CANDIED CHERRIES

water content determination

Durability of food products is strictly dependent upon physical, chemical, biochemical and microbiological processes that result from presence of water in the product structure. For this reason most fresh fruits and vegetables are dehydrated and then preserved through various methods, including candying. During this process sugar osmotically penetrates the interior of the product structure and pushes the surplus of water out. Reduction of water content in the product prevents development of microorganisms, which considerably prolongs the lifespan of the product. The knowledge of the amount of water after candying is important for engineering reasons (process control) and quality-related reasons (flavor, texture, hardness). Testing the amount of water can be accelerated by drying a small amount of the sample with the use of the MA R, MA X2, MA X7 or MA 5Y moisture analyzer by Radwag. The accuracy of such a test has been confirmed in the validation process.



The application note includes basic information for validation of the candied cherries drying method with the use of MA R, MA X2, MA X7 or 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.

SAMPLE PREPARATION

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

ACCESSORIES

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

METHOD DESCRIPTION

Weigh glass vessels with a glass rod and pre-dried quartz sand in the amount of ca. 20 g. Place the sample with a mass of ca. 5 g in glass weighing vessels on pre-dried quartz sand. Mix the sample with sand by means of the glass rod that must be left in the vessel. The use of sand as a foundation is aimed at eliminating creation of the shell on the surface of the sample in question. Weigh vessels again and 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 105°C for 3 hours. After this period, remove vessels and put into the desiccator until they cool down and weigh afterwards. Place samples in the laboratory dryer again and keep on drying them for 60 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

Type	CANDIED CHERRIES
Water content (%)	10.41
Standard deviation (%)	0.25

CANDIED CHERRIES – 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, the sample must be stored in a sealed container. Mix and fragment the sample before testing.

ACCESSORIES

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

METHOD DESCRIPTION

Set drying parameters presented below. Distribute a thin layer of the sample with a mass of ca. 2 g throughout the weighing pan. Lock the drying chamber manually or automatically.

DRYING PARAMETERS / RESULTS

Sample name	CANDIED CHERRIES
Drying profile	Standard
Drying temperature	120°C
Sample mass (g)	~ 2
End of analysis	Auto 2
Water content (%)	10.53
Standard deviation (%)	0.33
Analysis time $\acute{x}$ (min)	15

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

Sample name	CANDIED CHERRIES
Water content Ref. (%)	10.41 ± 0.25
Water content MA (%)	10.53 ± 0.33
Analysis accuracy (%)	|0.12|

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.