

## pH (Slurry)

### PRINCIPLE

pH is the negative log of the hydrogen ion concentration. The pH value of a sample solution is determined by measuring the potential difference between two immersed electrodes.

### SCOPE

This method is applicable to corn starch, modified corn starch, dextrans, corn syrup, corn sugars, feedstuffs, steepwater and all other products derived from corn.

### SPECIAL APPARATUS

1. pH Meter: An instrument with both pH and millivolt (mV) readouts, equipped with a flushable junction electrode specifically designed for high dry solids and low ionic strength samples capable of measuring pH values in the range of 1 to 10 (accurate to 0.01 pH unit), is recommended. Satisfactory instruments and electrodes are available from several suppliers (Note 1).
2. Stirring Apparatus: A magnetic stirrer or equivalent. Connect the chassis of the stirrer electrically to the ground circuit of the pH meter. An additional ground between the syrup sample and the pH meter ground circuit may be necessary to minimize erratic readings caused by rapid stirring.

### REAGENTS

Standard Buffers: Two buffer solutions, having known pH values of 4 and 7 at 25 degrees C are recommended (Note 2).

**pH — continued****METHOD PARAMETERS TABLE**

| Sample Type           | Sample Weight (g) | Purified Water | Notes |
|-----------------------|-------------------|----------------|-------|
| Corn Starch           | 20                | 100 mL         | 1-3,5 |
| Corn Starch, Modified | 20                | 100 mL         | 1-3,5 |
| Dextrin               | 20                | 100 mL         | 1-3,5 |
| Corn Syrup            | 100               | 100 mL         | 1-5   |
| HFCS                  | 200               | 0              | 1-5   |
| Corn Sugar            | 100               | 100 mL         | 1-3,5 |
| Feedstuffs            | 10                | 100 mL         | 1-3,5 |
| Steepwater            | 200               | 0              | 1-3,5 |

**PROCEDURE**

Standardize the pH meter and electrodes with pH 4 and 7 buffers according to the manufacturer's instructions (Note 3).

Place specified amount of sample in a clean beaker, dilute samples as specified in the above chart, and stir at a rate sufficient to produce a small vortex at the liquid surface. Analyze high fructose corn syrups and steepwater without dilution (Note 4). Immerse the standardized electrodes in the sample. Observe and record the pH value to the nearest 0.1 pH unit, after a stable reading is achieved (Note 5).

**NOTES AND PRECAUTIONS**

1. A free flowing junction electrode such as Fisher 13-620-109 or equivalent is recommended. This type of electrode is especially designed for measurement in general pH samples as well as food slurries of other viscous solutions. The junction can be cleaned easily between measurements; pressing down on the cap allows filling solution to flow through the junction to flush viscous solutions and small particles away from the reference junction.

**pH — continued**

2. Liquid buffers with known pH values close to 4 and 7 are available commercially, and can be used with confidence when handled according to the manufacturer's instructions.
3. The meter and electrodes should be standardized daily at both pH 4 and 7 to assure accurate measurements.
4. Dilution of high viscosity syrups is necessary for pH measurement even though the pH value may be altered. The lower viscosities of high fructose corn syrups permit pH measurement without dilution.
5. If the pH reading is not stable after a reasonable period of time, one drop of a saturated KCl solution may be added to stabilize the reading.

**METHOD HISTORY**

Combined the pH (Slurry) methods for Corn Starch (Unmodified) (B-44), Corn Starch (Modified) (C-44), Dextrin (D-44), Corn Syrup (E-48), Corn Sugar (F-42), Feedstuffs (G-20), Steepwater (J-48) on 4-15-2010.

Corn Starch (Unmodified), pH (Slurry) (B-44), Date of Acceptance 11-26-1956, Revised 10-10-1985.

Corn Starch (Modified), pH (Slurry) (C-44), Date of Acceptance 8-03-1973, Revised 10-10-1985.

Dextrin, pH (Slurry) (D-44), Date of Acceptance 11-26-1956, Revised 10-10-1985.

Corn Syrup, pH (Slurry) (E-48), Date of Acceptance 8-25-1952, Revised 3-28-2006.

Corn Sugar, pH (Slurry) (F-42), Date of Acceptance 11-13-1961, Revised 10-10-1985.

**pH — continued**

Feedstuffs, pH (Slurry) (G-20), Date of Acceptance 5-23-1955, Revised 10-10-1985.

Steepwater, pH (Slurry) (J-48), Date of Acceptance 5-21-1963, Revised 10-10-1985.

Corn Starch, pH (Slurry) (B-44), Date of Acceptance 11-26-1956, Revised 10-10-1985.