

Sensory and physicochemical characterization of a homemade raspberry jelly

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Abstract

The aim of the paper was to create an authentic food - raspberry jelly, and to characterize it from a sensory and physicochemical point of view. Thus, we decide to obtain a food as natural as possible, with special nutritional qualities due to the reach content of nutrients from raspberries. Without the addition of preservatives or other chemical additives, a "jelly" type product was created, made of raspberry, which is a rich source of valuable vitamins (A, D, C, E, B3, B2, B6), minerals (K, Mn, Cu, Fe, Mg) and helps to reduce the risk of illness, obesity and diabetes.

2 types of jelly were obtained (raspberry jelly with raw sugar and raspberry jelly with stevia sugar), which were subsequently analyzed from sensory and physicochemical point of view. After the analyzes carried out, it was found that the raspberry jelly obtained with the addition of stevia sugar was more appreciated than the jelly obtained with raw sugar, both due to the appearance and color, but also due to the consistency of the finite product. Regarding the physicochemical analyzes performed (determination of total acidity, sugar content and refractive index) for the 2 samples of raspberry jelly, higher values were obtained in the case of raspberry jelly with stevia sugar, for all 3 monitored characteristics.

Keywords: raspberry, jelly type products, stevia sugar, sensory analysis.

1.Introduction

Jellies are sugary products of various shapes, similar to candies, having various colors and sometimes being powdered with sugar [5,12,14]. The consistency of the jellies is firm but elastic and the mass is translucent, clear or matte. The raw material from which the jelly is obtained is produced from juice, syrup or fruit pulp with added sugar and gelling agent, which is boiled until it thickens and acquires a gel consistency. These products are considered fine oriental desserts [8,15].

As a dessert, jellies are valuable because they are sweets that do not contain a lot of sugar, but contain minerals, very necessary for the body. However, they do not contain heat-labile enzymes and vitamins, which are destroyed in the boiling process.

Their nutritional value is given by the nutritional potential easily taken over by the body (carbohydrates are transformed into energy with the least effort of the body) [3,10,11]. Considering that the activity of the brain and the nervous system in general is fundamentally based on the consumption of carbohydrates, they must be taken from fresh fruits. Thus, the body is at an advantage, because it receives, along with energy, the whole range of elements necessary for a healthy life: all the vitamins, enzymes and minerals contained in fresh fruit. In small quantities, jellies are convenient products to administer during the breaks between meals and in contexts that are not suitable for the consumption of fresh fruit - during commuting, on walks, during group activities and in other similar situations [6,7].

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Jelly has a variant glycemic index (GI), depending on the type of sweetener used in its preparation. Following the study conducted by Nikitin I., Nikitina M. *et al.*, it was found that the jelly obtained with sugar has a GI rating of 58.4, while the GI rating of the jelly made with fructose was lower, somewhere between 29.2 and 32.8 [9,11].

Raspberry (*Rubus idaeus* L.) is the edible fruit of a multitude of species of plants in the genus *Rubus* in the rose family, most of which are in the subgenus *Idaeobatus*. Raspberry is a perennial plant with woody stems, being popular due to its use in food, phytomedicine but also due to its use as an ingredient in nutraceutical cosmetic products [4,13]. The following nutrition information is provided by the USDA for raspberry:

Table 1. Nutritional information of raspberry

Characteristics	Raspberry, raw / 100 g
Energy (kcal)	57
Water (g)	85,6
Protein (g)	1,01
Total lipid (fat) (g)	0,19
Carbohydrate, by difference (g)	12,9
Sugars, total (g)	2,68
Ash (g)	0,35
Calcium, Ca (mg)	16
Iron, Fe (mg)	0,45
Magnesium, Mg, (mg)	19,2
Phosphorus, P (mg)	27
Potassium, K (mg)	156
Sodium, Na (mg)	<2,5
Zinc, Zn (mg)	0,22
Copper, Cu (mg)	0,053
Manganese, Mn (mg)	0,494
Vitamin C, total ascorbic acid (mg)	23
Biotin (µg)	3,43

Forest fruits, but also numerous small fruits, such as strawberries, raspberries, currants (generally red fruits), due to their rich content in bioactive compounds, have proven benefits for increasing human health. Thus, the polyphenols contained in these fruits, due to their chemical structure, have antioxidant, antimicrobial, antiinflammatory, antitumor and antiatherogenic (which limits the deposition of fats on the walls of blood vessels) properties. Antioxidants protect cells from the effects of free radicals on the body. Uncontrolled, free radicals cause cell degradation, favoring the onset of diseases and premature aging [1,13].

Because it was desired to obtain a product as natural as possible, in the process of obtaining one of the 2 types of jelly, stevia powder was used, as a natural source of sweetener.

The chemical compounds that produce the sweetness of the stevia leaves are even 250-300 times sweeter than sugar. Stevia has been used medicinally for centuries and has been cultivated for its sweet, strong flavor. Studies have shown that using stevioside (one of the sweet compounds in the stevia plant) as a supplement can reduce blood pressure. Also, stevia has been studied for a long time, in the case of patients with diabetes, offering impressive results [2].

2. Materials and method

Jellies are translucent products with a gelatinous consistency, composed of fruit syrup, sugar or glucose syrup (which usually is flavored, colored and acidulated) and a gelling agent which can be agar-agar, pectin or gelatin.

The jellies must correspond to N.I.D. 24-69, that is, to fulfill the following main characteristics:

- gelatinous, transparent appearance;
- uniform color in the entire mass of the product, characteristic the raw material from which it comes;
- taste and aroma: sweet and sour, characteristic the fruit from which it comes;
- refractometric degree (%): 67-69;
- acidity (in malic acid, %): 0.70-1.3.

Raspberries, necessary to obtain the 2 types of jelly came from our own production, and the raw sugar, stevia sugar and gelatin were purchased from local markets.

To obtain the raspberry jelly, raw sugar (or stevia sugar) was used, which was added to the extract obtained from the crushed and strained fruits, through a sieve. Also, gelatin was added to the mixture and then heated for about 5-10 minutes, until the sugar melts and the gelatin is incorporated into the contents. After pouring the jelly into special forms, they are placed in the refrigerator, at a temperature of 4-8°C, for a minimum of 3-6 hours, in order to obtain a successful coagulation.

After preparing the jellies, they were analyzed sensorially and physicochemically. Thus, the 2 types of raspberry jelly obtained (with raw sugar and with stevia sugar) were evaluated by 10 evaluators, aged between 17 and 52 years, without food allergies. The samples were presented once to each evaluator in coded plastic plates.

The following sensory attributes were evaluated: appearance, color, consistency, smell and taste, using the hedonic scale with 5 points: 5 - extremely pleasant, 4 - moderately pleasant, 3 - indifferent (neither pleasant nor unpleasant), 2 - slightly unpleasant, 1 - extremely unpleasant.

Regarding the physical-chemical analyses, the following characteristics were determined: titratable acidity (according to SR 2213/8-2007), sugar content (according to SR 2213/12-2009) and refractive index (by direct reading at 20°C using an Abbe refractometer).

3.Results and discussion

The results of the sensory examination following the questionnaires for the 2 varieties of jellies are presented below.

Following the results obtained on the basis of the questionnaires, for the assortment of raspberry jelly with raw sugar, the most appreciated sensory characteristics were the smell and the taste (with average scores very close of 4.5 points and 4.4 points respectively), but also the appearance (with an average score of 4.2 points). Color and consistency scored lower than the previously listed features, with color recording an average score of 4.1 points and consistency an average score of 3.9 points.

Table 2. Sensory characteristics for raspberry jelly with raw sugar – centralization

No.	Evaluator name	Appearance	Color	Consistency	Smell	Taste
1	S1	4	5	5	4	4
2	S2	4	5	4	5	5
3	S3	4	4	4	4	4
4	S4	4	3	4	5	4
5	S5	5	4	4	5	4
6	S6	4	4	2	5	5
7	S7	3	3	3	3	3
8	S8	5	4	4	5	5
9	S9	4	4	4	4	5
10	S10	5	5	5	5	5
Average score		4,2	4,1	3,9	4,5	4,4
Total average score		4,22				

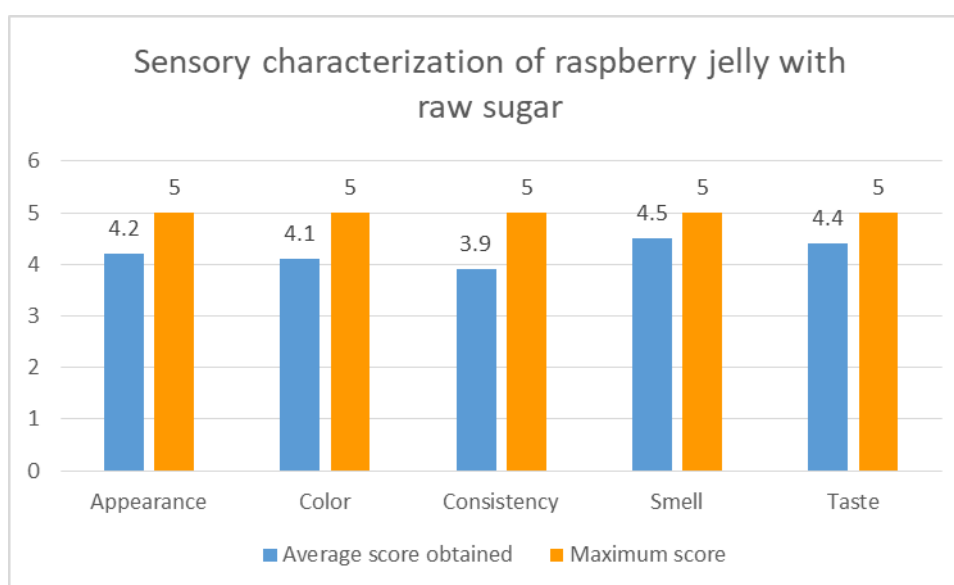


Figure 1. Graphic representation of sensory analysis of raw sugar raspberry jelly

Table 3. Sensory characteristics for raspberry jelly with stevia sugar - centralization

No.	Evaluator name	Appearance	Color	Consistency	Smell	Taste
1	S1	4	5	5	5	4
2	S2	5	3	5	5	4
3	S3	5	5	5	5	5
4	S4	4	4	4	3	4
5	S5	4	4	4	5	4
6	S6	5	4	2	4	3
7	S7	4	4	4	4	4
8	S8	4	5	4	5	5
9	S9	5	5	5	5	4
10	S10	4	4	4	4	4
Average score		4,4	4,3	4,2	4,5	4,1
Total average score		4,3				

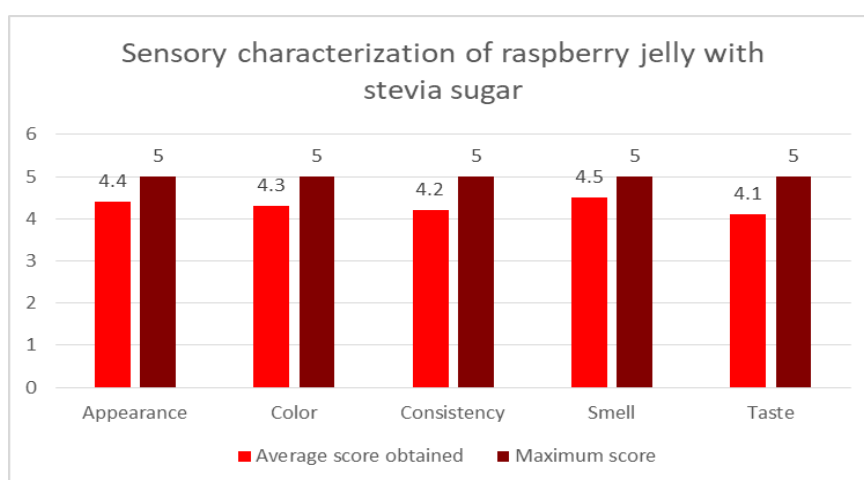


Figure 2. Graphic representation of sensory analysis of stevia sugar raspberry jelly

In the case of the raspberry jelly obtained by adding stevia sugar, the most appreciated characteristic was the smell (average score: 4.5 points) followed by the

appearance (4.4 points) with little difference. The least appreciated was the taste (4.1 points).

The results of the physicochemical examination of the samples are presented in the following figure.

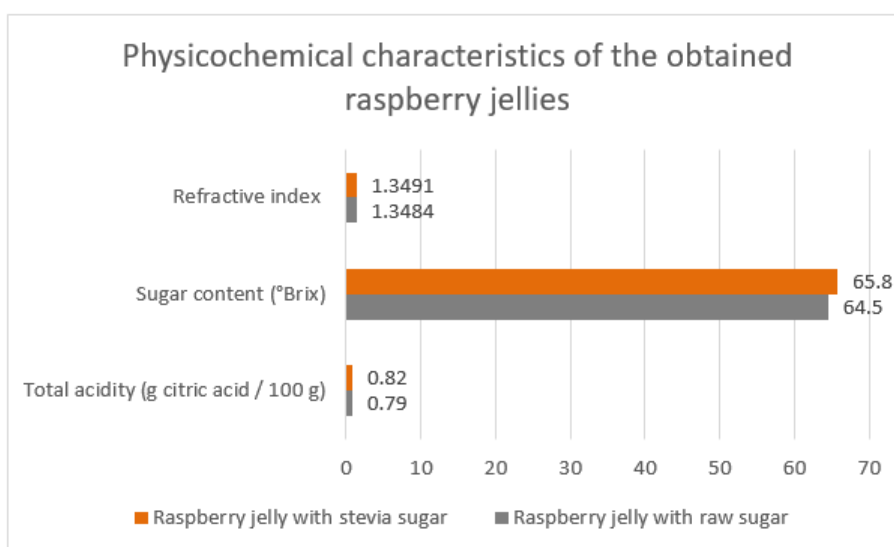


Figure 3. Physicochemical characteristics of the raspberry jelly samples

4. Conclusion

2 types of jelly were obtained (raspberry jelly with raw sugar and raspberry jelly with stevia sugar), which were subsequently analyzed from sensory and physicochemical point of view, noting the following aspects:

- The most appreciated characteristic of raspberry jelly with stevia sugar was the smell, with an average score of 4.5 points, being followed by the appearance, with a slight difference (4.4 points). The least appreciated was the taste with an average score of 4.1 points;
- The most appreciated characteristics of raspberry jelly with raw sugar were the smell and the taste with an average score of 4.5 points, respectively 4.4 points, but also the appearance with a score of 4.2 points. Color and consistency scored lower than the characteristics listed above;
- Regarding the physicochemical analyzes performed (determination of total acidity, sugar content and refractive index) for the 2 samples of raspberry jelly, higher values were obtained in the case of raspberry jelly with stevia sugar, for all 3 monitored characteristics.

Following the bibliographic study carried out, as well as the analyzes carried out, we consider that the daily consumption of raspberries from any source (jelly, candies, syrup, jam, juice, etc.) helps the human body to function better and to maintain its health.

Conflict of Interest. Author has declared that no competing interests exist.

Compliance with Ethics Requirements. Authors declare that they respect the journal's ethics requirements. Authors declare that they have no conflict of interest and all procedures involving human / or animal subjects (if exist) respect the specific regulation and standards.

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