV) readouts, capable of measuring pH values in the range of 1 to 10 (accurate to 0.01 pH unit), is recommended.

2. Stirring Apparatus: A magnetic stirrer is usually preferred.

REAGENTS

Standard Buffers: Two buffer solutions, having known pH values of about 4 and 7, are necessary (Note 1).

PROCEDURE

Standardization (Note 2):

Follow the manufacturer's instructions for calibration of the pH meter.

$$\text{mV per pH} = \frac{\text{pH 4.0 Buffer mV - pH 7.0 Buffer mv}}{\text{pH 4.0 - pH 7.0}}$$

pH (Paste) — continued

Analysis:

Samples containing hard granular particles should be ground. In most cases, however, grinding is not necessary.

Weigh 10 g (± 0.1 g) of sample, transfer to a 400 mL tall-form beaker and add 200 mL of purified water. Stir to disperse the sample and place beaker in a boiling water bath so that the bath liquid level is above sample level. Stir until sample is gelatinized (about 5 minutes), cover with a watch glass and cook about 10 minutes longer (total time in bath should be 15 minutes). Cool immediately to room temperature (about 25 °C) in a cold water bath. Remove from bath and stir starch paste to destroy any gel that may have formed.

Stir starch paste with magnetic stirrer at a rate sufficient to produce a small vortex at the solution surface. Immerse the electrode in the starch paste. Observe and record the pH value to the nearest 0.1 pH unit, after a stable reading is achieved. If erratic and/or unstable readings are observed, refer to the manufacturer's instruction manual.

NOTES AND PRECAUTIONS

1. Both liquid and dry stock buffers are available commercially, and can be used with confidence when handled according to the manufacturer's instructions.

2. The meter and electrodes should be standardized daily for pH.

METHOD HISTORY

Combined the pH (Paste) methods for Corn Starch (Unmodified) (B-42), Corn Starch (Modified) (C-42) and Dextrin (D-42) on 4-15-2010.

Corn Starch (Unmodified), pH (Paste) (B-42), Date of Acceptance 5-12-1958, Revised 4-01-2009.

pH (Paste) — continued

Corn Starch (Modified), pH (Paste) (C-42), Date of Acceptance 8-03-1973, Revised 4-01-2009.

Dextrin, pH (Paste) (D-42), Date of Acceptance 6-21-1974, Revised 4-01-2009.