PRESERVATION OF FRUITS WITH HOME-MADE DEHYDRATION METHOD

A.S. Szabo M. Csoka L. Varga

Corvinus University of Budapest, Faculty of Food Science
1118 Budapest, Somloi str. 14-16, Hungary
e-mail: andras.szabo@uni-corvinus.hu

ABSTRACT

In the paper information is given about the investigations of home-made dehydration of different domestic (apple, plum, sour cherry), subtropical and tropical (lemon, orange, kiwi, banana, pineapple) fruits, preserved by home-made dehydration technique. For dehydration FD-510 type electric heater was used. The content of water in the dehydrated samples was determined in drying owen. The sensory parameters, the rheological properties, the texture and also the storability depend significantly on the water content (and water activity) of the dried fruits.

INTRODUCTION

The water content of different fruits is significant, in some cases even over 90 %. But from point of view of storability mainly not the water content, but the water activity is dominant. If the water activity is rather low – during the dehydration process the ratio of free water to bounded water changes – the different microorganisms can not grow and develop on the surface of the foodstuffs. Based on the connection between water content and water activity there is a possibility to determine the amount of water, which should be removed from the original foodstuffs or agricultural products during the dehydration process. This is the method and the reason to produce safe food with long storability.

Dehydration is one of the most natural and widely used methods of food preservation technologies(1-3). E.g. solar dehydration is since centuries a simple but very effective technique for increase of the storability of various fruits and vegetables. Dehydration is a typical post-harvest technology with great economic importance. This paper deals

with results of investigations of home-made dehydration technique for domestic, subtropical and tropical fruits(4)(5).

MATERIAL AND METHOD

The dehydration experiments were carried out with the following domestic and subtropical and tropical fruits:

- apple (Malus domestica)
- plum (Prunus domestica)
- sour cherry (Cerasus vulgaris)
- lemon (Citrus limon)
- orange (Citrus aurantinum)
- kiwi (Actinida chinensis)
- banana (Musa paradisiaca)
- pineaaple (Ananas sativus)

The domectic fruits were grown in Hungary (Szolnok), the subtropical and tropical ones were transported from Greece, China, Italy, Costa Rica and Ecuador.

For dehydration HAUSER FD-510 type equipment (electric heater) was used. This machine is constructed for home-made dehydration of agricultural products with 250 W power. During the drying process – evaporation of water (and partly other volatile components) from the surface of the samples because of heating and ventillation – 2-3 kg fresh fuits in sliced form can be treated in the same time. The slices of fruits or vegetables should be placed on the paralel platters of the equipment. The optimum time requirement depends also on the water content of the samples, in general is between 4 and 10 hours.

Determination of the water-content of the dehydrated samples was carried out in drying owen, using 105 ^{O}C temperature.

RESULTS AND CONCLUSIONS

The main aim of dehydration technology is to produce dried fruit products with good sensory properties and acceptable (rather long) storability. If the remaining water content is still relative high, the storability is not too long, although the sensory properties (e.g. softness, elasticity, hardness, taste, colour) are excellent. Of course if we need

longer storability it is necessary to apply longer treatment, as well, this means higher energy requirement and higher tempereature, which can have a negative influence on the quality parameters of the dried fruit products.

The measured water contents of the different dried samples were the following:

Apple:	9.3-14.1 %
Plum:	14.3-18.0 %
Sour cherry:	15.5-18.3 %
Lemon:	21.8-40.0 %
Orange:	24.5-40.5 %
Kiwi:	17.4-18.0 %
Banana:	10.2-13.6 %
Pineapple:	14.2-14.5 %

During the dehydration process the water content of the original agricultural products decreases but on the other hand the dry material concentration increases. The average enrichment factor for the dry material in the investigated dehydrated fruits was e.g. in case of apple 9.4, in case of banana 3.3 , in case of sour cherry 5.9 and in case of plum 5.5. So it is evident, that in consequence of the dehydration treatment the difference in dry material can be even one order of magnitude in comparison with the original edible fruits.

The dehydrated products with optimum dehydration state have rather good sensory properties and contain practically all the valuable componensts (e.g. dietary fibers, minerals) of the fruits. Further significant adventage of the dehydration process is the reduction of the transport expenses, and the really long storability in normal conditions without special energy-use. Of course the storability depends not only on the water content and water-activity of the dried products but also on the temperature and humidity of the storage room. Let us mention that the storability of the reported dehydrated fruit samples was rather long, in all cases exceeded 3-4 month period at room temperature and 60-70 % relative humidity.

The dehydrated fruits can be used by the consumers directly but also after rehydration, e. g. in form of soups. Rehydration is a physical process antagonistic to the dehydration. During rehydration process of

course the volume of the dried products increases significantly depending on the water-uptake.

We are going to continue the research activity concerning the application of dehydration process for fruits and vegetables. The next topic is the investigation of long-term storability of dehydrated fruits.

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