

THE STATISTICAL ANALYSIS OF WALNUTS LOT QUALITY

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Abstract. The study includes the statistical analysis of the defects of "Cogilniceanu" variety walnuts that were kept for 6 months in standard storage conditions without additional pre-processing.

Keywords: walnuts, storage, statistics, defects

Introduction

Walnuts intended for commerce must have a healthy shell with an attractive color, without outer pericarp, so as healthy, matured, normally developed kernel. The presence of the signs of rancidity, oily appearance and mold stains is forbidden. The quality of walnuts mostly depends on the methods and conditions of their collection, conditioning, storage and processing [1]. Walnuts crops must be stored in well-ventilated, dry, clean, non-odorous rooms at a maximum temperature of 20°C (without sudden oscillations) and a relative humidity of not more than 70% [2]. The non-compliance of established conditions can depreciate the quality of walnuts by changing their kernel taste and color from white-yellow to brown-red or black due to the appearance of mold spores. In addition, it can lead to the initiation of lipids oxidation process and the appearance of worms that totally compromise the quality of walnuts kernel [1].

1. Materials and methods.

The walnuts (*Juglans regia* L.) of the "Cogilniceanu" variety, harvested in September 2017, without outer pericarp, washed and dried, were examined. The "Cogilniceanu" variety was chosen due to its morphometric characteristics (large fruit with 12.5g average mass, thin and hard shell), including a large kernel (up to 49% of the total weight), which completely fills the fruit cavity [3]. In order to assess the statistical peculiarities of walnuts quality, 10 lots (500 g walnuts in each one) were taken aleatory from fruits stored for 6 months in bags from natural material (intended for 50 kg of nuts) at a relative humidity of $60 \pm 2\%$ and a temperature of $10 \pm 2^\circ\text{C}$.

2. Research results.

In order to perform the analysis, walnuts in shell were manually cracked, removing kernels and quantitatively fixing the number of fruits with and without defects (Table 1).

Table1. Statistical characteristics of walnuts quality

Nr	Physico-chemical indicators	Unit of measurement	Values	Recalculated values
1	The number of walnut fruits in a lot	pcs.	$38,8 \pm 2,8$	
2	The weight of walnut fruits in a lot	g	$501,6 \pm 4,5$	
3	The average weight of a walnut fruit	g	$12,94 \pm 0,92$	$13,02 \pm 0,78$
4	The number of walnut fruits without defects in a lot	pcs.	$35,1 \pm 4,5$	
5	The weight of walnut fruits without defects in a lot	g	464 ± 58	
6	The average weight of a walnut fruit without defects	g	13 ± 1	$13,31 \pm 0,82$
7	The weight of walnut kernels in a lot	g	189 ± 23	
8	The yield of walnut kernels	%	$40,9 \pm 3,0$	$41,1 \pm 2,4$
9	The weight of walnut shell in a lot	g	270 ± 41	
10	The yield of walnut shell	%	$58,2 \pm 3,3$	$57,8 \pm 2,4$

In some cases the data from some lots with the highest deviation from the mean of all lots (Table 1, points 3, 6, 8, 10) was excluded in calculations, reducing respectively the number of freedom degrees and obtaining more accurate research information.

Conclusions

In spite of the fact that the legislative stipulated conditions of walnuts storage were respected and the average weight of analyzed fruits is analogous to the standard one, the yield of walnut kernel is rather small because of the percentage of damaged fruits reaches up to 10%. It is recommended to adjust fruits storage conditions and use special walnut treatment technologies (eg. whitening) in order to maintain their quality throughout the all period of storage.

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