MILLET GROATS

water content determination

An essential quality parameter of grains is their humidity. Too high content of water in the grain leads to unfavorable biochemical and microbiological transformations, thus limiting its safe storage period. If water content is too low, the grain becomes more susceptible to damage when processed by the threshing unit, while cleaning and transporting. On the other hand the information on the grain humidity is a key parameter for the sake of proper designing of the drying process. This process is energy-consuming so optimization results in substantial reduction of grain growing costs. It is possible to quickly analyze the water content in grains with the use of the validated method that involves MA R, MA X2, MA X7 and MA 5Y moisture analyzers by Radwag.



The application note includes basic information for validation of the millet groats drying method with the use of MA R, MA X2, MA X7 and MA 5Y moisture analyzers by Radwag Wagi Elektroniczne. The application note may be the basis for elaborating own drying method with a 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. Such an approach applies to previously dehydrated products and raw products.

SAMPLE PREPARATION

Not applicable.

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 into the temperature-controlled laboratory dryer. Dry samples at the temperature of 130°C for 2 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 or record the sample mass growth after drying.

RESULTS

Sample name	MILLET GROATS
Water content (%)	12.87
Standard deviation (%)	0.10

MILLET GROATS – 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

Not applicable.

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. 5 g and distribute its thin layer throughout the weighing pan. Lock the drying chamber manually or automatically.

DRYING PARAMETERS / RESULTS

Sample name	**MILLET GROATS**
Drying profile	Standard
Drying temperature	130°C
Sample mass (g)	~ 5
End of analysis	Auto 2
Water content (%)	12.64
Standard deviation (%)	0.10
Analysis time $\acute{x}$ (min)	~ 22

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

Sample name	**MILLET GROATS**
Water content (%) – Ref.	12.87 ± 0.10
Water content (%) – MA	12.64 ± 0.10
Analysis accuracy (%)	|0.23|

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.