Potato and corn pellet
water content determination

The amount of water in food products is one of quality parameters that determine the product flavor and its use-by date. The surplus of water in the product structure is unfavorable because it initiates hydrolytic transformations that result in substantial drop of quality and sensory values of the product, such as flavor, aroma, hardness, etc. For this reason the water content analysis is important at all production stages. On the other hand a precisely measured and limited amount of water is a guarantee of long life of the product, which is one of pro-consumer steps taken by every manufacturer. The method of measuring the water content to be used in testing must assure accurate and highly precise values, which can be obtained through the use of Radwag MA R, MA X2, MA X7 and MA 5Y moisture analyzers.



The application note includes basic information for validation of the potato and corn pellet 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. Such an approach applies to previously dehydrated products and raw products.

SAMPLE PREPARATION

Before testing, the sample must be stored in sealed packaging. The samples that take a form of large pieces must be mechanically fragmented.

ACCESSORIES

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

METHOD DESCRIPTION

Place samples with a mass of ca. 5 g in pre-dried glass weighing vessels. Specify the real mass of the samples 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 80^{o}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 mass or record the sample mass growth after drying.

RESULTS

Sample name	POTATO PELLET	CORN PELLET
Water content (%)	14.12	11.03
Standard deviation (%)	0.02	0.03

PELLET – 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

Before testing, samples must be stored in sealed packaging. Samples that take a form of large pieces must be mechanically fragmented.

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. 2 ÷ 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	POTATO PELLET	CORN PELLET
Drying profile	Standard	
Drying temperature	120°C	
Sample mass (g)	~ 4	~ 2
End of analysis	Auto 2	
Water content (%)	14.16	11.03
Standard deviation (%)	0.01	0.08
Analysis time $\acute{x}$	~ 10	~ 6

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

Sample name	POTATO PELLET	CORN PELLET
Water content (%) Ref.	14.12 ± 0.02	11.03 ± 0.03
Water content (%) MA	14.16 ± 0.01	11.03 ± 0.08
Analysis accuracy (%)	|0.04|	|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.