Effect of *shatavari* root powder on sensory and nutritional composition of biscuits

Priyanka Rani, Varsha Rani, Darshan Punia and Reena

**Abstract**

*Shatavari* (*Asparagus racemosus*) is a perennial climbing shrub and its medicinal properties have been reported in traditional systems of medicine such as Ayurveda, Siddha and Unani. The present study was conducted to develop value added sweet and salty biscuits using *shatavari* root powder and analyze its sensory and nutritional characteristics. The *shatavari* root powder was incorporated at 5, 7.5 and 10 per cent of level in Type-I, Type-II and Type III sweet and salty biscuits, respectively. All four types of biscuits i.e. control and value added sweet and salty biscuits were organoleptically acceptable by the judges. Type-I value added sweet and salty biscuits were organoleptically acceptable by the judges. Type-I value added sweet and salty biscuits (SRP: @5%) were found to be ‘liked very much’ whereas Type-II (SRP: @7.5%) and Type-III (SRP@10%) were ‘liked moderately’ by the judges. The crude fibre and ash content of all three types of value added sweet and salty biscuits increased significantly (P≤0.05) as compared to control biscuits. It was concluded that biscuits of enhanced functionality and nutritional value can be developed using SRP up to 10 per cent without compromising its sensory acceptability.

**Keywords:** *Shatavari* root powder, sweet and salty biscuits, sensory characteristics, proximate composition

**Introduction**

*Asparagus racemosus*, a perennial climbing shrub belong to the family Asparagaceae and sub family Liliaceae.[1] It is an indigenous medicinal plant originated to South Asian countries. Its medicinal properties have been reported in traditional systems of medicine such as *Ayurveda*, *Siddha* and *Unani* [2] and have been utilized for primary health care of people since time immemorial. Mostly the roots (powder or extract) of this plant have been used for medicinal purpose under popular local name as ‘*Shatavari* or *Shatavar*’. The roots are fleshy, whitish brown in colour and slightly sweet in taste, however powder obtained from dried roots imparts a slightly bitter after taste.

This herb is highly effective in problems related to female reproductive system[3] and therefore it is also known as ‘women’s herb’ blessed to cure all the ailments of female hormonal problems. It has been investigated by a number of researchers that its roots (powder and extracts) have an ability to improve lactation performance in lactating mothers [4, 5]. Research on the administration of *shatavari* root powder or extracts demonstrated a significant increase in milk secretion with increased growth of the mammary glands and alveolar tissues in mammals [6-13]. Other than lactogenic, it was also effective in ameliorating dysmenorrhea as it contain saponins which hinder the oxytocic activity on uterine musculature, thereby maintain the spontaneous uterine motility, confirming its utility in dysmenorrhea. The plant is also beneficial in female infertility [14], as it enhances folliculogenesis and ovulation, prepares the womb for conception and prevents miscarriages [15]. In recent years, it has become the most important ingredient to be added in female health tonic. *Shatavari* being a known source of phytoestrogens can be effective in reducing adverse menopausal symptoms such as hot flushes, night sweats, palpitations, insomnia and anxiety. *Shatavari* root extract has shown to treat pre eclampsia associated with pregnancy.

Nutrient composition of *shatavari* root powder (per 100g) obtained by chemical analysis showed that the ash content of *shatavari* root powder was found to be 6.13 per cent and the moisture content was 6.03 per cent The protein content obtained in SRP was 2.65 per cent and fat was 3.52 per cent. Dietary fibre was estimated by the AOAC enzymatic - gravimetric method and total dietary fibre was 16.06 per cent while insoluble and soluble dietary fibre were 13.4 and 2.66 per cent, respectively in SRP [16]. Shatavari root powder contained 5.44 per cent saponins, 212 Kcal energy, 2.17 mg of iron and 26mg of calcium [17].

One way to deliver specific health benefit of *shatavari* root powder in a familiar manner is the incorporation of this beneficial ingredient into existing food products. Thus, a conventional
food could be transformed into a functional food with altered nutritional characteristics, but with unchanged sensory attributes. In addition to traditional products, bakery products could be considered to have a great potential to deliver functionality as they are widely consumed throughout the world. Worldwide demand for bakery products is increasing at the rate of 10.07% per annum \[18\]. Among bakery products, biscuits have been widely consumed and their consumption rate is increasing day by day. Even the fast paced life of changing the socio economic conditions with less time for fresh food preparations has also created place for ready to eat food preparation. Keeping in view the nutritional and functional benefits of *shatavari* root powder the present study was conducted to develop sweet and salty biscuits using *shatavari* root powder and analyze its sensory characteristics and proximate composition.

**Materials and methods**

**Procurement of materials**

Fresh *shatavari* (*Asparagus racemosus*) roots were procured in a single lot from Medicinal, Aromatic and Underutilized Plants Section, Department of Genetics and Plant Breeding, CCSHAU, Hisar during the month of February, 2018. Other ingredients required for the preparation of value added sweet and salty biscuits and packaging material were purchased from the local market in a single lot.

**Preparation of shatavari root powder**

The procured fresh *shatavari* roots were washed, cleaned, blanched in distilled water (1:5 w/v) at 80 °C for 3-4 minutes followed by immediate wash with cool distilled water. After blanching roots were dried in shade for 6 hrs. to evaporate the excessive moisture, finally dried in the hot air oven at 50±5 °C for 6 hrs. The dried roots were grinded in electric grinder and sieved through 60 mesh sieve; stored in the airtight low density polyethylene bags for further use. Blanching of roots was done to reduce the bitterness and enhance the level of incorporation of *shatavari* root powder (SRP) in product.

**Standardization and development of value added sweet and salty biscuits**

Recipe for sweet and salty biscuits was standardized then control sweet and salty biscuits was developed using whole wheat flour (100%). Value added sweet and salty biscuits were developed by substituting wheat flour with 5, 7.5 and 10 per cent of SRP.

**Results**

**Sensory characteristics of sweet and salty biscuits**

Mean score of colour of control sweet and salty biscuits prepared from wheat flour was found in the category of ‘liked very much’ i.e. 8.30. The mean scores of colour for Type-I (8.20) and Type-II (8.10) value added sweet and salty biscuits were comparable to that of control biscuits. The mean score of colour of Type-III biscuits was ranked 7.90 which was ‘liked moderately’ by the panellists (Table 1). The mean score for appearance of control sweet and salty biscuits was 8.30 and ‘liked very much’ by the judges. Mean score of appearance of value added sweet and salty biscuits developed using *shatavari* root powder i.e. Type-I, Type-II and Type-III were 8.00, 7.70 and 7.60, respectively.
Aroma of wheat flour made sweet and salty biscuits (control) and Type-I sweet and salty biscuits prepared using *shatavari* root powder was ‘liked moderately’ with mean scores 8.30 and 8.10, respectively. However, mean scores of Type-II and Type-III sweet and salty biscuits were 7.80 and 7.70, respectively and were ‘liked moderately’ by the judges. Mean scores of texture of control sweet and salty sweet biscuits was 8.30 (liked very much). Value added sweet and salty biscuits made with 5 and 7.5 per cent of SRP got similar score i.e. 7.70 for texture and Type-III sweet and salty biscuits with 10 per cent of *shatavari* root powder got lowest 7.60 mean score for texture. However, mean scores of textures for all types of value added sweet and salty biscuits were lying in the category of ‘liked moderately’ (Table 1 and Figure 1).

Mean score of taste of control sweet and salty biscuits was 8.40 (liked very much). However, mean scores of taste of Type-I, Type-II and Type-III sweet and salty biscuits made with *shatavari* root powder were 8.00, 7.90 and 7.70, respectively. Overall acceptability scores of control sweet and salty biscuits made from wheat flour (control) was 8.26 whereas value

### Table 1: Sensory characteristics of sweet and salty biscuits developed using *shatavari* root powder

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Colour</th>
<th>Appearance</th>
<th>Aroma</th>
<th>Texture</th>
<th>Taste</th>
<th>Overall acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (WF:100)</td>
<td>8.30±0.15</td>
<td>8.30±0.21</td>
<td>8.30±0.21</td>
<td>8.00±0.25</td>
<td>8.40±0.16</td>
<td>8.26±0.18</td>
</tr>
<tr>
<td>Type-I</td>
<td>8.20±0.20</td>
<td>8.00±0.21</td>
<td>8.10±0.21</td>
<td>7.70±0.22</td>
<td>8.00±0.16</td>
<td>8.00±0.17</td>
</tr>
<tr>
<td>Type-II</td>
<td>8.10±0.23</td>
<td>7.70±0.21</td>
<td>7.80±0.20</td>
<td>7.70±0.26</td>
<td>7.90±0.23</td>
<td>7.84±0.19</td>
</tr>
<tr>
<td>Type-III</td>
<td>7.90±0.23</td>
<td>7.60±0.16</td>
<td>7.70±0.21</td>
<td>7.60±0.22</td>
<td>7.70±0.31</td>
<td>7.49±0.18</td>
</tr>
<tr>
<td>C.D. (P&lt;0.05)</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>0.65</td>
<td>0.51</td>
</tr>
</tbody>
</table>

Values are Mean ±SE of three independent determinations. NS- Non-significant; WF: Wheat flour; SRP: *Shatavari* root powder

### Table 2: Proximate composition of sweet and salty biscuits

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Moisture</th>
<th>Crude fat</th>
<th>Crude protein</th>
<th>Crude fibre</th>
<th>Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (WF:100)</td>
<td>3.30±0.01</td>
<td>23.78±0.07</td>
<td>8.15±0.42</td>
<td>1.55±0.04</td>
<td>2.15±0.01</td>
</tr>
<tr>
<td>Type-I</td>
<td>3.00±0.15</td>
<td>23.62±0.01</td>
<td>7.65±0.21</td>
<td>2.01±0.06</td>
<td>2.66±0.04</td>
</tr>
<tr>
<td>Type-II</td>
<td>2.89±0.05</td>
<td>23.56±0.05</td>
<td>7.41±0.35</td>
<td>2.22±0.09</td>
<td>2.78±0.02</td>
</tr>
<tr>
<td>Type-III</td>
<td>2.87±0.13</td>
<td>23.29±0.46</td>
<td>7.22±0.31</td>
<td>2.49±0.11</td>
<td>3.14±0.03</td>
</tr>
<tr>
<td>C.D. (P&lt;0.05)</td>
<td>NS</td>
<td>NS</td>
<td>0.22</td>
<td>0.26</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Values are Mean ±SE of three independent determinations. * Fresh weight basis; NS-Non-significant Values with similar superscripts do not differ significantly.

### Discussions

Sweet and salty biscuits developed under the present were found to be organoleptically acceptable by the judges. Type-I value added sweet and salty biscuits (SRP: @5%) were found to be ‘liked very much’ whereas Type-II (SRP: @7.5%) and Type-III (SRP@10%) were ‘liked moderately’ by the judges. The crude fibre and ash content of all three types of value added sweet and salty biscuits increased significantly.

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Moisture, crude fat, crude protein, crude fibre and ash content of all the three types of value added sweet and salty biscuits ranged from 2.87 to 3.00, 23.29 to 23.62, 7.22 to 7.65, 2.01 to 2.49 and 2.66 to 3.14 per cent, respectively. Maximum contents of crude fiber and ash were observed in Type-III value added sweet and salty biscuits, whereas the maximum contents of crude protein and crude fat were found in control sweet and salty biscuits (Table 2).
(P≤0.05) as compared to control biscuits. It had been reported that shatavari root powder contains 16.06 per cent of total dietary fibre and 6.13 per cent of ash content [16] this can be fact that the incorporation of shatavari root powder enhanced ash content and fibre content of biscuits. Nutan [20] and Rana [21] reported similar results for value added products developed using the tulsi and marwa leaves powder, respectively. They reported that tulsi and marwa leaves powder incorporated products had significantly higher content of crude fiber, ash, total dietary fiber, soluble dietary fiber, insoluble dietary fiber, calcium, iron, zinc, total phenolic content and DPPH free radical scavenging activity as compared to unsupplemented control products. developed multi-grain herbal biscuits i.e. S1, S2 and S3 by utilization of 2, 4 and 6 per cent of SRP powder. Gupta et al. [22] developed multi grain biscuits were investigated for the nutritional characteristics. Roots of Shatavari were cleaned, washed and dried in cabinet dryer at 50 °C. Ash content of biscuits ranged from 1.05 to 1.42 per cent. Mehta [23] developed low cost nutritious biscuits with ayurvedic formulation. Three different herbs shatavari, ashwagandha and yastimadhu were incorporated in the powder form to enhance the functionality of biscuits. The biscuits contained fair amount of carbohydrates (65%), fat (25%), protein (7%) and fibre (0.68%). The results indicated that newly formulated biscuits were widely accepted by the consumers mainly due to its low cost and health benefits and it was also reported that these herbal powders retain the active component without decomposition even after baking process.

Conclusion
Thus it may be concluded that incorporation of shatavari root powder to develop value added biscuits may enhance the functionality and nutritional value of the biscuits. Consuming SRP incorporated biscuits will not improve only the nutritional status of consumers but it will also uplift the health status as the consumer will be benefited with medicinal value of SRP in melodious taste of biscuits. The SRP up to 10 per cent level can be incorporated successfully in the development of biscuits without compromising its sensory acceptability.

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References