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THE NATURAL AND ARTIFICIAL DRYING PROCESS OF GRAPES. COMPARATIVE STUDIES

BY

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Abstract. Grapes have been dried by two methods: natural – by sun exposure, and artificial – using laboratory drying oven. Naturally the grapes are dried for 190 h and artificially for 30 h. It has been proved that by natural drying the products do not modify their colour comparing to those artificially dried. Sun drying method is more economical than the artificial one because the last one requires higher energy consumption, but it has the disadvantage of requiring longer time.

Key words: natural drying process; artificial drying process; grapes.

1. Introduction

It is well known that fruits are indispensable in human diet because they have fibers, minerals and vitamins that are important in preventing chronic diseases, cardiovascular problems, type II diabetes, dementia and some type of cancer (Bernaz, 2007).

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Even if fresh fruits ensure a higher level of nutrients, the fresh state could be preserved only for a limited period of time (Storage Guidelines For Fruits & Vegetables, 2011). So, in order to assure access to all fruits all through the year it is required that the fruits to be conserved. But, during the conservation process the high temperature and the presence of air could destroy an important amount of nutrients, especially vitamins, some of them being decomposed at temperatures over 40°C (Njoku *et al.*, 2011).

Thus, drying is the oldest fruits conservation technique that reduces both the water content and the fruit volume and weight, also decreasing packing, storage and transportation related costs (Tsotsas & Mujumdar, 2012).

Drying process occurs by two different methods: natural and artificial. Natural drying could be performed by two means: under sun exposure or in the shade. The artificial drying can be achieved using different equipments, each of them optimized for a specific product (Cobzaru, 2014).

The grape vine (*Vitis vinifera*) is a subtropical plant and the fruits are known as grapes. The cultivated varieties have instead much larger grape berries attaining 30 mm being of different colors: white, white-greenish or purple (Dobrei *et al.*, 2005).

There are three varieties of grapes: for wine, for meals and apirenes (Rotaru, 2009).

Grapes varieties for meals are different from those for wine by both their biological and technological characteristics. Thus, meal grapes require more water and a soils richer in nutrients than wine grapes.

Unlike the previous two types, apirene grapes have a higher drought tolerance and are characterized by the lack of seeds, that allows them to be used for raisins. These type of grapes store high amounts of sugars and the drying of grains start on the vine, where they grew. Grape berries are easy to separate from bunch – a technological behaviour very important for raisin preparation. Because those kind of grapes are very sensitive to low temperatures ($-10^{\circ} \div -12^{\circ}\text{C}$), so they are grown only in warm geographical areas (Stroe, 2012; Rotaru, 2009).

These considerations justify the opportunity of our study, where we investigate the natural and artificial dried grapes processes.

2. Experimental

2.1. The Preparation of Grapes

Raisins or dried grapes have been obtained using both natural and artificial methods. Naturally, dehydration occurred in sun light, while artificially they were dried in the laboratory oven. The grapes were purchased from the supermarket and before they were dried they were separated from the bunch, were well washed and then dried.

2.2. Natural Drying

The grape berries prepared as mentioned above were put on a 50 cm² sheet of white paper. The paper sheet used was white so the fruits will not be stained from the drying support.

The grapes were exposed to sun light for 190 h, during this time the fruits being mixed and turned around in order for the drying to be uniform.

The drying is considered to be finished when sample weigh remains constant between two successive measurements. The obtained raisins were gathered in paper bags and stored in a dark, cool place.

2.3. Artificial Drying

In order to dry the grapes artificially, they were prepared as mentioned above, then they were placed on a aluminium tray. The drying process occurs in the laboratory oven at 100°C.

Same as to the natural drying the grapes were turned and mixed in order to be uniformly dried and were weighted at well-establish time intervals in order to calculate the water loss (in umidity percents) vs. time lapse.

After the drying process is finished (sample weight is constant for several consecutive measurements) the raisins were gathered and stored in paper bags in a dark, cool place.

The time required for complete drying of grapes in the oven is 30 h, the sample being weighted at each 60 min.

3. Results and Discussions

In order to calculate the amount of water lost, expressed in umidity percents, the following formula has been used (Dumitriu, 1972):

$$u = \frac{m_1 - m_2}{m_1 - m_0} \cdot 100, [\%]$$

where: m_0 – weight for the empty container, [g]; m_1 – weight for the container with the sample before the drying process, [g]; m_2 – weight for the container with the sample after the drying is finished, [g].

In Figs. 1 and 2 are showed the variation of umidity vs. time for both samples of grapes naturally and artificially dried.

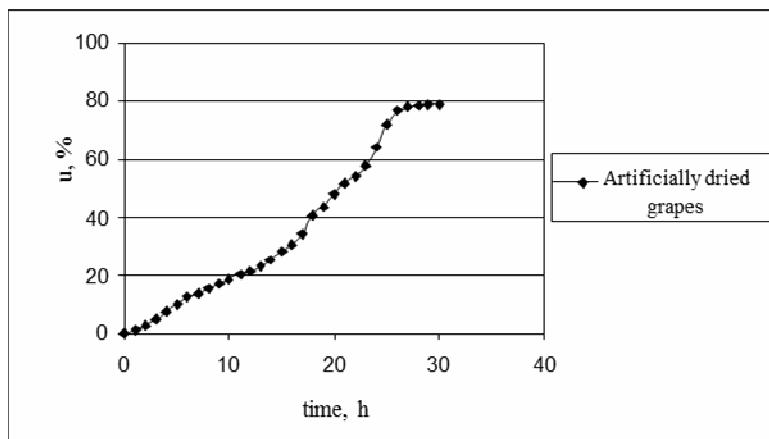


Fig. 1 – Umidity variation vs. time for artificially dried grapes.

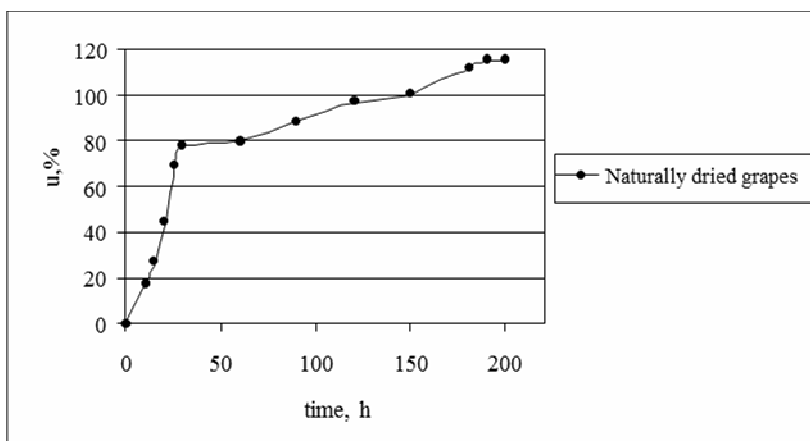


Fig. 2 – Umidity variation vs. time for naturally dried grapes.

As it has been showed in Fig. 1 the grapes artificially dried require a shorter time that those dried naturally (Fig. 2), but the amount of water eliminated by natural drying method is higher that those for the artificial dried sample.

4. Conclusions

The grapes were dried by using two methods: natural- sun exposure and artificial – laboratory oven.

Sun drying method is the most economical one compairing with the artificial one because it does not require energy consumption, but has the drawback that requires a longer time amount.

Naturally, the grapes are dried for 190 h and artificially for 30 h.

Two figures were drawn by measuring the water lost, expressed in umidity percents vs time lapse.

By natural drying, the sample colour change less compairing to the sample artificially dried.

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PROCESUL DE USCARE NATURALĂ ȘI ARTIFICIALĂ A STRUGURILOR. STUDII COMPARATIVE

(Rezumat)

S-au uscat struguri prin două metode și anume: natural, la soare și artificial, în etuva de laborator. Pe cale naturală, timpul de uscare pentru struguri a fost de 192 de ore, iar pe cea artificială de 30 ore. S-a constatat că, prin uscare naturală, produsele își schimbă foarte puțin culoarea față de produsele uscate artificial. Uscarea la soare este o metodă mai economică decât uscarea artificială la etuvă deoarece nu necesită un consum de energie mare, însă prezintă dezavantajul unui timp mai îndelungat.