

A Revival of Traditional BEH-ROB Marmalade and Inspecting Its Sensory and Physicochemical Characteristics

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ABSTRACT

BEH ROB marmalade is a traditional product in Iran, produced by boiling the pomegranate juice along with quince puree and sugar. In this research we examined the effect of quince fruit (0%, 10%, 25% and 40%) and sugar (0%, 10%, 20% and 30%) on sensory characteristics including taste, color, consistency, adhesiveness, spreadability on the bread and the overall acceptability, chemical characteristics including acidity, pH, Brix and total solids and color analysis including L*, a* and b* index of BEH ROB marmalade. The experiments were conducted using full factorial design. The results of experiments indicated that the increased amount of quince puree leads to the increase of stiffness and adhesiveness desirability and the decrease of color desirability ($P < 0.05$). Furthermore, adding the quince puree and sugar caused the decrease of acidity and the increase of pH and total solids ($P < 0.05$). Furthermore, it was concluded that adding the puree causes the decrease of a* and b* and adding sugar causes the increase of a*, b* and L* ($P < 0.05$). Additionally, the results of experiments showed that the best treatment contains 25% of quince, and 20% of sugar and the worst treatment contains 40% of quince without any sugar.

KEYWORDS: pomegranate; sensory characteristics; physicochemical characteristics; marmalade; quince.

INTRODUCTION

Pomegranates (*Punica granatum* L.) are special to tropical regions and most botanists suppose that its origin was the Caucasus, the Caspian Sea coast and Zagros Mountains, Iran [1]. From the old days, it has been a custom to make jam as a way of preserving fruits and vegetables. The difference of these products is related to the size and type of the fruit pieces used [2]. In fact, marmalade is the fruit jelly in which there are little fruit pieces with skin in the form of suspension [3]. In South Khorasan varieties of pomegranate such as Shishe Kap, Bajestani and Ardestani are cultivated widely in the cities near the desert margins.

This research aims at making a new product using the pomegranates wastes. Some of the previous researches about the process of production of jam and their chemical and sensory characteristics have been published in the literature [4, 5]. But to our knowledge, no work has been reported in the literature on the sensory and physicochemical characteristics of BEH-ROB marmalade.

In this research the sensory characteristics (i.e. taste, color, consistency, stiffness, adhesiveness, spreadability on the bread and the overall acceptability), chemical characteristics (i.e. acidity, pH, Brix, and total solids), and color (L*, a* and b* indexes) of BEH ROB marmalade have been examined.

MATERIALS AND METHODS

Marmalade Production

Pomegranate (Shishe Kap variety), quince and sugar were used to produce the marmalade. Pomegranates were juiced manually and the quince was grinded in the form of puree. The processed fruits were kept in the fridge so that their physicochemical changes were minimized. Quince puree, sugar or both were added to the pomegranate juice and kept under the process of cooking to reach 68 °Brix. Then little containers were filled and kept in the fridge for 24 hours to turn into Jelly.

Experiments

Sensory quality tests were performed using a 15 non-trained panelist with a 7 points Hedonic scale [6]. Each panelist examined all samples randomly and individually, and fresh water was drunk between each two phases for better specification. Brix was measured with a manual RHBO-80 refractometer, pH was measured with a pH_11 Sartorius pH meter and acidity (based on citric acid) was measured compliant with Iranian 214 standard (jam, marmalade, and jelly) [7].

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To evaluate the color, 26 grams of each sample was put into identical plates to form a thin layer of each sample. Samples were photographed using HP 5400 Scanner and the photographs were used for color processing (a^* , b^* , L^* factors). L^* indicates lightness, a^* indicates the degree of redness (magenta to green), and b^* indicates the degree of yellowness (yellow to blue).

Statistical Analysis

The experiments were conducted using full factorial design. Calculations were done using Microsoft Excel software. For the analysis of variance, Minitab software (version 14) was also used.

RESULTS AND DISCUSSION

Sensory Characteristics of Pomegranate Marmalade

Statistical analysis indicated that increased amount of quince and sugar have no significant effects on consistency, taste, spread ability and the overall acceptability of sample BEH-ROB marmalade ($P > 0.05$). It was also indicated that the effect of increased amount of quince on the marmalade color, stiffness and adhesiveness, is completely significant ($P < 0.05$) (Figs. 1- 2). But the effect of increased amount of sugar on the color, stiffness and adhesiveness of the samples was not significant ($P > 0.05$).

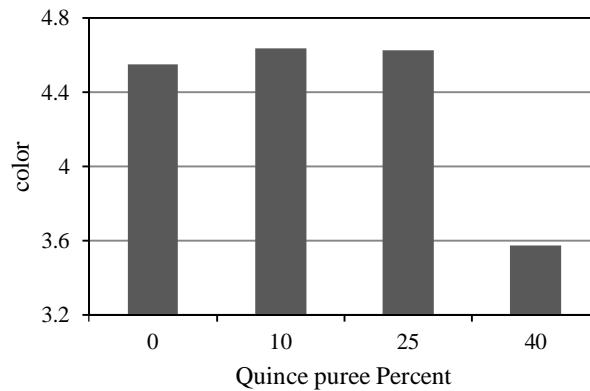


Figure 1. Effect of Quince puree Percent on Color

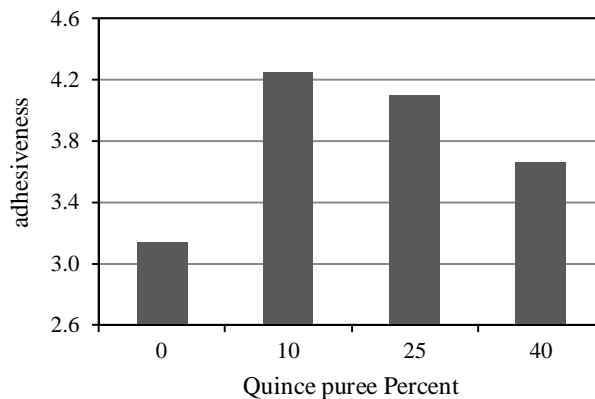


Figure 2. Effects of Quince puree Percent on adhesiveness

Chemical characteristics of pomegranate marmalade

Since the Brix of the samples was controlled with a machine and within a special range, statistical analysis was not performed on them. Results of experiments indicated that the Brix of samples was within the range of 68 to 69.5. The effect of increased amount of quince and sugar on pH, acidity and total marmalade solids is completely significant ($P < 0.05$) (Figs. 3- 4).

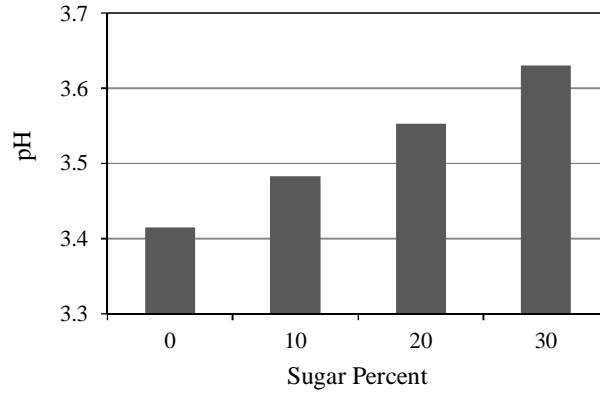


Figure 3. Effect of Sugar Percent on pH

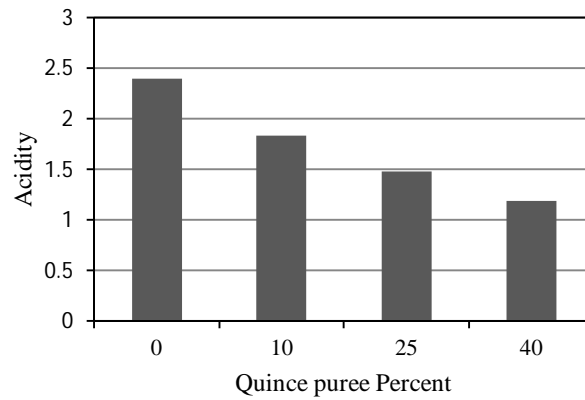


Figure 4. Effect of Quince puree Percent on Acidity

Sensory characteristics of pomegranate marmalade

The results of statistical analysis indicated that the effect of quince and sugar amount on a^* , b^* , and L^* indexes is completely significant ($P < 0.05$) (Figs. 5-7).

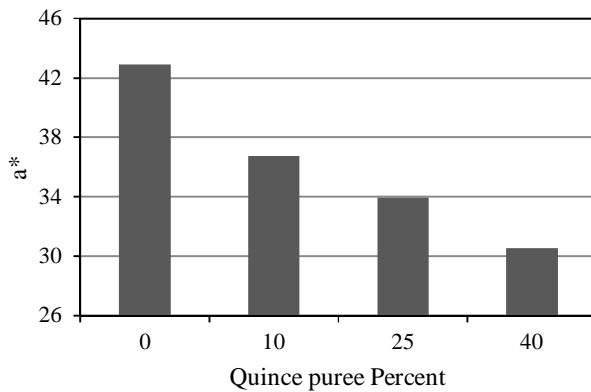


Figure 5. Effect of Quince puree Percent on a^*

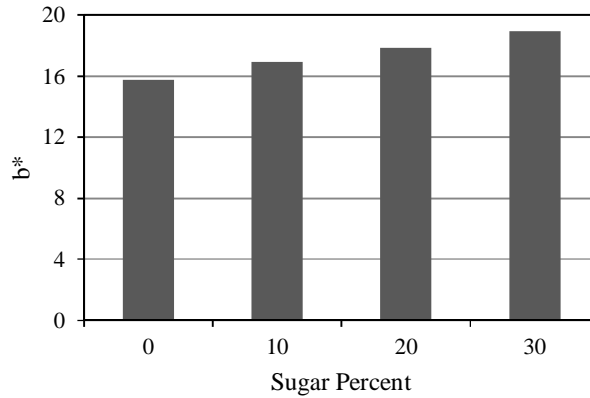


Figure 6. Effect of Sugar Percent on b*

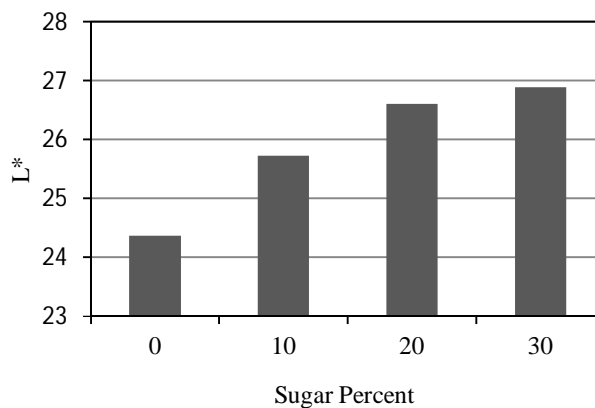


Figure 7. Effect of Sugar Percent on L*

CONCLUSIONS

In the present study, the effects of quince fruit (0%, 10%, 25% and 40%) and sugar (0%, 10%, 20% and 30%) on sensory properties, chemical characteristics and color of BEH ROB marmalade were investigated. The results of experiments indicated that the increased amount of quince puree leads to the increase of stiffness and adhesiveness desirability and the decrease of color desirability ($P < 0.05$). Furthermore, adding the quince puree and sugar caused the decrease of acidity and the increase of pH and total solids ($P < 0.05$). Furthermore, it was concluded that increasing the puree content, causes the decrease of a^* and b^* , whereas increasing the sugar content causes the increase of a^* , b^* and L^* ($P < 0.05$). Additionally, the results of experiments showed that the best treatment contains 25% of quince, and 20% of sugar.

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