



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(5): 523-526
Received: 25-07-2019
Accepted: 27-08-2019

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

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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 (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 ($P \leq 0.05$) 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.

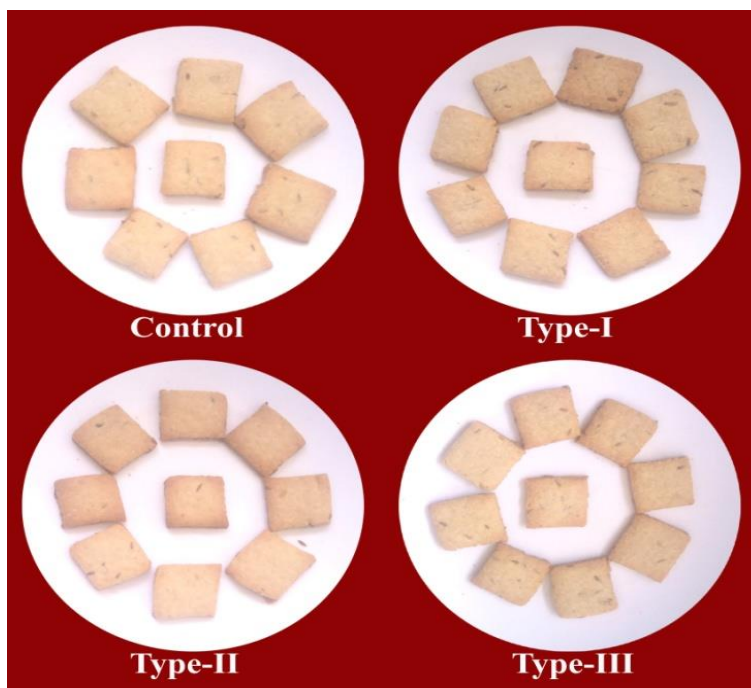


Plate 1: Sweet and salty biscuits prepared using wheat flour alone (Control), with 5% (Type-I), 7.5% (Type-II) and 10% (Type-III) incorporation of *Shatavari* root powder

Sensory evaluation of developed sweet and salty biscuits

Developed sweet and salty biscuits were subjected to sensory evaluation with respect to color, appearance, aroma, texture, taste and overall acceptability by a panel of 10 semi trained judges, using 9 point hedonic scale.

Proximate composition

Moisture, crude protein, crude fat, crude fibre and ash content of developed control and value added sweet and salty were analyzed using standard methods of AOAC^[19].

Statistical analysis

Data were statistically analyzed using online software OPSTAT available at University website hau.ac.in. The statistical test applied was one-way ANOVA.

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).

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

Treatment	Colour	Appearance	Aroma	Texture	Taste	Overall acceptability
Control (WF:100)	8.30±0.15	8.30±0.21	8.30±0.21	8.00±0.25	8.40±0.16	8.26±0.18
Type-I	8.20±0.20	8.00±0.21	8.10±0.21	7.70±0.22	8.00±0.16	8.00±0.17
Type-II	8.10±0.23	7.70±0.21	7.80±0.20	7.70±0.26	7.90±0.23	7.84±0.19
Type-III	7.90±0.23	7.60±0.16	7.70±0.21	7.60±0.22	7.70±0.31	7.49±0.18
C.D.($P \leq 0.05$)	NS	NS	NS	NS	0.65	0.51

Values are Mean ±SE of ten independent observations. NS- Non-significant;

WF: Wheat flour; SRP: *Shatavari* root powder

Type-I: SRP@5%; Type-II: SRP@7.5%; Type-III: SRP@10%

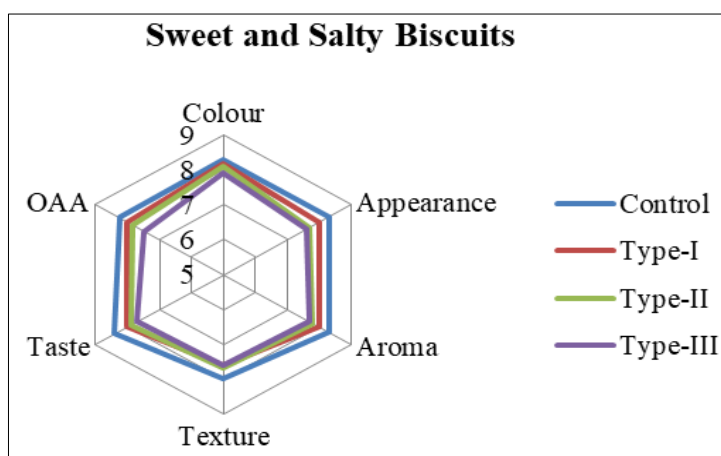


Fig 1: Sensory characteristics of sweet and salty biscuits developed using *shatavari* root powder

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

added sweet and salty biscuits developed using *shatavari* root powder i.e. Type-I, Type-II and Type-III obtained mean score for overall acceptability as 8.00, 7.84 and 7.49, respectively.

Proximate composition of sweet and salty biscuits

Table 2: Proximate composition of sweet and salty biscuits developed using *shatavari* root powder (% , on dry weight basis)

Treatment	Moisture*	Crude fat	Crude protein	Crude fibre	Ash
Control (WF:100)	3.30±0.01 ^a	23.78±0.07 ^a	8.15±0.42 ^c	1.55±0.04 ^a	2.15±0.01 ^a
Type-I	3.00±0.15 ^a	23.62±0.01 ^a	7.65±0.21 ^b	2.01±0.06 ^b	2.66±0.04 ^b
Type-II	2.89±0.05 ^a	23.56±0.05 ^a	7.41±0.35 ^a	2.22±0.09 ^{bc}	2.78±0.02 ^b
Type-III	2.87±0.13 ^a	23.29±0.46 ^a	7.22±0.31 ^a	2.49±0.11 ^c	3.14±0.03 ^c
C.D. ($P \leq 0.05$)	NS	NS	0.22	0.26	0.08

Values are Mean ±SE of three independent determinations. * Fresh weight basis; NS-Non-significant

Values with similar superscripts do not differ significantly.

Type-I: SRP@5%; Type-II: SRP@7.5%; Type-III: SRP@10%

WF: Wheat flour; SRP: *Shatavari* root powder

Moisture, crude fat, crude protein, crude fiber 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).

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

($P \leq 0.05$) 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 nutritive 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.

Acknowledgement

Authors highly acknowledge University Grant Commission (UGC) for providing financial support under NET/JRF fellowship during this research work.

References

- Chadha YR. The wealth of India: A dictionary of Indian raw materials and industrial products, National Institute of Science Communication and Information Resources, Council of Scientific & Industrial Research. New Delhi, 2003, 470-471.
- Alok S, Jain SK, Verma A, Kumar M, Mahor A, Sabharwal M. Plant profile, phytochemistry and pharmacology of *Asparagus racemosus* (*Shatavari*): A review. Asian Pacific Journal of Tropical Diseases. 2013; 3(3):242-251.
- Kumar S, Mehla RK, Dang AK. Use of *Shatavari* (*Asparagus racemosus*) as galactopoeitics and therapeutic herb-A Review. Agricultural Review. 2008; 29(2):132-138.
- Khan SS, Chaghtai SA, Siddiqui MA, Khan SM. Indian medicinal plants, II: *Asparagus racemosus* Willd. Acta Clinica Scientia. 1991; 1(2):65-69.
- Shelukar PS, Dakshinkar NP, Chaudhary A. Evaluation of herbal galactogogues. Indian Practical. 2000; 39:1023-1026.
- Meites J. Proceedings of the first international pharmacology meeting. London: Pergamon Press. 1962; 1:151.
- Joglekar GV, Ahuja RH, Balwani JH. Galactogogue effect of *Asparagus racemosus*. Indian Medical Journal. 1967; 61:165.
- Sabnis PB, Gaitonde BB, Jetmalani M. Effects of alcoholic extracts of *Asparagus racemosus* on mammary glands of rats. Indian Journal of Experimental Biology. 1968; 6(1):55-57.
- Patel AB, Kanitkar UK. *Asparagus racemosus* Willd. Form Bordi, as a galactogogue, in buffaloes. Indian Veterinary Journal. 1969; 46:718-721.
- Sholapurkar ML. Lactare for improving lactation. Indian Practical. 1986; 39:1023-1026.
- Narendranath KA, Mahalingam S, Anuradha V, Rao IS. Effect of herbal galactogogue (Lactare) a pharmacological and clinical observation. Medical Surgery. 1986; 26:19-22.
- Vihan VS, Panwar HS. A note on galactagogue activity of *Asparagus racemosus* in lactating goats. Indian Journal of Animal Health. 1988; 27:177-178.
- Bhutada SG. Effect of herbal antistressor AV/ASE/14 and galactagogue Payapro on milk production in buffaloes during summer. Indian Veterinary Medical Journal. 1999; 23(2):135-136.
- Frawley D. Ayurvedic Healing: A Comprehensive Guide. Motilal Banarsidass Pub. Pvt. Limited, Delhi, 1997.
- Naik BJ. Management of preeclampsia by Ayurvedic drugs. Journal of National Integrated Medical Association. 1988; 30(7):7-12.
- Babat US. Investigations of nutritive value of *Asparagus racemosus* - an Analytical Approach. Chapter II. 2006. Chemistry Department, University of Pune, Pune, 1969.
- Kumari S, Gupta A. Nutritional composition of dehydrated Ashwagandha, *Shatavari*, and ginger root powder. International Journal of Home Science. 2016; 2(3):68-70.
- Kamaljit K, Baljeet S, Amarjeet. Preparation of bakery products by incorporating pea flour as a functional ingredient. American Journal of Food Technology. 2010; 5:130-135.
- AOAC. Official Methods of Analysis. Association of official analytical chemist. Washington, D.C. Arhaliass, A., Legrand, 2000.
- Nutan. Nutritional and sensory evaluation of value added products developed from maize-oat-tulsi flour blends. 2015. Ph.D. Thesis. Dept. of Foods and Nutrition, CCSHAU, Hisar, 125004.
- Rana. Nutritional evaluation and acceptability of value added products based on composite flour (pearl millet-sorghum-mung bean-marwa), 2015. Ph. D. Thesis. Dept. of Foods and Nutrition, CCSHAU, Hisar, 125004.
- Gupta S, Bishnoi JP, Shree A, Alifiya. Processing and utilization of *Asparagus racemosus* for development of herbal biscuits. International Journal of Chemical Studies. 2018; 6(3):48-51.
- Mehta M. Development of low cost nutritive biscuits with Ayurvedic formulation. International Journal of Ayurvedic and Herbal Medicine. 2013; 3(3):1183-1190.