

## SOLUBLES

### PRINCIPLE

For dextrin and starch, the soluble solids are removed from a sample by extraction with water. The slurry is filtered and the soluble solids are determined by evaporating an aliquot of the filtrate to dryness and weighing.

For feedstuffs, the method determines water soluble material by extracting with water, filtering, washing and drying a known weight of sample.

### SCOPE

The method contains a procedure applicable to dextrans obtained from the heat treatment of starch in the dry state, unmodified starches, and with minor changes, to modified, pregelatinized and other high solubles starches. The method also contains a procedure applicable to all feedstuffs derived from corn.

### SPECIAL APPARATUS

1. Water Bath or Temperature Controlled Room: Maintained at  $25 \pm 1$  °C
2. Shaking Device: Wrist-Action Shaker
3. Vacuum Oven: Maintained at 100 °C and at a pressure not in excess of 50 mm Hg

### PROCEDURE

For Dextrans:

Weigh 5.00 g of sample at 25 °C and transfer to a dry 250 mL Erlenmeyer flask. Pipet 200 mL purified water (25 °C), stopper flask and shake vigorously to wet sample. Place in the shaker and agitate while submerged in the water bath or in a temperature controlled atmosphere (25 °C) for one hour.

For Starch:

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Weigh accurately about 20 g of sample (Note 1) into a suitable container, add 198 mL of purified water at room temperature, close container and agitate at a moderate rate for 30 minutes.

Gravity filter through a Whatman No. 2 filter paper; collect the filtrate in a clean, dry flask. If the first portion of the filtrate is hazy, return that portion to the same filter to ensure a clear filtrate. Pipet 100 mL of filtrate into tared evaporating dish (Note 2).

Evaporate filtrate to dryness on a steam bath and dry the residue 1 hour in a vacuum oven at 100 °C. Remove dish from oven, cool in desiccator and weigh.

For Feedstuffs:

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

Place an 11 cm high strength, retentive filter paper in a moisture dish with cover. Dry in a vacuum oven at 110 °C for 1 hour. Cool in desiccator, cover and weigh.

Weigh accurately about 2 g of sample and transfer to a 400 mL beaker. Add 200 mL of purified water at room temperature and agitate at a moderate rate for 30 minutes. Vacuum filter through the dried and tared filter paper supported on a cone in a 60 funnel (Note 3). Rinse the beaker and wash the residue with four 25 mL portions of purified water, sucking residue dry after each water addition.

Place filter paper and residue in original moisture dish and dry in vacuum oven at 110 °C for 4 hours. Cool in desiccator, cover dish and weigh (Note 4).

Determine moisture content of ground sample by an approved method.

## CALCULATIONS FOR DEXTRIN AND STARCH

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$$\% \text{ Solubles, (as is)} = \frac{\text{Residue Wt. (g)} \times 200 \text{ mL} \times 100}{\text{Sample Wt. (g)} \times 100 \text{ mL}}$$

### CALCULATIONS FOR FEEDSTUFFS

$$\% \text{ Solubles, as is} = \frac{(100 - \% \text{ Moisture}) \times (\text{Dried Residue Wt. (g)} \times 100)}{\text{Sample Wt. (g)}}$$

### NOTES AND PRECAUTIONS

1. Grind samples containing hard granular pellets. For best results it is suggested that a 2 g sample and 199 mL of purified water be employed when the solubles concentration exceeds 5%. Furthermore, the extraction temperature should be maintained at  $25 \text{ }^\circ \pm 1 \text{ }^\circ\text{C}$  in the analysis of high solubles samples.
2. The amount of sample used, particularly the aliquot size evaporated, should be adjusted so that the residue weight does not exceed 0.2 g. A 50 mL aliquot of the filtrate is sufficient for evaporation with dextrans of high solubility, i.e., over 50%. In this case amend the calculation accordingly.
3. Filtration may be facilitated with the use of a Fisher Filtrator.
4. In the case of materials with a low solubles concentration, it is recommended that an aliquot of the thoroughly mixed filtrate and wash waters be evaporated to dryness for determination of solubles content.

### METHOD HISTORY

Combined the Solubles methods for Corn Starch (Unmodified) (B-56), Dextrans (D-56) and Feedstuffs (G-26) on 11-09-2010.

Corn Starch (Unmodified), Solubles (B-56), Date of Acceptance 5-07-1956, Revised 10-18-1988.

Dextrans, Solubles (D-56), Date of Acceptance 9-22-1970, Revised 3-30-1993.

Feedstuffs, Solubles (G-26), Date of Acceptance 11-08-1954, Revised 10-18-1988.

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