

MOISTURE (Oven)

PRINCIPLE

Moisture in a weighed starch sample is removed by heating in an oven under specified conditions of time, temperature and vacuum (Note 1). The weight loss is then calculated as moisture.

SCOPE

This method is generally applicable to all commercial starches and their modifications (Note 2).

SPECIAL APPARATUS

1. Oven: Use a good quality vacuum oven having uniform heat distribution and capable of retaining vacuum for several hours after the pump is shut off. The oven shelves may be soldered to the wall retaining sleeve to aid in heat transfer to the sample dishes.
2. Vacuum Pump: A vacuum supply such as a laboratory vacuum pump capable of maintaining an oven pressure during operation not in excess of 100 Tor is necessary.
3. Drying Train: A drying tower filled with indicating "Drierite" is attached to the air inlet of the oven. The tower is connected in series to a gas scrubber containing concentrated sulfuric acid.
4. Moisture Dishes: Metal dishes, preferably aluminum, approximately 2 inches in diameter and equipped with covers are recommended.

PROCEDURE

Starch samples containing hard granular pellets should be ground, taking precautions to prevent significant change of moisture. In most cases, grinding is not necessary.

Weigh accurately about 5 g of sample into a predried, cooled and tared moisture dish. Place dish and cover (cover removed) in vacuum oven operating at 120 °C

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MOISTURE (Oven) — continued

and maintain at a pressure not in excess of 100 Tor for 4 hours. While sample is drying, bleed a small stream of air through the drying train and oven.

Shut off the vacuum line and slowly fill the oven with air drawn through the drying train. Open oven, quickly close dish with cover, place in desiccator until cool (30 minutes usually sufficient) and weigh.

CALCULATION

% Moisture

$$= \frac{(\text{Sample Wt. (g)} - \text{Dry Sample Wt. (g)}) \times 100}{\text{Sample Wt. (g)}}$$

NOTES AND PRECAUTIONS

1. Gravity convection and forced-draft air ovens are sometimes substituted for the vacuum oven. However, moisture values are generally 0.1 to 0.3 percent lower than those obtained in a vacuum oven.
2. This procedure is not applicable to highly-modified starches which show evidence of decomposition (usually discoloration) under the conditions specified. When analyzing starches containing volatiles in addition to water, the results should be expressed as "loss on drying" rather than moisture.