POTATO STARCH

water content determination

Starch is a polysaccharide that performs a role of the supplementary material of plants in the form of grains whose size and shape depend on the type of the plant. Speaking of potatoes, the production starts with cleaning and washing potatoes that are then grated and thinned with water. The purpose of this process is to break and release starch grains included in the structure of the potato. The potato pulp is later dehydrated so that a starch-rich fraction and solid fibers are obtained. The starch included in the solid phase is cleaned and concentrated in the extraction while solid fibers removed mechanically. At the final stage of the production, starch is cleaned, mechanically dehydrated and dried. The starch moisture must not exceed 20%, which is usually checked with the use of MA R, MA X2, MA X7 or MA 5Y moisture analyzer by Radwag. The potato starch is used in the food industry (sauce and soup thickening), textile industry (gluing yarn, painting), paper industry (chemical paper-pulp gluing), chemical industry (adhesive making), cosmetic and pharmaceutical industries (powder and talk production). Therefore it is essential that water content is analyzed not only for the sake of engineering processes but also to assure a proper quality of the final product.



The application note includes basic information for validation of the potato starch drying method with the use of MA R, MA X2, MA X7 and MA 5Y moisture analyzers series by Radwag Wagi Elektroniczne. The application note may be the basis for elaborating own drying method with special regard to distinctive features of the product in question.

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TERMS

ACCURACY of determining water / dry matter content is the difference between the result of the water / dry matter content received in the moisture analyzer method and the result of the water / dry matter content received while drying the same sample through a reference method.

PRECISION is a degree of compliance between independent results of the test, received in specific conditions. The measure of precision is a standard deviation from a series of several measurements.

REFERENCE METHOD

The reference method parameters are usually specified in standards or other discipline-specific documents as the so-called guides. If such documents are unavailable, the drying temperature that does not cause the sample to change colors is used. With regard to the potato starch, the requirements of the EN ISO 712. Cereals and cereals products. Determination of moisture content. Reference method have been used.

SAMPLE PREPARATION

Before testing, the sample must be stored in a tightly sealed container. Mix the sample before testing.

ACCESSORIES

Laboratory dryer, glass weighing vessels with a lid, AS 220.X2 analytical balance, laboratory spoon.

METHOD DESCRIPTION

Place the sample with a mass of ca. 5 g in pre-dried glass weighing vessels. Specify the real mass of the sample in question with the use of the balance whose weighing accuracy is 0.1 mg (AS 220.X2). Put weighing vessels with the sample and lids in the temperature-controlled laboratory dryer. Dry samples at the temperature of 130^{o}C for 1.5 hours. After this period, remove vessels and put into the desiccator to let them cool down and weigh afterwards. Place samples in the laboratory dryer again and keep on drying them for 30 minutes. Cool them down and weigh again. Repeat the procedure until you obtain a stable sample mass or record the sample mass growth after drying.

RESULTS

Sample name	POTATO STARCH
Water content (%)	19.07
Standard deviation (%)	0.01

POTATO STARCH – WATER CONTENT ANALYSIS WITH THE MOISTURE ANALYZER

The water content testing with the use of the moisture analyzer (IR radiation) entails two phenomena: convection and radiation. The sample temperature rises from outer layers to the bottom of the sample. The temperature gradient in the sample structure minimizes through optimization of the thickness of the dried sample and drying temperature. Too high drying temperature may lead to surface burning of the sample, which may be hard to diagnose if the sample color is dark.

SAMPLE PREPARATION

Before analyzing, samples must be stored in sealed containers. Mix the sample before collection for testing.

ACCESSORIES

MA R, MA X2, MA X7 and MA 5Y moisture analyzer, laboratory spoon, disposable aluminum weighing pans.

METHOD DESCRIPTION

Set drying parameters presented below. Collect the sample with a mass of ca. 5 g and distribute a thin layer of the sample throughout the weighing pan. Lock the drying chamber manually or automatically.

DRYING PARAMETERS / RESULTS

Sample name	**POTATO STARCH**
Drying profile	Standard
Drying temperature	120°C
Sample mass (g)	~ 5
End of analysis	Auto 2
Water content (%)	19.07
Standard deviation (%)	0.03
Analysis time $\acute{x}$ (min)	8

ACCURACY OF THE MA R, MA X2, MA X7, MA 5Y METHOD

Sample name	**POTATO STARCH**
Water content (%) Ref.	19.07 ± 0.01
Water content (%) MA	19.07 ± 0.03
Analysis accuracy (%)	|0.00|

RESERVATION

The method in question has been verified by the Research Laboratory, yet the results do not include factors arising from diversity of tested samples, operators' personal skills as well as measuring capability used by moisture analyzer users. For this reason Radwag shall not be held responsible for drying parameters but they can be used to elaborate own drying method.