New food products derived from pomegranate

Maestre J., Melgarejo P., Tomás-Barberán F.A., García-Viguera C.

in

Melgarejo P. (ed.), Martínez-Nicolás J.J. (ed.), Martínez-Tomé J. (ed.).
Production, processing and marketing of pomegranate in the Mediterranean region: Advances in research and technology

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 42

2000
pages 243-245

New food products derived from pomegranate

J. Maestre*, P. Melgarejo, F.A. Tomás-Barberán*** and C. García-Viguera*****
*Consejeria de Medio Ambiente, Agricultura y Agua de la Región de Murcia,
Plaza Juan XXIII s/n, 30008 Murcia, Spain
**Escuela Politécnica Superior de Orihuela, Universidad Miguel Hernández,
Ctra. de Beniel km 3,2, 03312 Orihuela (Alicante), Spain
***Departamento de Ciencia y Tecnología de los Alimentos, CEBAS-CSIC,
Apdo. 4195, 30080 Murcia, Spain

SUMMARY – The main objective of the present work has been the utilisation of the pomegranate fruits that could not be consumed fresh (about 30% of the total production), together with an alternative use of this cultivar, in order to increase its consumption. The use of the juice for the production of processed products would give an extra value to this cultivar. Different varieties (Borde and Mollar) and extraction procedures were analysed, in order to obtain a juice with the best qualities for further application in the preparation of derived foods, such as jams, jellies, juices, carbonated beverages, syrups and liqueurs. It was concluded that the Borde cultivar rendered a juice with better colour and higher stability, due to its lower pH and anthocyanin composition. Other products with intact seed were also assayed: refrigerated, frozen, appertised in syrup, candied, in brandy and in vinegar.

Key words: Pomegranate, juice, jellies, jam.

RESUME – *"Nouveaux produits alimentaires dérivés de la grenade". L'objectif principal du présent travail a été l'utilisation des fruits de grenade qui ne pouvaient pas être consommés en frais (environ 30% de la production totale), en même temps qu'une utilisation alternative de ce cultivar, afin d'augmenter sa consommation. L'utilisation du jus pour la production de produits transformés apporterait une valeur supplémentaire à ce cultivar. On a analysé différentes variétés (Borde et Mollar) ainsi que les procédures d'extraction, afin d'obtenir un jus ayant les meilleures qualités pour une application ultérieure dans la préparation de produits alimentaires dérivés, tels que confitures, gelées, jus, boissons gazeuses, sirops et liqueurs. On en a conclu que le cultivar Borde donnait un jus ayant une meilleure couleur et une stabilité plus élevée, dû à son pH et à sa composition en anthocyanines plus faibles. D'autres produits avec des graines intactes ont également été testés : réfrigérés, surgelés, appertisés en sirop, confits, à l'eau-de-vie ou au vinaigre.*

Mots-clés : *Grenade, jus, gelées, confiture.*

Introduction

In all the trials of this work, the colour has been the main aspect studied. It is one of the most important parameters when making a sensorial valuation of the quality of a food, as it is one of the factors used, a priori, by the consumer to reject or accept a food.

Given that the colour of the pomegranate is determined by its phenolic compounds, especially anthocyanins, it is fundamental to study them and their stability in order to valuate this parameter. The anthocyanins are glycosides, that upon hydrolysis give rise to a sugar and aglycon called anthocyanidin. This in turn has a structure made up of a benzopyril nucleus and a phenol ring, which is known as the cation flavilio, which is deficient in electrons and therefore very reactive.

There are numerous factors related to the stability of these pigments. Among others, the following are noteworthy: enzymatic action, temperature, oxygen, light, ascorbic acid, pH, metals, sugars and sulphurous anhydride.

Food products

Juice

Juice is extracted from mature pomegranate seeds of Borde and Mollar types, by pressing and liquefying. The pressing method obtained a greater quantity of juice as well as better quality.

The juice was stored at different temperatures, 0, 20 and –20°C. It was concluded that the temperature giving the best fresh results was 0°C, whereas for its preservation and use later, the best result was obtained from storage at –20°C.

The anthocyanins found in the pomegranate are the derivates 3,5-diglycoside and 3 delphinidin, cyanidin and pelargonidin glycoside (Gil *et al.,* 1995). The stability of these pigments was different according to type. Thus delphinidin was the most unstable at all temperatures assayed, whereas pelargonidin was the most stable. This degradation seemed to be enzymatic as pasteurisation of juice prevents it.

The colour stability was likewise assayed at treatments of severe pasteurisation (100°C, 15 min), observing only slight losses in pigment stability.

Jams and preserves

The products were made from frozen Mollar pomegranate juice, adding pectins, saccharose and citric acid. It was observed that during the processing treatment 25% of the pigments are destroyed. They continue to degrade during preservation, this depending much more on temperature than on light as the greatest degradation takes place at 37°C and the best preservation is at 5°C.

Jellies

When making the jellies, approximately 50% of the total anthocyanins present in the juice of both varieties was lost. Likewise it was observed that the jellies stored at 5°C underwent less pigment degradation. When stored at higher temperatures, the Mollar variety presented greater losses than the Borde variety. Likewise, the Mollar variety presented a quicker degradation when the jellies were made with non-acidified juices (pH 4) thus proving that the acidification of juice produced a noteworthy improvement in the colour of these products, both initially and during storage.

During storage, certain colour differences were observed, which indicates that the pH was not the only parameter responsible for this characteristic.

Refrigerated kernels (minimally-processed)

Pomegranates destined for this production were chilled to 0°C and later selected carefully in order to avoid alterations from fungi or bacteria or any cracks in the rind.

Once selected, they were carefully washed on the outside and dried with a current of air at room temperature. The kernels were then removed. The kernels were once again selected in order to eliminate any which had been damaged or squashed during kernel removal. They were then conditioned in PEbd bags that were heat-sealed.

Following this operation they were put into a chamber at 0°C.

The conservation was excellent for the first 10 days in each case and in some cases they lasted satisfactorily up to 15 days.

Frozen kernels

After obtaining the kernels in a similar way to the previous case, they were then put into PEbd bags with syrup of 15°Brix. This concentration is very similar to that of the kernels. They were then frozen in a chest freezer.

The cell juices left the kernels and entered the syrup, which turned red during the freezing process.

In the same way, kernels coated with solid sugar were also frozen. In this case the sugar also turned red. The kernels should be eaten frozen to avoid an excessive loss of turgence.

Appertised kernels

The kernels were put into metal tins with a syrup of 15°Brix, after which they were heated, sealed and sterilised in bain marie for 10 minutes. After stabilisation, most of the tins had kernels that were too soft and that tasted cooked. Some tins had kernels with adequate texture and taste, possibly those that underwent a less severe heat treatment.

Kernels in preserve

Given the high water content of the kernels, when they are placed in strong syrup they undergo plasmolysis, which makes the product more attractive. Some juice also leaves the kernels turning the syrup red.

Kernels in marc and distilled liquor

The objective was to obtain a product similar to brandied cherries. When the kernels were put into spirit with a high alcohol content (52% vol.) the kernels dehydrated almost immediately and the spirit became milky white until the kernels could no longer be seen.

Something similar happened with marc but in this case the process was slower.

Kernels in vinegar

The kernels were put into glass jars. Wine vinegar with an acidity of 5° was added and the jars were closed. After a few days the kernels began to turn brown, and thus most of the interest of using red pomegranate kernels for salads was lost.

Other preparations

It is also envisaged to prepare other liqueurs, syrups and soft drinks from pomegranate juice and kernels, but to date we have had no reliable experiences with these preparations.

References

Gil, M.I., García-Viguera, C., Artés, F. and Tomás-Berberán, F.A. (1995). Changes in pomegranate juice pigmentation during ripening. *J. Sci. Food Agric*., 68: 77-81.