Chemical and Sensorial Evaluation of a Newly Developed Bean Jam

Raquel P. F. Guiné
Ana R. B. Figueiredo
Paula M. R. Correia
Fernando J. Gonçalves
Objective

Develop a new food product that brings together:
• Innovation
• Pleasure
• Healthy food
1.7 Million deaths
Due to low consumption of fruits and vegetables
Assure benefits and protecting effect
It is important to increase plant food consumption in every possible form

Obesity
Diabetes type 2
Cancer
Cardiovascular diseases
Constipation
Among others
<table>
<thead>
<tr>
<th>Raw materials</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beans</td>
<td>Is one of the most important sources of protein in human diets. It offers health benefits in the prevention and reduction of diabetes, obesity, heart disease and chronic disorders.</td>
</tr>
<tr>
<td>Apples</td>
<td>Is the most consumed fruit in Europe. It presents health benefits by being rich in phenolic compounds including flavonoids and fiber.</td>
</tr>
<tr>
<td>Carrots</td>
<td>It is among the most consumed plant foods for having a nice color and flavor. It is rich in fiber, carotenes, vitamins, minerals and other bioactive compounds.</td>
</tr>
</tbody>
</table>
The product, bean jam, aimed to associate the benefits of beans with the consumption of fruit and vegetables. In this work three jam formulations have been developed, from a base constituted on apple and carrot, to which was added bean cooking water.
## Product formulation

**Maceration (6 to 12h)**

**Boiling**

- **Water from boiling the beans**
- **Rich in nutrients**

<table>
<thead>
<tr>
<th>Code</th>
<th>PRODUCT DESCRIPTION</th>
<th>FORMULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BJA</td>
<td>Bean jam with apple</td>
<td>1.9 kg raw apple 0.9 kg sugar 1.5 L bean boiling water</td>
</tr>
<tr>
<td>BJAC</td>
<td>Bean jam with apple and cinnamon</td>
<td>1.9 kg raw apple 0.9 kg sugar 1.5 L bean boiling water 10 cinnamon sticks</td>
</tr>
<tr>
<td>BJC</td>
<td>Bean jam with carrot</td>
<td>1.5 kg raw carrot 0.9 kg sugar 1.5 L bean boiling water</td>
</tr>
</tbody>
</table>
Chemical analyses

- Determination of lipids – Method Soxhlet
- Determination sugars (ºBrix) – Refractometry
- Determination antioxidant activity – Method ABTS
- Determination of crude fibre – Method Weende
- Determination of protein – Method Kjeldahl
Sensorial analysis

Product acceptability

Ordering Proof
- Bean jam with carrot
- Bean jam with apple and cinnamon
- Bean jam with apple
- Carrot jam
- Apple jam

2 tests

Sensorial profile
- Bean jam with carrot
- Bean jam with apple and cinnamon
- Bean jam with apple

Scale 1 to 5
- Colour
- Aroma
- Consistency
- Sweetness
- Taste
- Global appreciation

Raquel Guiné et al. Chemical and Sensorial Evaluation of a Newly Developed Bean Jam
Prospective market study

Study the preferences and choices of potential consumers

On-line questionnaire

Quantitative study

1110 respondents

Between 18 and 67 years

Gender

- Female: 23%
- Male: 77%

Age group

Frequency (%)
Results
Sensorial analysis
Ordering proof

BJC – bean jam with carrot
WJC – water jam with carrot
BJAC – bean jam with apple and cinnamon
WJA – water jam with apple
BJA – bean jam with apple
Sensorial analysis

Sensorial profile

Raquel Guiné et al. Chemical and Sensorial Evaluation of a Newly Developed Bean Jam
Prospective market study

Do you regularly consume jams?

- Yes: 45%
- No: 55%

When do you eat jams?

- Breakfast: 41%
- Meal/Dessert: 11%
- Tea: 73%
- Other: 7%

Brand preference

- White brands: 36%
- Registered brands: 64%
**Prospective market study**

### Importance for Quality/Price

- **Yes**: 88%
- **No**: 13%

### Would you be willing to try a new jam?

- Bean jam with apple: 18%
- Bean jam with carrot: 14%
- Bean jam with apple and cinnamon: 67%

### Relevant characteristics

- **Variety**: 52%
- **Health benefits**: 40%
- **Nutritional value**: 41%
- **Package**: 6%
- **Shelf life**: 40%
- **Price**: 65%
- **Brand**: 13%

**Frequency (%)**
The jams produced with the water from boiling beans are very rich in sugars, particularly the two variations with apple.

As to fiber, the bean jam with apple and cinnamon was richer when compared to the other two.

The fat content was similar on both samples made with apple and higher in the sample made with carrot.

The antioxidant activity was found to be in the ranges reported in literature for similar products.
The sensory analysis showed that the product preferred was the bean jam with apple and cinnamon (with generally higher scores, including overall assessment).

Still, the color was better for the bean jam with carrot and the consistency for the bean jam with apple.

Regarding the market study it was concluded about the possible interest of the potential consumers in experiencing these innovative products.

Among the three possibilities, the inquired chose the bean jam with apple and cinnamon as the product they would most be willing to try.
Acknowledgment

Thanks to CI&DETS Research Centre and Polytechnic Institute of Viseu for Financial support