Sensory Analysis of Pomegranate Peel Powder in the Development of Value Added Food Products

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Abstract: The present study entitled “Sensory analysis of pomegranate peel powder in the development of value added food products” was carried out with the objective to prepare value added food product by incorporation of pomegranate peel powder, to possess the sensory acceptability of the developed value-added food product, to determine the nutritive value and cost of the prepared value-added food product. The products namely were “bread”, “cookies”, were prepared by the incorporation of pomegranate peel powder in different proportions T₁(95g wheat flour+5g pomegranate peel powder) and T₂(90g wheat flour +pomegranate peel powder). T₁(85g wheat flour+15g pomegranate peel powder)respectively for each of the product. On the basis of sensory evaluation it was observed that for bread treatment T₁ and for cookies treatment T₂ scored best regarding color and appearance, body and texture, taste and flavor and overall acceptability of the product. Sensory evaluation was carried out by using the nine point Headonic scale.

Keywords: Pomegranate peel, Sensory evaluation

1. Introduction

Pomegranate (Punica granatum L.) fruits are widely consumed, fresh and in commercial products, such as juices, jams and wines. Pomegranate rind is a rich source of hydrolysable tannins of the ellagitannin group. Pomegranate rind extracts have recently attracted interest because of their potential use as natural food preservatives and nutraceuticals (Negi et al., 2003). Pomegranate fruits peel is an inedible part obtained during processing of pomegranate juice. Pomegranate peel is a rich source of tannins, flavonoids and other phenolic compounds (Li et al., 2006). Demand for whole wheat bread has increased considerably in the last few years because of its better nutritional image and an increasing preference for its organoleptic characteristics. Bread and baked products are the most important sources of dietary fiber in the total food consumption. Bread with high fiber addition in general is cereal diet and is more effective than low carbohydrate diabetic diet in the control of maturity-onset diabetes. Many studies on high non soluble fiber bread are available but there are not sufficient works on high fiber bread with low phytic acid content, to reduce serum cholesterol. The study aimed to determine the influence of enrichment of wheat bread with various levels of the food industry by-products; pomegranate peels flour via chemical and organoleptic analysis. (Abdel Moneim E. Suleiman, Wisal A. M. Babiker, Vajid N. Veetil (2016).

2. Justification

Fruit peel is generally discarded in majority of fruits even when it is safe for consumption. Indeed, the peel is being recognized as one of the essential components of our diet as it contains many vital nutrients and non-nutrient compounds which play an important role in the well being. Peels of pomegranate get washed in a large amount at the juice corners etc, whereas it can be consumed easily to make food healthier and tastier. Pomegranate peel is a rich source of flavonoids which are powerful antioxidant substances and can protect cells from cancer-causing free radicals. Although the fruits itself are said to contain flavonoids, but the highest concentration of flavonoids and phenolic compounds are contained in the skin.. (Rowayshed et al., 2013)

Objective

Therefore, this study was undertaken with the following objectives:
1) To assess the sensory acceptability of the developed value-added products.

3. Materials and Methods

The details of the materials, procedures to be followed and techniques to be adopted during the course of present investigation have been elaborated in this chapter under the following heads:
- Experimental site
- Procurement of raw materials
- Development of value-added food products
- Organoleptic evaluation
- Experimental design

3.1 Experiment site

The present study was carried out in the Nutrition Research Laboratory of the Department of Food Nutrition and Public Health, Ethelind College of Home Science, Sam
Higginbottom University of Agriculture, Technology and Sciences, Prayagraj.

3.2 Procurement of Raw Materials

The main raw material was pomegranate peels which will be collected from the local fruit shops /juice shop of Prayagraj. Rest raw materials required for the study will be purchased from the local market of Prayagraj.

3.3 Preparation of Pomegranate Peel Powder

- Pomegranate (free from insects and diseases)
- Washing (to remove micro-organism and dirt) and Peeling
- Spreading on flat wooden trays
- Drying in hot air oven at 50°-60°C (6-7hrs)
- Dehydration till moisture becomes 6.8 percent
- Grinding
- Packaging (polythene bags or air tight containers)
- Storage (at ambient temperature in dry place)

Source: - Srivastava and Kumar (2009)

3.4 Development of Value-Added Products

Value added products were developed by incorporating pomegranate peel powder. The value added product developed was to be “bread”, “cookies”. The standard recipe of selected product was served as control (T0) three treatments i.e. incorporated by pomegranate peel powder on different levels was refers as T1, T2, T3 respectively of the products. The products were prepared by using standard recipes.

3.5 Experimental Design

Details of treatments: The basic recipes were standardized and serve as control T0. Three treatments i.e. incorporation of pomegranate peel powder at different levels referred to as T1, T2 and T3 respectively for four products developed. The treatments of the product are shown in the table below:

3.5.1 Details of treatments

<table>
<thead>
<tr>
<th>Name of the snacks</th>
<th>Product treatment</th>
<th>Wheat</th>
<th>Pomegranate Peel Powder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread</td>
<td>T0</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>95%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>85%</td>
<td>15%</td>
</tr>
<tr>
<td>Cookies</td>
<td>T0</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>95%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>85%</td>
<td>15%</td>
</tr>
</tbody>
</table>

The treatments were prepared as follows:

T0 (control): In this standardized recipe were followed to prepare the products without incorporation of pomegranate peel powder.

T1 (5 percent): In this treatment 5 percent pomegranate peel powder is added to the product incorporated with wheat.

T2 (10 percent): In this 10 percent pomegranate peel powder is added to the product incorporated with wheat.

T3 (15 percent): In this treatment 15 percent pomegranate peel powder is added to the product incorporated with wheat.

Replications: The experiment was replicated three times to get an average value.

3.6 Organoleptic Analysis of the Developed Product

The sensory evaluation of the prepared product was done by the panel of 5 judges selected from the faculty member of the Ethelind College of Home Science. The various sensory attributes like color and appearance, body and texture, flavor and taste, overall acceptance will be assessed. The sample was placed before the judges with sample code. The evaluation will be done on the 9 points Hedonic scale-based score card. (Srilakshmi, 2011)

3.7 Statistical Analysis

The data was analyzed by using ANOVA, CD and other appropriate statistical analytical methods (Chandel, 2006).

4. Result and Discussion

Organoleptic characteristics of the prepared products

Organoleptic characteristics of Bread

<table>
<thead>
<tr>
<th>Table 4.1: Average sensory score of bread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>T0</td>
</tr>
<tr>
<td>T1</td>
</tr>
<tr>
<td>T2</td>
</tr>
<tr>
<td>T3</td>
</tr>
</tbody>
</table>

Colour

It shows the mean sensory scores of bread in relation to color indicates that T1 had the highest score 8.4 followed by T0 (8.16), T2 (7.73) and T3 (7). It is quite obvious that treatment T1 was liked very much and treatment T3 was liked moderately regarding to the color of bread.

Texture

It shows that the mean sensory scores of bread relation to taste indicates that T0 had the highest score 7.73 followed by T1 (7.7), T2 (7), and T3 (7.36). It is quite obvious that T1 was liked very much whereas T2 was liked moderately regarding the texture of bread.

Taste

It shows that the mean sensory score of bread in relation to taste indicates that that T0 had the highest score 7.73 followed by T1 (7.7), T3 (7.36) and T2 (7). It is quite obvious
from the table T_0 was liked very much whereas treatment T_2 was liked moderately according to the taste.

**Flavor**

Table 4.1.1 shows that the mean sensory score of *bread* in relation to flavor indicates that that T_1 had the highest score 8.13 followed by T_2(7.86), T_3(7.4) and T_0(7.66). It is quite obvious from the table T_1 was liked very much whereas treatment T_3 was liked moderately according to the flavor.

**Overall acceptability**

Table 4.1 shows that the mean sensory score of *bread* in relation to overall acceptability indicates that that T_1 had the highest score 8 followed by T_2(7.86), T_3(7.4). It is quite obvious from the table T_1 was liked very much whereas treatment T_3 was liked moderately according to the overall acceptability of *bread*.

**Organoleptic characteristic of cookies**

<table>
<thead>
<tr>
<th>Control and treatments</th>
<th>Color</th>
<th>Texture</th>
<th>Taste</th>
<th>Flavor</th>
<th>Overall Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>T_0</td>
<td>7.73</td>
<td>7.53</td>
<td>7.53</td>
<td>7.33</td>
<td>7.4</td>
</tr>
<tr>
<td>T_1</td>
<td>7.4</td>
<td>7.46</td>
<td>7.4</td>
<td>7.4</td>
<td>7.53</td>
</tr>
<tr>
<td>T_2</td>
<td>7.8</td>
<td>7.66</td>
<td>7.8</td>
<td>7.8</td>
<td>7.86</td>
</tr>
<tr>
<td>T_3</td>
<td>7.93</td>
<td>7.93</td>
<td>7.86</td>
<td>7.8</td>
<td>7.93</td>
</tr>
</tbody>
</table>

**Color**

Table shows that the mean sensory scores of *cookies* in relation to color indicates that T_1 had the highest score 7.93 followed by T_2 (7.8), T_0 (7.73) and T_1 (7.4). It is quite obvious from the table that the treatment T_1 was liked very much whereas treatment T_1 a powder was liked moderately according to the color of *cookies*.

**Taste**

Table shows that the mean sensory scores of *cookies* in relation to taste indicates that T_1 had the highest score 7.86 followed by T_2 (7.8), T_0 (7.53) and T_1 (7.4). It is quite obvious from the table that T_1 was liked very much whereas treatment T_1 was liked moderately according to the taste of *cookies*.

**Flavor**

Table shows that the mean sensory scores of *cookies* in relation to flavor indicates that T_2 and T_3 the highest score 7.8 followed by T_2 (7.4) and T_0 (7.33). It is quite obvious from the table that the treatment T_2 and T_3 was liked moderately regarding the flavor of *cookies*.

**Overall acceptability**

Table shows that the mean sensory scores of *cookies* in relation to overall acceptability indicates that T_1 had the highest score 7.93 followed by T_2 (7.86), T_1 (7.53) and T_0 (7.4). It is quite obvious from the table that the treatment T_1 was liked very much whereas control T_0 was liked moderately regarding the overall acceptability of *cookies*.
5. Conclusion

As the results obtained, it is concluded that pomegranate peels possess good sensory property and many product were made by mixture of the peel powder such as bread, cookies were prepared by the incorporation of pomegranate peel powder in different proportions T1(95g wheat flour +5g pomegranate peel powder) and T2(90g wheat flour + pomegranate peel powder), T3(85g wheat flour +15g pomegranate peel powder) respectively for each of the product. On the basis of sensory evaluation for the products it was observed that for bread treatment T1 and for cookies treatment T1 scored best regarding colour and appearance, body and texture, taste and flavour and overall acceptability of the product.

Score Card for Sensory Evaluation of the Product
Name of the product: 
Date of the Presentation:
Kindly evaluate the given product on the basis of the following scores:
Like extremely 9
Like very much 8
Like moderately 7
Like slightly 6
Neither like nor dislike 5
Dislike slightly 4
Dislike moderately 3
Dislike very much 2
Dislike extremely 1

<table>
<thead>
<tr>
<th>Product</th>
<th>Colour</th>
<th>Texture</th>
<th>Taste</th>
<th>Overall acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>T2</td>
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<td></td>
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<td></td>
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<tr>
<td>T3</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Comments:
Name: Signature:

References


