WHITE RICE

water content determination

The moisture of harvested rice is more than 20% and it is too much because the surplus of water results in unfavorable changes, e.g. mold development. For this reason rice must be cleaned and dried to reach the moisture of fewer than 14% shortly after the harvest time. For the purposes of rice dehydration, various methods are adopted, for example column dryers, recirculation dryers, fluid dryers, etc. Rice is hygroscopic so the information on water content during storage is important. Keeping a suitable moisture level while storing and transporting rice is required to assure its commercial class and to prevent growth of fermentation. The precise information on rice moisture is therefore required both during processing and storage. Such information can be obtained quickly with the use of MA R, MA X2, MA X7 or MA 5Y moisture analyzers by Radwag. The method of specifying water content of rice has been validated so parameters of the moisture analyzer method guarantee precise results.



The application note includes basic information for validation of the white rice 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.

Metrology, Research and Certification Center, Radwag Wagi Elektroniczne, Poland
Toruńska 5, 26-600 Radom, Poland +48 48 386 60 00, e-mail: office@radwag.com, www.radwag.com

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. The water content of rice has been tested as per requirements of the EN ISO 712. Cereals and cereals products. Determination of moisture content. Reference method.

SAMPLE PREPARATION

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

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 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

Type	LONG-GRAIN WHITE RICE
Water content (%)	14.51
Standard deviation (%)	0.03

LONG-GRAIN WHITE RICE – 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 cause 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, grind it down with a grinder, and then collect for 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. Collect the fragmented 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	**LONG-GRAIN WHITE RICE**
Drying profile	Standard
Drying temperature	130°C
Sample mass (g)	~ 3.5
End of analysis	Auto 3
Water content (%)	14.58
Standard deviation (%)	0.13
Analysis time $\acute{x}$ (min)	16

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

Sample name	**LONG-GRAIN WHITE RICE**
Water content (%) – Ref.	14.51 ± 0.03
Water content (%) – MA	14.58 ± 0.13
Analysis time (%)	|0.07|

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.