

## DRYING – EFFICIENT METHOD OF PEACHES STORAGE

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**Abstract:** The presented article contains an analysis of peaches culture, the nowadays situation and future tendencies. There are indicated the most known peaches species and their health benefits. We propose an alternative for the unprocessed peaches that can't be preserved for a long period of time – the drying.

**Keywords:** dehydration process, drying, benefits, consumption.

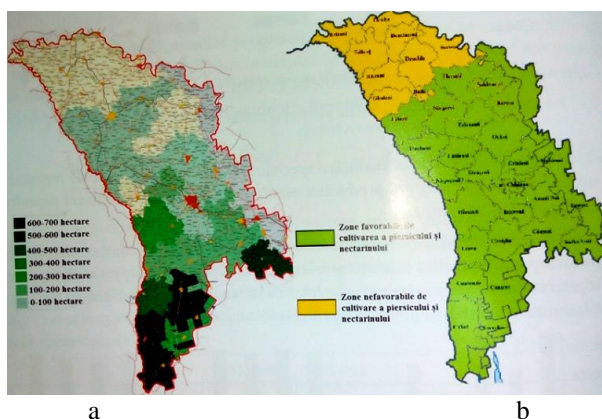
### Introduction

Peaches are a fruit tree species cultivated in R. of Moldova. Those were brought from Central Asia, South Caucasus and Crimea. Thanks to scientists' Sophia and Boris Sokolov decades of researches, there were created new peaches species, basic peaches cultivation technologies and thus it became a R. of Moldova commercial culture. After a lot of change within peaches assortment and agro-technics, it was wide-spread cultivated on both peasants' and large surfaced orchards.

At the moment the peach is the third by cultivation surfaces and production volume fruit, being surpassed by apples and plums, despites the fact that only 2/3 of our country territory is climatically suitable for that culture. The highest peaches concentration is within Ștefan-Vodă, Cahul, Căușeni and UTAG.

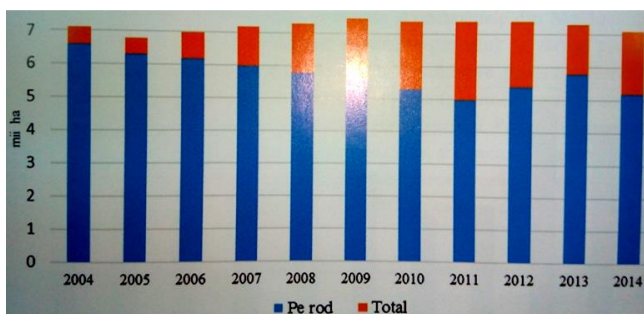
### Republic of Moldova peaches actual status and development tendencies.

Large industrial plantations were founded in the second half of XX's. The most suitable peaches cultivating zones are Center, South and South-East (Fig. 1). South zone is low in rainfalls and so it requires additional irrigation. North zone peaches cultivation is risky as it shows low temperatures, especially late spring frosts and insufficient warmth during vegetation period.

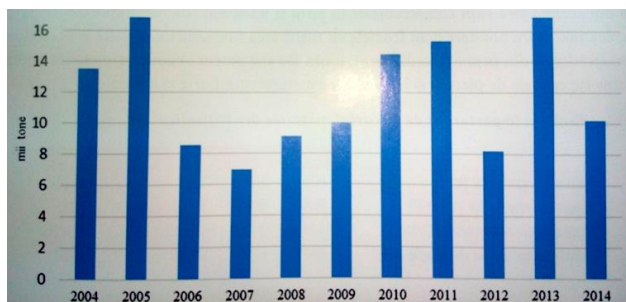


**Fig.1** (a) – Peaches plantations surface,  
(b) – territorial repartition of suitable and unsuitable zones [1]

Conform to National Bureau of Statistics (B.N.S.), the total Republic of Moldova orchards surface in 2014 were 122.3 thousand ha, including 36.2 thousand ha of stone fruits of which 7.1 thousand ha of peaches. Between years of 2005 and 2009, peach cultures were in constant growth thus in 2005 – 6.8 thousand ha and in 2009 – 7.5 thousand ha. After 2009 the total peach surface were decreasing, instead of that there was a growth of plantations by harvest, constituting 5.8 thousand ha in 2013 (Fig. 2).



*Fig.2* Republic of Moldova peaches surfaces dynamics [1]



*Fig.3* Global peaches harvest dynamics in Republic of Moldova [1]

Conform to B.N.S., the total global harvest were of different nature between 2004 – 2014 years, that fact was influenced by those years climacteric conditions.

The lowest harvest was denoted to be in 2007 with – 6.96 thousand t, and the highest in 2013 – 16.9 thousand t (Fig. 3). The average harvest per surface unit had the same oscillatory tendencies, for the interval of years 2004 – 2010, it was influenced by the weather actors of those years.

The highest average harvest in republic per surface unit was obtained in 2013 with 2.9 t/ha (Fig. 4).

An important role in Republic of Moldova peaches consumption plays Greece whose fruits are about 93% of all imported and commercialized peaches (Table 1). Of those the biggest share has the early maturated fruits that are commercialized in the first decade of June. The conclusion would be to extend the surfaces occupied by early maturing peaches.

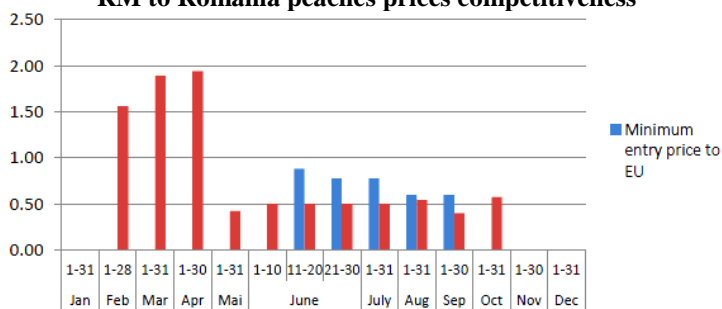
**Table 1.** Republic of Moldova peaches import evolution [10]

	2010	2011	2012	2013	2014
<b>Imports volume (tons)</b>	8659	5840	9897	3661	4468
<b>Imports value (thousand USD)</b>	9646	6488	8601	4614	4935
<b>Import average price (USD/ton)</b>	1114	1111	869,1	1260,3	1104,5
<b>Greece imports volume (tons)</b>	8471	5205	9092	3363	4093

Republic of Moldova export level was influenced by the Russian Federation fruits and vegetables embargo. Thus starting with 2011 the exported peaches quantity was considerably reduced reaching in 2014 only 5191 t of exported fruits, which is about 51% of the potential of 2010 (Table 2).

**Table 2.** Republic of Moldova peaches export evolution [10]

	2010	2011	2012	2013	2014
<b>Global production (tons)</b>	14540	15400	8200	16900	10200
<b>Exports volume (tons)</b>	12424	9023	7463	8043	5191
<b>Exports value (thousand USD)</b>	12068	9684	12024	7065	5912
<b>Export average price (USD/ton)</b>	971,3	1073,3	1149,2	878,4	1138,9

**RM to Romania peaches prices competitiveness****Fig. 4.** RM peaches prices in Romania [10]

In EU, the PMI for fresh from Moldova peaches varies between 0.60 and 0.78 euro/kg and is applicable in the period from 11 June – the end of September. The local production starts from middle of June and continues till the beginning of September. Romania imports the peaches from May to October, and the most of them are delivered during the three summer months. In Moldova peaches production lasts from middle of July till the end of August. Theoretically, the most expensive peaches from Moldova has better chances in August, when AIP is almost equal to the PMI, yet the export is unlikely. In that period, Moldova peaches will compete with those from Greece (0.32 euro/kg), Italy (0.61 euro/kg) and Spain (0.80 euro/kg). Still the quality, should be at list comparable with Italy peaches.

### **Peaches – as strategic product for Republic of Moldova**

The actual situation of harvested peaches is a deplorable one. Those are altered during transportation or because of their exceeding quantities are just leaved on the orchards soil. In Republic of Moldova there are more than 7300 ha of peaches cultures, the South itself holds 160 ha equivalent to 10.87 thousand tons. Reminding the

aforsaid, because of the strict requests to the exported products and the peaches characteristics themselves, those can't be so easily transported or stoked so the most actual problem is to sell the fruits. To reduce fruits losses one proposes the thermal treatment of peaches, by dehydration that represents a well-known method with lot of benefits. Dried peaches require less storage space, have increased expiration period as well as brings health benefits. Nowadays Republic of Moldova exports 2000 – 3500 t/year of dried fruits. The price per kg per dried fruits is up to 6 – 8 times higher than fresh ones.

### **Peaches – as object of study**

#### **The importance of fresh fruits consumption**

The peach fruit possess important therapeutic properties as it contains such vitamins as C, A, B3, B5 and E. It contains as well Fe, Mg, P, Cu, Zn, I, K, Se, phytonutrients, antioxidants and carotenoids. 100g of peaches contain: 29 ÷ 64 calories, 87 g of water, 1 g of fibers, 8 g of carbohydrates, 160 mg of K, 30 mg of Vitamin C, 0.5 mg of Vitamin E, 100 µg of β-carotene, 16 mg of Mg and 7 mg of Ca. The peaches also contain: 10.4 – 16.2% dry substances, 5.4 – 11.9% total sugar, 0.36 – 0.44% total acidity, 12.6 – 21.5 mg% ascorbic acid, 0.3 – 0.6 g% of pectin, 0.7 – 0.9 g% proteins, 0.07 – 0.16 g% of tenoides, 0.03 mg% of Vitamin B1, 0.05 mg% of Vitamin B2, 0.90 mg% of Vitamin B6, 0.3 mg% of Vitamin A, 0.43 mg% of Vitamin E.

#### **Health benefits**

The peach fruit helps against the diabetes and cardiovascular diseases. Thanks to their high antioxidants value the peaches are used in cosmetics as it prevents skin aging and helps at its regeneration as well as reduces the oxidation of the malicious LDL cholesterol. It reduces the stress reducing the anxiety. Containing selenium, it also prevents cancer. It has a good cleaning effect for the kidneys, stomach, intestine and bladder. Peach tree flowers are also used in medicine as sedatives.

#### **Importance of dehydrated peach fruits consumption**

Dried peaches contains Vitamin A, a lot of vegetal sugar, benefic carbohydrates, phytonutrients, antioxidants, important for eyes carotenoids, protecting against cancer and heart diseases – flavonoids. They support immune and digestive systems thanks to the high content of fibers and Vitamin C. The fruits contain tannins which help against intestinal and diuretic disorders. Have antimicrobial, anti-stress and antivirus effects. The pectin helps to regulate the cholesterol level.

#### **Health benefits**

Dry peaches stimulate the immune system; help to normalize intestine functions, help gastritis by stimulating gastric juices. Reduce the risk of heart diseases, arthritis, eyes affection, cancer appearance, anemia, constipation, arterial hypertension, asthma and bronchitis.

#### **The most widespread Republic of Moldova sorts of dehydrated peaches**

*Maycrest* – medium sized fruit (160 – 180 g), round form with yellow-red peel all over peach's peel. The pulp is yellow-orange with red infiltrations, especially under the peel.

**Springold** – medium sized fruit (90 – 130 g), symmetrically round form with slightly pubescent peel, colored with glossy red about 75 – 80% of total surface. The seed is semi-adherent to the pulp.

**Colins** – medium sized fruit (70 – 110 g), round regulated form, the peel is slightly pubescent, colored in glossy dark red. The pulp has a fine structure, firm but succulent with a pure taste. The seed is semi-adherent to the pulp.

**Urojainâi Joltâi** – medium or above medium sized (145 – 150 g), the form is spherically-oval. The peel is thin and dense, adherent to the pulp, yellow, covered in large stains and dark red ribbed here and there. The seed is semi-adherent to the pulp.

**Cardinal** – medium sized fruit, spherical form, with thick golden-yellow peel, on the shady side and with red stripes on the sunlit side. Red color covers the most of the surface. There are a lot of intertwined fruits of this variety [1].

### **Republic of Moldova peaches drying methods analysis**

Drying is one of the most ancient operations applied by humanity. In the same time this operation has diversified from simple hot air or sun drying to atomized or lyophilization.

The main food drying reason is their shelf time duration extension. By reducing humidity one reduces food water activity to a specific level where harmful microorganisms' growth is inhibited. There is as well reduced enzymatic activity likewise unwanted reactions production speed.

#### **Air heleo drying:**

*Advantages:* free energy source.

*Disadvantages:* long drying duration between 7 – 20 days.

#### **Heleo drying:**

*Advantages:* radiant solar energy use, drying duration is reduced by 3 – 5 times. The product is protected from insects, dust, humidity, more efficiently are preserved the nutritive substances, the productivity grows up to 2 times, the drying occurs in carousel regime.

*Disadvantages:* irregular drying.

#### **Convective drying:**

*Advantages:* well known method, can provide major productivities.

*Disadvantages:* irregular and long drying period (12 – 18 hours), reduces some nutritive substances.

#### **Vacuum drying (by sublimation):**

*Advantages:* doesn't occur proteins denaturation, there has no place microbiological processes, there can be integrally preserved all the vitamins, soaking it absorbs water regaining the initial form.

*Disadvantages:* production temperature and pressure maintenance energy surplus.

#### **Infrared waves drying:**

*Advantages:* rapidly removes humidity, reduced processing duration.

*Disadvantages:* expensive method.

#### **SHF field drying:**

*Advantages:* the product is heated the entire thickness, the combined method reduces by three times the costs and reduces the thermal treatment period.

*Disadvantages:* could take place product's carbonization.

**Microwaves drying:**

*Advantages:* traverses the air, plastic materials, the porcelain and the glass; are reflected by metallic surfaces; are absorbed by water, protein substances, sugars, fats; SHF waves drying is a full volume drying, short processing duration.

*Disadvantages:* irregular waves' distortion.

**Conclusion**

This article presents a peaches cultures analysis; were indicated favorable and unfavorable cultivating zones; were shown surfaces and global surfaces dynamics; were analyzed the tendencies of developing this culture, we studied the import and the export. We proposed an alternative to value the production of remaining after export, internal market realization or enterprises processing peaches. We presented the importance and the benefits of using fresh and dried peach fruits for people consumption. There were also mentioned optimal and efficient varieties and methods for fruits dehydration process.

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