

## DYNAMICS OF WALNUTS HUMIDITY AND REHYDRATION

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**Abstract:** Work deals with analysis of humidity values of the walnuts during storage and rehydration. Rehydration process contribute to delete oxidized polyphenols, and to diminished astringent taste, so directly rises walnuts safety and beneficial properties.

**Keywords:** walnut, core, cake, humidity, rehydration, kinetics, health benefits

### Introduction. Why is important to control walnut humidity?

In the recent years, the world-wide popularity of the walnut fruits (*Juglans Regia* L.) and their derivatives (oil, cake, protein extracts) have significantly risen. Despite the high nutritional value, a fly in the ointment is high contain of polyphenols, which causes some problems. Phenolic compounds offer astringent taste and are inhibitors of normal enzyme release and activity, blocking biochemical processes, inclusive breath. This causes walnuts to lose water. The consequences of consuming of dry anhydrous walnut core are that it absorbs water from food lump and leads to partial indigestion. A simple solution of this problem is a control of humidity and well-timed rehydration of walnuts. The interest in softening the core of the nut before consumption also appeared when it is being used in preparing various foods. This work deals with brief analysis of humidity values of the walnuts parts (core, cake after oil pressure) which vary by the conditions and terms of storage and rehydration.

### Experimental. Walnut humidity and rehydration

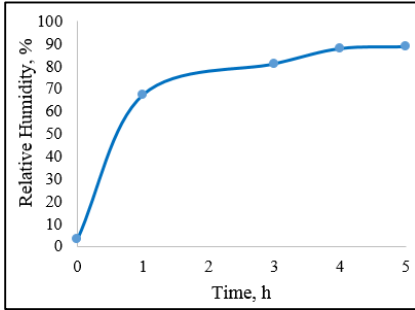
**Control of humidity.** All the samples for analyzes were taken from the same walnut variety, "Calarash". The moisture content of walnuts, was determined by drying the sample until a constant mass in the drying stove at a temperatures of  $105 \pm 2^\circ\text{C}$ .

*Table 1. Relative ( $H_R$ ) and absolute ( $H_A$ ) humidity of walnuts in different conditions*

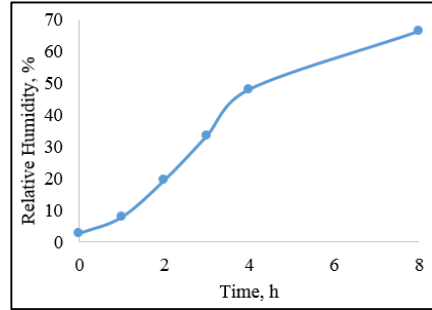
Sample, storage condition and time	$H_R$ , %	$H_A$ , %
<b>Nuts core from whole walnuts, peeled immediately before the determination</b>		
From the tree, with the green bark, milk ripeness, August	$20.1 \pm 0.4$	$26.2 \pm 0.6$
From the tree, without green bark, milk ripeness, August	$13.6 \pm 0.3$	$15.8 \pm 0.4$
Technical ripeness, September	$3.2 \pm 0.1$	$3.3 \pm 0.1$
After 10 months of storage at $3^\circ\text{C}$	$3.1 \pm 0.1$	$3.2 \pm 0.1$
After 22 months in desiccator, at room temperature	$2.7 \pm 0.1$	$2.8 \pm 0.1$
<b>Walnut cake</b>		
In a polyethylene bag at $3^\circ\text{C}$ , 10 months storage	$6.1 \pm 0.2$	$6.5 \pm 0.2$
In a polyethylene bag at $3^\circ\text{C}$ , 22 months storage	$6.1 \pm 0.2$	$6.5 \pm 0.2$

So, storage of whole walnuts for a long time at the same storage conditions reduce their humidity (Table 1). It can be noticed that the humidity of walnut cake is twice higher than that of walnuts core of technical ripeness. This data is in good correlation with weight of walnut oil, evacuated by pressure of core in order to obtain oil and cake.

**Rehydration (Moistening).** The core samples were soaked in water for 1-8 hours. After soaking, humidity values were determined by dehydration at 105°C.



**Fig.1.** Rehydration of walnut core after six months of storage (order I kinetics)



**Fig.2.** Rehydration of walnut core after 22 months of storage (complex kinetics)

Walnuts contain significant amounts of proteins and fats, that ensure germination and enzyme release. In reality, the role of enzymes is to dissolve other nutrients into smaller and simpler particles for digestion. The moistening process increases the phenomenon of enzyme release and their activity. It can be noticed, that the water in which we soaked the walnuts, became brown, and the taste of water became bitter. So, moistening contribute to deletion of undesirably substances and increase benefits of walnuts consumption. Figures 1 and 2 shows different kinetics of rehydration, but for all cases it has been determined that the optimal time is 4 hours, enough for the nearly full moistening of the core. If the process of soaking is too long (more than 8 hours), the taste of walnut cores changes, and becomes bitter.

### Conclusions:

- The dehydration of walnut fruits core during storage can to produce inhibition of biologically active substances release and to cause digestion problems.
- Rehydration process contribute to delete oxidized polyphenols, and to diminished astringent taste, so directly rises walnuts safety and beneficial properties.
- Rehydration take place according to different kinetics: so, it seems order I kinetics after 6 months, and complex kinetics with induction period after 2 years of storage.
- An optimal time for rehydration of walnuts consists 4 hours at room temperature.

### References

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