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Research Article

FORMULATION AND STANDARDISATION OF NUTRACEUTICAL PREPARED WITH *MUDGA* AND *SHATAVARI* FOR HEALTH AND NUTRITION

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ABSTRACT

According to Acharya Kashyapa, *Aahara* is *Mahabheshaja*. Ayurveda is an untapped source of vast information about nutrition providing foods, drinks and regimen. There are healthier and effective replacements for the health supplements available in the market. *Mudga* is a common pulse found in almost every Indian household is fortified with *Shatavari* which is very well known for its *balya rasayana* action

In this study *Palalam* (Ladoo) having reference in Bhavaprakasha Nighantu Kritaanavarga / 132 is made with modifications using *Mudga*, *Shatavari* and *Tugaksheeri*. Formulation, standardization, nutritional analysis, shelf life analysis, sensory tests of *Mudga Shatavari Palalam* is done to confirm its efficacy as a health supplement. All the tests were found to be satisfactory.

The nutritional values of the product showed that it contains higher amount of nutrition, energy, proteins, dietary fiber, vitamin A, vitamin C, calcium, iron and has lower saturated fats, sodium and cholesterol. The *Mudga Shatavari* Ladoo was found to be fit for consumption, highly palatable and nutritive.

Two servings of the product provide a person with 25% of the required daily nutrition. It can be given as a weight supplement to underweight children, lactating mothers, senior citizens, growing children and those having nutritional deficiency disorders and all others in general to improve immunity and to augment the nutrition from their diet.

This formulation can also be used in the form of granules, biscuits etc as required. It can also be provided as part of mid-day meals in schools to improve the nutrition in children.

INTRODUCTION

In Ayurveda health is defined as:

समदोष् समग्ननश्च समधातुमऱक्रिय्।
प्रसन्नात्मेग्ि्यमना् स्स्थ इत्यभभधीयते॥[1] (Su.Su. 15/58)

which means

"One who has balanced Doshas, Agni, properly formed dhatus, proper elimination of waste products or Malas along with peaceful mind and senses is said to be a healthy person."

The prerequisites to attain this include following proper diet (*Aahara*), *Vihara*, *Dinacharya* and *Ritucharya*, which is elaborately mentioned in the classical texts.

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Ayurveda considers *Aahara*, *Nidra* and *Bhramacharya* as *Trayoupasthambhas* of Life (Three Pillars of Life)[2]. *Aahara* is considered as the best sustainer of life[3].

Ayurveda has a rich literary documentation about *Aahara* which are scientifically proven more than 5000 years ago. From ancient classical texts like Charaka Samhitha to newer classics like Bhavaprakasha Nigandu have detailed guidelines about nutrition.

Science of food and nutrition in Ayurveda are so developed that Charaka has categorized all the food items into twelve classes: Corns with bristles, Pulses or legumes, meat, leafy vegetables, fruits, vegetables which are consumed raw, wines, water from different sources. Milk and milk products, products of sugar cane, food preparations and accessory food items such as oils and salt has further sub-categorized these food groups[4].

The usage of nutraceuticals as advocated by Ayurveda can also be classified depending upon the age of the individual, season of consumption, time of consumption, physiological conditions and according to the target organ. There are healthier and effective replacements for the health supplements available in the market.

Mudga is a common pulse found in almost every Indian household is fortified with *Shatavari* (*Asparagus racemosus*). *Shatavari* is very well known for its *balya rasayana* action. *Mudga* which is considered as a *Nithya Abhyasa (Upayogi) Dravya* should be made a of part of our daily diet[5].

This study aims to understand the pharmacognostic actions of combination of *Mudga* and *Shatavari* which can be used for further research studies. It aims to provide a cost effective method of reversing the effects of nutritional deficiency disorders and to provide alternatives to health supplements available in the market.

In this study *Palalam* (Ladoo) which has reference in Bhavaprakasha Nighantu is made with some modifications. The *Palalam* is made using *Mudga*, *Shatavari* and *Tugaksheeri*. Formulation, standardization, nutritional analysis, shelf Life analysis, sensory tests of *Mudga Shatavari palalam* is done to confirm the efficacy as a health supplement.

MATERIALS AND METHODS

Collection of Raw Materials

All the raw materials were procured from the local pharmacies and Moong Dal and Jaggery were collected from grocery stores. The physical impurities were removed from the herbal drugs and they were dried and made into a fine powder to use for the pharmacognostical study.

Method of Preparation

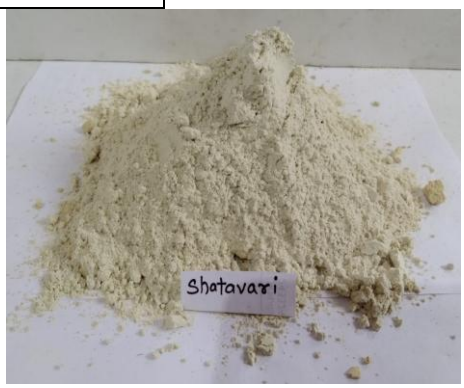
Raw materials required for the preparation of *Mudga Shatavari* Ladoo were collected from the local market. The formulation was prepared as per the reference of Bhavaprakasha Nighantu – Kritaanavarga /132 with some modifications for practicality[6]. The Authentication and standardization of all ingredients was done. The TLC of *Shatavari* and *Mudga Churnam* was also done. Standardisation, Phytochemical test, and TLC of the final product were done. HPTLC of *Shatavari* and the final product was done. Nutritional Value assessment, Shelf Life Study and Sensory test of the final product were done.

Table 1: Ingredients

Mudga Shatavari Palalam
Mudga – 100gm
Shatavari (Rhizome powder) – 15gm
Tugaksheeri – 15gm
Gritha – 10ml
Guda – 50gm
Jala – 100ml
Shuntee Churnam – As *Prakshepa Dravya*
Ela Churnam – As *Prakshepa Dravya*

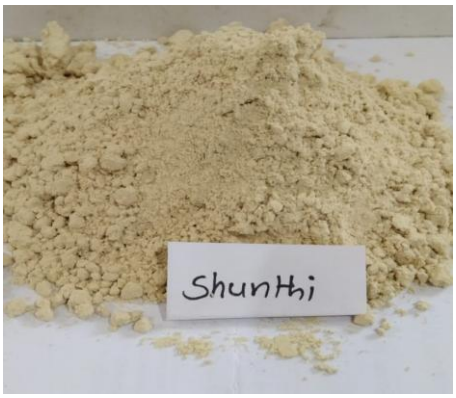
Mudga

Fried *Mudga*

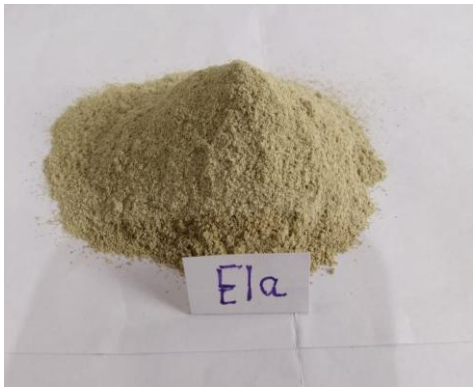


Shatavari

Guda



Shunthi

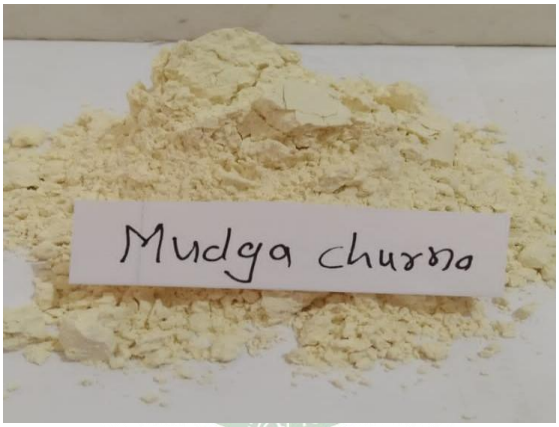


Ela

Method of Preparation

Preparation of *Gudapaka*: 50gm of *Guda* (organic jaggery) is taken along with 100ml water and heated till it attains *Paka* (approx. 50ml).

Preparation of *Palalam*: *Mudga* procured from local market is thoroughly cleaned. It is lightly fried with *Gritha* and then powdered. 100gm of *Mudga* flour is mixed with 15gm of *Shatavari Churnam* and 15gm of *Tugaksheeri*. This mixture is mixed with 10ml of *Gritha* and 50ml of *Gudapaka*. It is then made into *Palalam* (Ladoo) of 25gm each, taking care not to form lumps.



Mudga Churna

Mixing with *Gudapaka*

***Mudga Shatavari* Ladoo**

RESULTS AND DISCUSSION

Organoleptic Study

Organoleptic study of a drug refers to the evaluation of a drug by color, odour, size, shape, taste and special features including touch, texture etc with the help of sense organs. The obtained results of *Mudga Churna, Shatavari Churna* and *Mudga Shatavari* Ladoo are shown.

Table 2: *Mudga Churna, Shatavari Churna* and *Mudga Shatavari*

Description	***Shatavari Churnam***	***Mudga Churnam***	***Mudga Shatavari Ladoo***
Colour	Creamish	Creamish	Brownish
Odour	Faint	Faint	Pungent
Taste	Bitter	Bitter	Bitter and Astringent

Physiochemical Analysis

Physiochemical analysis of *Shatavari Churna, Mudga Churna* and *Mudga Shatavari* Ladoo was done. This test includes determination of pH, loss on drying, total ash content, acid insoluble ash, water soluble extract, alcohol soluble extract.

Table 3: Physiochemical analysis of *Shatavari Churna, Mudga Churna* and *Mudga Shatavari* Ladoo

Description	***Shatavari Churna***	***Mudga Churna***	***Mudga Shatavari Ladoo***
pH	5.32	5.17	4.85
Loss on Drying	NIL	NIL	-
Total Ash Content	3.08%	4.73%	2.63%
Acid Insoluble Ash	NIL	NIL	-
Water soluble extract	25.38%	16.96%	25.26%
Alcohol soluble extract	63.02%	13.59%	-
Moisture Content at 110Deg	-	-	23.45%

Phytochemical Test

Phytochemcial test is a confirmatory qualitative phytochemical screening of plant extracts which is performed to identify the main classes of compounds (tannins, saponins, flavonoids, alchloids, phenols, glycosides, steroids and terpenoids) present in the extracts following standard protocols.

Table 4: Phytochemical test of *Mudga Shatavari* Ladoo

Extracts	*Mudga Shatavari Ladoo*
Alkaloids	Present +++
Tannin	Present ++
Saponin	Present +++
Flavonoids	Present ++

Thin Layer Chromatography

Thin layer chromatography is known as a versatile and high throughput liquid chromatography technique with a wide range of important applications. These applications can be divided into those in direct service of life science such as botany phytochemistry and medicine. The TLC based screening methods often target medicinal plants in the search for various physiological properties of botanical material example the free radical scavenging, anti-microbial and enzyme inhibiting activity.

Table 5: TLC of *Mudga* and *Shatavari*

	Mudga Churna		***Shatavari Churna***		***Mudga Shatavari Ladoo***	
Description	RF Value	Colour	RF Value	Colour	RF Value	Colour
Eye observed	NIL	-	NIL	-	NIL	-
254nm observed	0.85	Yellow	0.85	Yellow	0.83	Yellow
365nm observed	0.83 / 0.85	Yellow	0.85	Yellow	0.83	Yellow
Iodine Chamber	0.83 / 0.85	Brown	0.85	Brown	0.83	Brown

HPTLC of *Shatavari* and *Mudga Shatavari* Ladoo

High Performance Thin Layer Chormatography is the modern version of TLC wherein the principles are same but the practice is fully automated and GLP/ USP/EP compliant.

HPTLC is the fastest, simplest most economical and flexible visible technique which can analyse in parallel more than 100 samples. It is risk free and multiple detections can be done without repeating chromatogram. It is used for the analysis of non-volatile organics such as pharmaceuticals, API's, botanicals, forensics, foods, specialty chemcials etc, for establishing purity, impurities, finger print, identification, quantification and reverse engineering.

HPTLC of *Shatavari* and *Mudga Shatavari* Ladoo was done from Geo-Chem Pvt Ltd. The results are given below:

RESULT

Peak obtained of sample at RF 0.54 is matching with the Standard RF 0.54 at 254 nm.

The sample complies as per specification with respect to above test.

Nutritional Values

The test results of the nutritional values of *Mudga Shatavari* Ladoo shown in Table-16 below show that it contains:

Table 6: Results of the Nutritional values of *Mudga Shatavari* Ladoo

	Recommended Intake For A Young Adult	**Value In 100 Gms of *Mudga Shatavari* Ladoo**
Calories	2000 per day	333.59
Protein	40gm/day	16.2 gm
Fat	20gm	1.2 gm
Dietary Fibre	33gm	6.21 gm
Calcium	800mg	54.64 mg
Iron	16mg	3.38 mg
Vitamin A	1000mcg	0.47 mg

The product contains high amount of nutrition, energy, proteins, dietary fiber, vitamin A, vitamin C, calcium, iron and has lower saturated fats, sodium and cholesterol. It can be considered as a perfect health supplement.

It is evident that two servings of the product provide a person with 25% of the required daily nutrition.

As a health supplement it can be given to underweight children, lactating mothers, senior citizens, growing children and those having nutritional deficiency disorders and all others in general to improve immunity and to augment the nutrition from their diet.

Shelf Life Study

The shelf life of a food is the time period within which the food is safe to consume and/or has an acceptable quality to consumers. By performing shelf life analysis; one can define accurate dates for products, ensuring that the quality remains acceptable and safe for consumers.

Shelf life depends on physical, microbiological and chemical processes taking place in the product when stored under recommended condition. Chemical changes include oxidation of food, change and loss in

colour, change in pH, enzymatic deterioration. Physical tests assessed are moisture content, textural changes, breakage or clumping of food. Microbial assessment for absence of pathogenic microorganism as per regulatory standards is carried out. Apart from microbial and chemical shelf life of food products, sensory aspects of the food products like its flavor, texture and appearance for example play a vital role in consumer acceptability.

RESULT: The shelf life of the *Mudga Shatavari* Ladoo was found to be 07 days.

NOTE: The shelf life period of the Ladoo would be higher with if the water content in the *Gudapaka* is avoided. For commercial production the Ladoo can be prepared with shelf life of minimum 15 days.

Sensory Tests

Sensory testing involves the objective of evaluation of food products by trained human senses. Sensory testing involves scientific methods for testing the appearance, texture, smell and taste of a product.

- Sensory test was carried out on the sample
- A panel of 07 members tested the product for Appearance & colour, odour, flavour, taste, after taste and texture
- The grading was done on a scale of 1-9
- The results were within acceptable limits
- The overall acceptability was 8.29

DISCUSSION

Ayurveda India's timeless medical treasure is based on the concept of promoting a holistic life through a healthy Ayurvedic diet and lifestyle. Diet or *Aahara* in Ayurveda is responsible for nourishing not just the body but also the mind, soul and any disruptions in healthy eating habits is the main cause of diseases. That is why Ayurveda refers to *Aahara* as one of the three *Upasthambhas* or one of the key pillars of life.

Nutraceuticals are food or part of the food that provide health benefits including the prevention/ treatment of a disease. Nutraceuticals has more advantages over the medicine as they avoid side effects, have been fortified naturally with dietary supplements etc.

This *Mudga Shatavari* Ladoo prepared as per reference from Bhavapraksha Niganthu is a Nutraceutical which can be given as a dietary supplement or health supplement. Ayurveda considers *Mudga* as a *Sada pathyakara aahara* and is a good source of proteins. *Shatavari* being a *Rasayana* drug in Ayurveda, is a perfect choice as Nutraceutical. The association of Nutraceutical with Ayurvedic medicine brings the long standing consumer acceptance.

After Authentifcation and standardisation of the raw drugs, the *Mudga Shatavari* Ladoo was prepared as per the reference in Bhavaprkasha Niganthu with modifications. The *Mudga Shatavari Ladoo* was tested and was found to be highly nutritive. The nutrition values were found to be sufficient to provide an average adult with the nutrition required for leading a healthy life.

In future pilot study can be carried out to find the efficacy of the product. The tests carried out in this study prove that the product can be prepared on a large scale and marketed for use of the general public.

The *Mudga Shatavari* Ladoo is highly nutritive and will be helpful in providing adequate nutrition for growing children, It can be provided as part of mid-day meals to students.

Mudga Shatavari Ladoo can be taken by people of all age groups including children, youth, lactating mothers, post-menopausal women, old age people as a dietary supplement.

The *Mudga Shatavari* Ladoo can be provided in various forms such as biscuits, *Churna*, powder etc.

The Limitation of the product is that its shelf life is found to be 05 days due to which it cannot be stored for long. The product was freshly prepared in a small scale and was meant to be tested and consumed immediately. The moisture content due to the water added in the *Gudapaka* was the cause of the short shelf life. This can be avoided when the product is prepared on a large scale or in a controlled environment.

CONCLUSION

This study concludes that the product *Mudga Shatavari Ladoo* consisting of *Mudga Churnam*, *Shatavari, Tugaksheeri* is formulated, standardized and tested and found to have all nutrients required to be used as a health supplement. It is a safe and healthy and cost effective health product which will provide the nutrition required to lead a healthy life.

This product is a very safe alternative to the overrated Health supplements available in the market which are high in sugar, palm oil and preservatives.

This formulation can also be used in the form of granules, biscuits or other forms as required. It can be provided as part of mid-day meals in schools to improve the nutrition in children.

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