AVOCADO
water content determination

Avocado is the so-called climacteric fruit, which means that it can still ripen after being picked.

For this reason avocados are often picked while still green, thanks to which they can be delivered to distant areas.

The avocado picking time can be determined on the basis of the size and color of the fruit, tree blooming, but also through the instrumental method – based on the dry matter content of the avocado fruit. Whereas the visual assessment may prove to be imprecise, the dry matter content measurement with the use of the moisture analyzer seems to objectively indicate if the avocado is ripe or unripe. The use of the Radwag moisture analyzer with an IR emitter allows quick and precise measurement and therefore evaluation of the avocado fruit ripeness from different parts of the tree.

The application note includes basic information for validation of the fresh avocado drying method with the use of moisture analyzers series MA/R and MA/X2, manufactured 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.

Avocado – water content determination

The method with the use of IR radiation

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, samples must be stored in sealed packaging. Slice avocado into narrow strips with a knife or grater.

ACCESSORIES

Laboratory dryer, weighing vessels, balance AC 220.X2, laboratory spoon.

METHOD DESCRIPTION

Place samples with a mass of ca. 5 g in pre-dried glass weighing vessels. Specify the real mass of samples with the use of the balance whose weighing accuracy is 0,1 mg (AS.220.X2). Place weighing vessels with the sample and lids in the temperature-controlled laboratory dryer. Dry samples at the temperature of 150o for 3 hours. After this period, remove vessels, put them into the desiccator to let them cool down and then weigh. Place samples in the laboratory dryer again and keep on drying them for 30 minutes. Cool the samples down and weigh again. Repeat the procedure until you obtain a solid sample or when you can record sample mass growth after drying.

RESULTS

Sample name	AVOCADO	
	With skin	Without skin
Water content (%)	77.23	78.61
Standard deviation (%)	0.20	0.35

AVOCADO – WATER CONTENT TESTING THROUGH 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. Slice the avocado into narrow strips with a knife or grater.

ACCESSORIES

Moisture analyzer MA/R or MA/X2, laboratory spoon, disposable aluminium weighing pans.

METHOD DESCRIPTION

Set drying parameters presented below. Distribute a thin layer of the sample with a mass of ca. 3 g throughout the weighing pan. Lock the drying chamber – manually or automatically – to start drying.

DRYING PARAMETERS/RESULTS

Sample name	AVOCADO /with skin/	AVOCADO /without skin/
Drying profile	Standard	
Drying temperature	115°C	
Sample mass (g)	~ 2.5 ÷ 3	
End of analysis	Auto 2	
Water content (%)	78.44	79.98
Standard deviation (%)	0.14	0.60
Analysis time $\bar{x}$ (min)	~ 8	

ACCURACY OF THE METHOD MA/R÷ MA/X2

Sample name	AVOCADO /with skin/	AVOCADO /without skin/
Water content Ref. (%)	77.23 ± 0.20	78.61 ± 0.35
Water content MA R/X2 (%)	78.44 ± 0.14	79.98 ± 0.60
Analysis accuracy (%)	|0.21|	|0.37|

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.