CRANBERRY

water content determination

Cranberries are temporarily growing juicy ball-shaped and tart-flavored fruits that prove to be rich in numerous health-promoting ingredients (potassium, sodium, selenium, vitamin A, C, E). Raw cranberry fruits contain over 80% of water, which encourages the industry to process them into various products or to dehydrate them for preservation and lifespan-prolongation purposes. One of the cranberry processing steps is fragmentation which supports transferring of the mass and heat during engineering processes, including drying. The efficiency of engineering processes is usually controlled through measurements of control samples taken directly from the process line. It also applies to content of water that can be quickly and precisely determined with the use of MA R, MA X2, MA X7 or MA 5Y moisture analyzer by Radwag.



The application note includes basic information for validation of the cranberry 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

Mechanically fragment the sample.

ACCESSORIES

Dryer, glass weighing vessels with a lid, AS 220.X2 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 into the temperature-controlled laboratory dryer. Dry samples at the temperature of 105^{o}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 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	**CRANBERRY**
Water content (%)	12.76
Standard deviation (%)	0.02

CRANBERRY – 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.

SAMPLE PREPARATION

Mechanically fragment the sample.

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. Collect the sample with a mass of ca. 4 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	**CRANBERRY**
Drying profile	Standard
Drying temperature	110°C
Sample mass (g)	~ 4
End of analysis	Defined: 1mg / 40 sec.
Water content (%)	12.38
Standard deviation (%)	0.30
Analysis time $\acute{x}$ (min)	~ 25

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

Sample name	**CRANBERRY**
Water content (%) Ref.	12.76 ± 0.02
Water content (%) MA	12.38 ± 0.30
Analysis accuracy (%)	|0.38|

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.