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## Studies on preparation of medicinal Shatavari cookies

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**Abstract**

The present investigation on “Studies on preparation of medicinal (Shatavari) cookies” was undertaken to explore the underutilized or neglected but highly nutrient rich shatavari powder in bakery products. Shatavari powder is a rich source of alcohol, phenolic compounds, alkaloids and can be utilized in bakery products such as cookies. The prepared cookies were analyzed for nutritional composition. The changes occurred during storage of cookies were also studied.

Preliminary experiments were conducted to find out optimum level of shatavari powder for preparation of quality cookies. The quality cookies were prepared from 6% shatavari powder and 94% refined wheat flour. Chemical composition of shatavari powder showed that the moisture content was 6.26%, carbohydrates 54.13%, protein 12.18%, fat 0.80%, crude fiber 2.72%, calcium 26.12 mg/100g and iron 10.17 mg/100g. The fresh cookies had 9.18% moisture, 15.18% protein, 26.32% fat, 3.22% crude fibre, 72.32% carbohydrates, 31.22 mg/100g calcium and 8.16 mg/100g iron. The sensory evaluation of cookies was carried out regularly at an interval of one month. The mean score for colour and appearance was 8.12, texture 7.87, flavour 7.81, taste 7.54 and overall acceptability was 7.43 on 9 point hedonic scales. Storage study of cookies showed that the cookies prepared by incorporation of 6% shatavari powder and 94% refined wheat flour packed in polypropylene (PP) and low density polyethylene (LDPE) can be stored up to 3 months in good quality with minimum losses in sensory, nutritional and textural characteristics.

**Keywords:** Preparation, medicinal, Shatavari, cookies, Chemical

**Introduction**

Bakery products have become more popular in India since the earlier times. Among the different bakery products cookies constitutes the most popular group. Cookies were invented very early. They could be kept for long time because their moisture content is very low. Cookies are chemically leavened bakery product containing high percentage of fat and sugar (Navy 1980)<sup>[4]</sup>.

Shatavari (*Asparagus racemosus Wild*) a climbing ayurvedic plant, is known for its numerous activities such as hyperlipidemia, hypertension, angina, dysmenorrhea, anxiety disorders, benign prostatic hyperplasia (BPH), leucorrhoea and urinary tract infections. This plant possesses a wide range of secondary metabolites inclusive of steroids, alkaloids, dihydrophenanthrene derivatives, flavonoids, furan derivatives and essential oils (Singla and Jaitak, 2014)<sup>[7]</sup>.

The shatavari root is useful in treating the ailments like dysentery, tuberculosis and diabetes. Commonly, it supports to maintain the health by giving immunity to diseases. It is considered as very good energy provider to the weak body system (Thakur and Sharma, 2015)<sup>[8]</sup>. In the studies reported above, shatavari can be used in powder form. The utilization of shatavari powder in bakery products particularly in cookies can be done. Therefore an attempt has been made to utilize characteristics of cookies, identifying maximum level of incorporation without adversely affecting the quality of cookies and improving the nutritional characteristics of cookies.

**Materials and Methods**

The experiment was conducted in the laboratory of Department of Food Science and Technology, Post Graduate Institute at Mahatma Phule Krishi Vidyapeeth, Rahuri during the year 2019-2020. Shatavari powder was purchased in local market.

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### Packaging material

The packaging materials like polypropylene (PP) and low density polyethylene (LDPE) were purchased from the local market.

### Ingredients

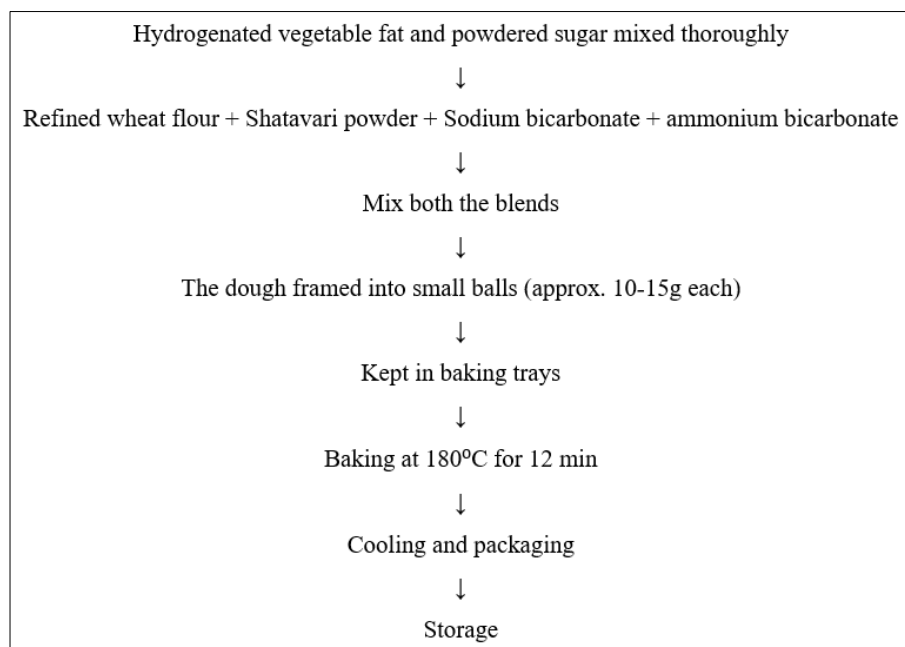
The major ingredients for the preparation of products such as refined wheat flour, sugar and vanaspati ghee were purchased

from local market of Rahuri and other chemicals were used from the laboratory store.

### Method

#### Procedure for preparation of cookies by incorporating shatavari powder

The procedure for preparation of cookies by incorporating shatavari powder is shown in fig. 1.



**Fig 1:** Flow chart for preparation of shatavari cookies

**Table 1:** Treatment details

Treatments	Maida (%)	Shatavari Powder (%)	Treatments	Maida (%)	Ashwagandha powder (%)
T <sub>0</sub>	100	00	T <sub>0</sub>	100	00
T <sub>1</sub>	99	01	T <sub>1</sub>	99	01
T <sub>2</sub>	98	02	T <sub>2</sub>	98	02
T <sub>3</sub>	97	03	T <sub>3</sub>	97	03
T <sub>4</sub>	96	04	T <sub>4</sub>	96	04
T <sub>5</sub>	95	05	T <sub>5</sub>	95	05
T <sub>6</sub>	94	06	T <sub>6</sub>	94	06
T <sub>7</sub>	93	07	T <sub>7</sub>	93	07
T <sub>8</sub>	92	08	T <sub>8</sub>	92	08
T <sub>9</sub>	91	09	T <sub>9</sub>	91	09
T <sub>10</sub>	90	10	T <sub>10</sub>	90	10

### 2.2. Physico-chemical analysis of raw material and cookies

The method described in A.A.C.C. (2000) [1,2] for determining moisture was used. The protein content of cookies was estimated by determining total nitrogen content using standard Micro-Kjeldhal method and fat content of the cookies estimated by the soxhlet method A.A.C.C (2000) [1,2]. The crude fiber content in the product was estimated by A.A.A.C. (2000) [1, 2]. The carbohydrate content in the selected cookies were obtained by subtracting from 100, the sum of values of moisture, protein, fat, ash and crude fiber content per 100 g of the sample (Raghuramulu, *et al.*, 1993) [5]. Calcium and iron were analyzed using atomic absorption spectrometry (AAS).

### Packaging and storage of cookies

The selected treatment (T<sub>6</sub>) i.e. 6% of shatavari powder and 96% refined wheat flour blended cookies was packed in polypropylene (PP) and low density polyethylene (LDPE) and

stored for 90 days. The samples were drawn at an interval of 30 days and evaluated for chemical and sensory quality.

### Sensory evaluation of cookies prepared by incorporation of shatavari powder

Sensory evaluation of cookies prepared by incorporation of shatavari powder was carried on by 9 point hedonic scale. The average scores of the ten judges for different quality characteristics *viz.* colour and appearance, flavour, texture, taste and overall acceptability were recorded.

### Statistical analysis

All experiments were carried out by using Factorial Completely Randomized Design (FCRD). The data obtained in the present investigation were analyzed for the statistical significance according to the procedure given by Rangaswamy (2010) [6].

### Results and Discussion

**Table 2:** Physico-chemical composition of raw materials used in the preparation of cookies

Sr. No.	Physical and Chemical constituents	Mean value (Shatavari powder)	Mean value (Refined wheat flour)
1.	Moisture (%)	6.26	4.16
2.	Protein (%)	12.18	11.0
3.	Fat (%)	0.80	0.90
4.	Crude fiber (%)	2.72	0.72
5.	Carbohydrates (%)	54.13	73.9
6.	Calcium (mg/100 g)	26.12	23
7.	Iron (mg/100 g)	10.17	2.70

\*Each value represents the average of three determinations

**Table 3:** Sensory evaluation of cookies prepared by incorporation of shatavari powder

Sample code	Sensory attributes*					Rank
	Colour and appearance	Texture	Flavour	Taste	Overall acceptability	
T <sub>0</sub>	8.0	8.0	8.0	8.2	8.0	8
T <sub>1</sub>	8.2	8.3	8.1	8.1	8.2	7
T <sub>2</sub>	8.2	8.3	8.3	8.3	8.3	5
T <sub>3</sub>	8.3	8.3	8.4	8.4	8.3	5
T <sub>4</sub>	8.3	8.4	8.5	8.5	8.4	3
T <sub>5</sub>	8.7	8.5	8.6	8.5	8.4	2
T <sub>6</sub>	8.9	8.8	8.8	8.8	8.8	1
T <sub>7</sub>	8.1	8.2	8.2	8.4	8.2	6
T <sub>8</sub>	7.4	7.8	7.8	7.8	7.9	9
T <sub>9</sub>	7.1	7.3	7.4	7.5	7.7	10
T <sub>10</sub>	7.0	7.2	7.2	7.1	7.5	11
Mean	8.03	8.10	8.15	8.18	8.19	-
S.E.±	0.01	0.01	0.03	0.03	0.01	-
C.D at 5%	0.04	0.02	0.10	0.09	0.03	-

The organoleptic evaluation of cookies prepared by different combination of shatavari powder and refined wheat flour were carried out. The cookies were prepared and presented to panel of ten judge for assessing the quality and acceptability of product. Organoleptic evaluation of cookies was carried out using a 9 point hedonic scale of sensory characteristics such as colour, texture, taste and overall acceptability. Treatment T<sub>6</sub> i.e. 6% shatavari powder and 94% refined wheat flour was selected and kept for 3 months for storage study. Chemical analysis and sensory evaluation was done at interval of 30 days.

**Table 4:** Chemical analysis of shatavari powder and refined wheat flour blended cookies during storage

Parameters	Initial				Final			
	T1P1	T1P2	T2P1	T2P2	T1P1	T1P2	T2P1	T2P2
Chemical constituent								
Moisture (%)	4.11	4.11	9.18	9.18	4.31	4.35	9.38	9.40
Protein (%)	12.20	12.20	15.18	15.18	11.96	11.88	14.96	14.88
Fat (%)	25.92	25.92	26.32	26.32	0.52	0.49	26.14	26.11
Crude fiber (%)	0.80	0.80	3.22	3.22	0.64	0.61	3.08	3.04
Carbohydrate (%)	74.70	74.70	72.32	72.32	74.55	74.53	72.16	72.15
Calcium (mg/100g)	22.40	22.40	31.22	31.22	22.23	22.19	31.06	31.02
Iron (mg/100g)	1.70	1.70	8.16	8.16	1.54	1.48	8.01	8.00

Where: T<sub>1</sub> - (100% maida)

T<sub>2</sub> - (94% maida and 6% shatavari powder)

P<sub>0</sub> - Low density polyethylene (LDPE), P<sub>1</sub> - Polypropylene bag (PP)

The data in above Table 4 shows that protein, fat, crude fibre, iron, calcium and carbohydrate contents decreased in T<sub>2</sub> with increasing Shatavari powder concentration, this is due to replacing the refined wheat flour which is major source of the protein and fat. Except moisture all other parameters found decreased in final analysis as compared to initial analysis. Cookies stored in low density polyethylene (LDPE) shows better quality than polypropylene (PP).

#### Changes in sensory parameters of Shatavari powder and refined wheat flour blended cookies during storage

Shatavari powder and refined wheat flour blended cookies (6% Shatavari powder and 94% refined wheat flour) remained in good condition at ambient temperature during the entire storage period of 3 months. The cookies stored in low density polyethylene bags (LDPE) showed good quality than polypropylene (PP) during 3 months of storage. The overall acceptability score of shatavari powder and refined wheat

flour blended cookies was decreased from 8.80 to 6.87 in PP and 8.80 to 7.33 in LDPE.

#### Conclusion

Shatavari powder and refined wheat flour blended cookies prepared with combination of 6% shatavari powder and 94% refined wheat flour was best and it was fairly stable to storage period for chemical composition. The cookies remained in good condition during storage period of 3 month. The cookies stored in LDPE bags showed good quality than polypropylene (PP) during 3 month storage.

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