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Development of healthy chocolate coated coconut balls by using herbal powders

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Abstract
In modern era, peoples are being health conscious but the available food items are unable to provide proper nutrients through claimed food items. An Indian traditional medicine like herbal powder has a very high effectiveness and vital source for new drug development. Value addition to coconut related confectionary products is a resource to development of new medicinal and functional food items. Herbal functional and nutraceutical food is used as a rigid support to maintain health and to promote optimal healthcare, longevity, vitality and quality of life. Healthy chocolate-coated Coconut balls are prepared by using desiccated coconut powder and condensed milk. To develop this product optimsation level of ingredients was carried out based on sensory evaluation. Optimization for the level of Shatavari (*Asparagus racemosus*) and Gokshur (*Tribulus terrestris*) was done and added to the prepared coconut balls at various levels. Shatavari and Gokshur are added independently and in combinations, and the best results were received for combo of Shatavari and Gokshur, which are subjected to organoleptic evalution for the best one.

Keywords: Functional food, herbal powder, sensory evaluation, health care

Introduction
Functional foods and nutraceuticals provide a better option to improve the human health well Being, reduce diseases and support to the rural areas for their all over development. Functional foods and dietary supplements are rapidly growing concept all over the market because the peoples are more aware, their health consciousness due to which their market has been increased. It contains various bioactive compounds that may facilitate to the health-promoting properties of foods items. The consumers are aware of the major role of functional food into diet can play in management of diseases and health care [4].

Bioactive Compounds are the naturally occurring chemical components it contains, or derived from, a plant, animal or marine source, that provide the desired health benefits and well being. Preparations of functional food ingredients are the standardized and its extracts containing bioactive compounds of varying purity forms, which areused as an ingredient for manufacturing in the foods, cosmetics and pharmaceutical sectors also. Nutrients, flavoring materials and dietary supplements are unit major constituents within the nutraceuticals that create them essential in maintaining health, reduce the various disease conditions and thus increase the quality of life [6].

Coconuts have a major role in human diet due to the presence of essential functional components. In coconut fatty acids are present in more amounts that have increasing health beneficial functions. Coconut natural fat in human diet which helps in improving anti-inflammatory action on the immune system of human being. It normalizes the body lipids and protects the liver from liver damage. Coconut is a rich source of edible oil and a more amount of extracted coconut used as a frying medium. It is also used in the preparation of chutneys, curries and products formed from shredded coconut, coconut milk, coconut jam, coconut syrup, coconut honey, sweetened condensed coconut milk, etc. In day to day life, coconut have largely used in the preparation of bakery products and many traditional Indian sweets [7, 8].

Coconut based snacks and confectionary products have been largely famous among the people, wherein coconut is the main ingredient. This is made from coconut, sugar, milk, butter and savoring agents. Coconut added confectionary products contribute to high amount of calories and nutrition in the diet provides taste and deliciousness into final product. Fresh coconut meat is rich in protein, lipid, carbohydrate, and other good nutrients [12, 10].

In asparagus the group of steroidal saponins and terpentene saponins are major bioactive constituents. This plant additionally contains vitamins A, B1, B2, C, E, Mg, P, Ca, Fe, and folic acid and other primary chemical components of Asparagus are essential oils, asparagines, arginine, tyrosine, flavonoids (Kaempferol, Quercetin, and rutin), resin, and tannin steroidal glycosides (asparagosides), bitter glycosides, asparagines and flavonoids.

Asparagine is a strong diuretic and it's containing diosgenin and other saponins such as shatavarins (I- IV) from roots and leaves of *A. racemosus*. In *A. racemosus* the phenolic compounds are largely present like phytoestrogenes and flavonoids like isoflavones, couestans and prenylated flavonoids that Posses oestrogenic activity [5].

Roots of *A. racemosus* is used in formulation of Ayurvedic rasayana which prevent from aging, imparts immunity, increase longevity, and add vitality to the body and its root extract posses antiulcer, antioxidant, and antidiarrhoeal, antidiabetic activities also used as cooling agent, nervine tonic, galactogogue and diuretic properties [2].

Tribulus terrestris fruits have been used as a tonic for kidneys, diuretic and cough treatment and for the treatment of skin irritation, headache also. In Indian Ayurvedic system, the fruit have been used in the treatment of infertility, impotence, erectile dysfunction and low sexual activity and also shows cardio tonic properties [13].

It shows diuretic drug, aphrodisiac, antiurolithic, immunomodulatory, ant diabetic drug, absorption, nervosum tonic, medication, analgesic, medicine, anticancer, medicinal drug, anti helmintic, and ant carcinogenic activities. It is an Ayurvedic remedy for the urogenital disease, promoting urine flow, soothing the mucosa, and aiding in the excretion of stones and calculi for menopausal symptoms, anemia, diabetes, ophthalmic headache, insufficient lactation [11].

Materials and Methods

Desiccated coconut powder and condensed milk was purchased based on quality parameters from local market. *Asparagus racemosus* (Shatavari) and *T. terrestris* (gokshur) was collected from department of botany, Shivaji University, Kolhapur.

Preparation of *A. racemosus* (Shatavari) root powder

Firstly, roots of shatavari were separated from their branches then cleaning of roots by using water, after that cutting into small pieces allowed drying in shade for 5-6 days. Then grinded it into powder forms and sieved properly. This powder was packed into HDPE packaging material and stored into cool and dry place.

Preparation of *T. terrestris* (Gokshur) fruit powder

The fruits of Gokshur plants were separated from plant, and then cleaning is followed by using water to remove extraneous matter. Shade drying is followed for Gokshur fruits up to 2-4 days to avoid volatile compound losses. After that grinded into grinder and made it into powder form, sieved it to remove coarse material. Then packed into HDPE packaging material and stored it.

Preparation of healthy chocolate-coated coconut balls

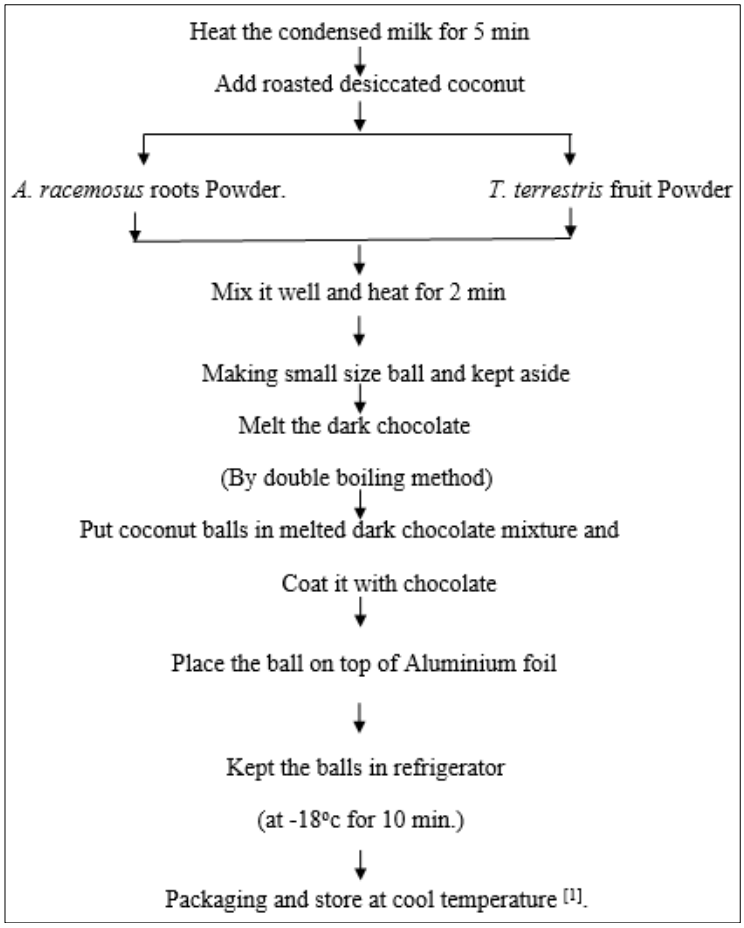

Fig 1: Preparation of healthy chocolate coated coconut balls.

During preparation of coconut balls firstly desiccated coconut powder was roasted then condensed milk was heated up to 5 min. Roasted coconut powder was added to hot condensed milk. After that, both the herbal powders were added and heated for 2 min to allow proper mixing of herbal powders. Small size balls were prepared and kept aside. Dark chocolate was melted by Double boiling method. Prepared coconut balls were dipped into melted dark chocolate mixture and coating was placed. After some time prepared balls were wrapped into aluminuim foil paper and balls were kept into refrigerator (-18^0c for 10 min.). Finally the prepared chocolate coated coconut balls were stored into air tight container.

Optimization of control sample

For optimization of control sample, sweet condensed milk and desiccated coconut, powder was used. In that, sample No.4 was selected based on sensory evaluation. Both the ingredients in sample No. 4 were taken in ratio of 50:50.

Table 1: Optimization for control sample

Sample No.	Sweetened Condensed Milk	Desiccated Coconut Powder
1.	80	20
2.	70	30
3.	60	40
4.	50	50
5.	40	60

Process optimization

In process optimization, the proportion of both herbal powders was used in desiccated coconut powder and condensed milk in various percent levels. Final sample was selected based on sensory evaluation.

Table 2: The Shatavari Gokshur fruit powder Condensed Milk

Sample Code	Shatavari root powder (%)	Gokshur fruit powder (%)	Desiccated coconut powder (%)	Sweetened Condensed Milk (%)
T1	7	7	36	50
T2	6	6	38	50
T3	5	5	40	50
T4	4	4	42	50
T5	3	3	44	50

Result and Discussion

Table 3: Sensory analysis of control sample

Name of sample	Attributes				
	Color	Texture	Taste/Mouth feel	Appearance	Overall Acceptability
1)	8.0	8.2	7.8	7.8	7.6
2)	8.2	8.0	7.8	7.6	7.8
3)	7.8	7.6	7.5	7.3	7.8
4)	8.5	8.5	9	9	9
5)	7.6	7.3	7.8	7.5	7.3

In sensory evaluation of control sample, sample No. 4 was selected based on highest sensory score on organoleptic basis.

Table 4: Formulation of final product

S. No.	Sample No.	Sweetened Condensed milk (gm)	Desiccated Coconut powder (gm)	Shatavari and Gokshur powder (gm)
1)	E.C.	50	50	-
2)	T1	50	48	2
3)	T2	50	47	3
4)	T3	50	46	4
5)	T4	50	45	5
6)	T5	50	44	6

For the formulation of coconut balls the condensed milk, desiccated coconut powder, Shatavari and Gokshur powder were added. In that, T3 sample was selected on sensory basis.

Table 5: Physicochemical analysis of chocolate-coated coconut balls

Parameter	Healthy chocolate coated coconut balls (100gm)
Moisture (%)	8.64 ±0.02
Ash (%)	2.89 ±0.02
Protein (g)	7.8 ±0.01
Total Fat (g)	0.18±0.01
Crude fiber (%)	10.74± 0.02
pH	4.0-4.2
Carbohydrate(g)	58.31
Total Energy (Kcal)	543.44

For the physicochemical analysis of chocolate coated coconut balls moisture content was (8.64%), Protein content (7.8g), crude fiber (10.74%), Carbohydrates (58.31%) and it gives 543.44 Kcal per 100g.

Table 6: Mineral analysis of Final product

Parameters (Mg/l)	Final product
Calcium	11.6
Iron	49.6
Potassium	156
Magnesium	BDL
Zinc	12.54
Sodium	13.2
Manganese	BDL

For the analysis of trace elements such as Mg, Al, K, Cr, Mn, Fe, Cu, and Zn, were determined by atomic absorption spectrometer method. The Atomic absorption spectrometer is used to determine the elemental concentrations. In the mineral analysis of healthy chocolate coated coconut balls, product were rich in Iron (49.6mg/L), Calcium(11.6mg/L), sodium(13.2mg/L), zinc(12.54mg/L) and potassium was (156mg/L) in high amount. Flame photometer is the most useful instruments in clinical analysis. This is used for determining sodium, potassium and calcium trace elements from the sample.

Table 7: Colour analysis of chocolate coated coconut balls

Sample	Total average value	L	a	b
I	Average	25.418	5.466	5.171
II	Average	25.753	5.827	5.428
III	Average	25.679	5.737	5.301

(Above average reading represents n=10 times)

- The colour analysis of chocolate coated coconut balls was done by using Hunter Lab Colour measuring system (Labscan XE system, Reston, USA). Wavelength range 360-800 nm.
- The parameter determined were L*(L*=0 [black] and L*= 100 [white]), a*(-a*= greenness and +a* = redness), b* (-b* = blueness and +b* = yellowness) Average value represent the mean of Ten readings [3].

Phytochemical screening

Qualitative Phytochemical screening of aqueous extracts of coconut balls showed the presence of alkaloids, tannins, saponins and volatile oils.

GCMS Analysis

GC/MS analysis of the volatile constituents of healthy chocolate-coated coconut balls. Was carried out on a gas chromatograph directly coupled to mass spectrophotometer using column Oven Temp. 40.0 °C, Injection Temp.:250.00 °C, Flow Control Mode: Linear, Velocity Pressure: 52.2 kPa, Total Flow: 76.5 mL/min, Column Flow:1.04 mL/min, Linear Velocity:36.7 cm/sec, Purge Flow:3.0 mL/min, Split Ratio: 70.0, Oven Temp. Program and injection volume 1 µL.

Table 8: Oven Temp. Program

Rate	Temperature(°C)	Hold Time(min)
-	40.00	1.00
5.00	135.0	5.00
4.00	220.0	1.00

GC Analysis Peck

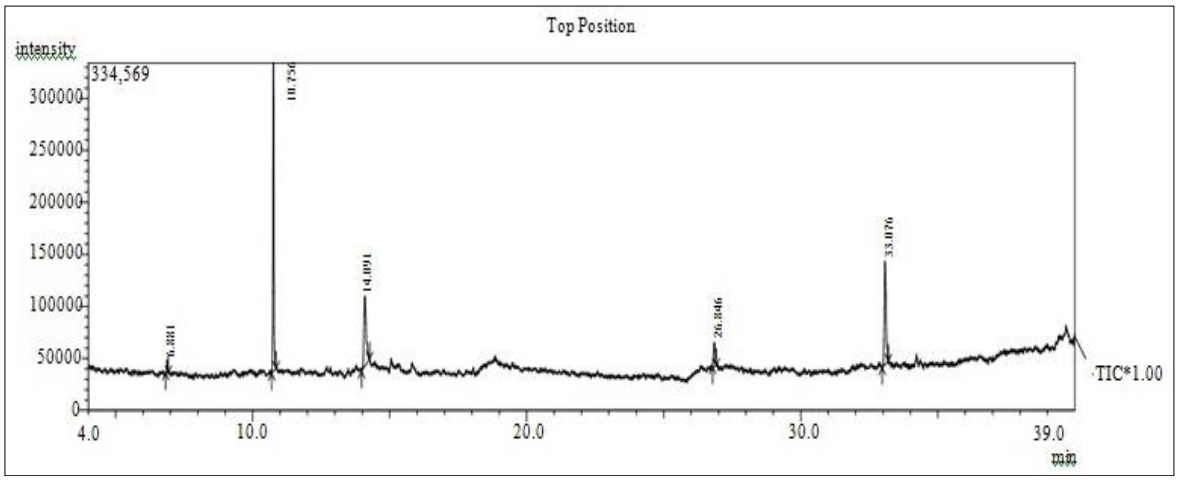

Fig 2: GC Analysis peck of final product

Table 9: Peak report TIC

Peak#	R. Time	I. Time	F. Time	Area	Area%	Name
1	6.881	6.830	6.925	23304	1.36	Benzene, 1,3-dimethyl-
2	10.756	10.700	10.850	772684	45.15	o-Cymene
3	14.091	13.970	14.270	381526	22.29	Endo- Borneol
4	26.846	26.780	26.920	95933	5.61	Dodecanoic acid, methyl ester
5	33.076	32.975	33.195	437887	25.59	Spiro[4.5]dec-6-en-8-one, 1,7-dimethyl-4-(1-
				1711334	100.00	

Determination of % radical scavenging activity (Antioxidant Activity)

The healthy coconut balls extract was analyzed for free radical scavenging activity. The total antioxidant property of healthy coconut balls was determined by 2, 2-Diphenyl-1-picrylhydrazil radical (DPPH) in terms of % radical scavenging activity. DPPH solution (1 mg/ml) was made by dissolving DPPH in methanol. DPPH solution (100 µl) was diluted to 5 ml and absorbance was taken at 535 in UV-Spectrophotometer. The absorbance was taken as control absorbance. The extract (100µl) was made by dissolving required healthy coconut balls in methanol; then it was added with 100µl of 1mg/ml of DPPH solution. Then it was diluted to 5 ml by methanol then it was incubated at room

temperature for 30 min. Then absorbance was measured at 535 nm in UV spectrophotometer. The absorbance was taken as sample absorbance. Following formula was used to calculate the antioxidant activity.

DPPH scavenging effect % was calculated according to the following:

$$\% \text{ antioxidant activity} = \frac{\text{Absorbance of control} - \text{Absorbance of sample}}{\text{Absorbance of sample}} \times 100$$

Sample Name	Healthy coconut balls
Antioxidant (%RSA)	85.02 ± 0.140

Conclusion

In the present study, it is concluded that the coconut balls are prepared from sweetened condensed milk and desiccated coconut powder from the optimized level of ingredients with good sensory attributes. Selected control sample used for addition of both herbal powder like shatavari (*A. racemosus*) and Gokshur (*T. terrestris*) has increased nutritional as well as functional value. Both herbal powders which prevent from aging, imparts immunity, increase longevity, and add vitality to the body and also used in the treatment of infertility, impotence, erectile dysfunction, Galactogogue and low sexual activity. Nutraceutical value of coconut balls was increased since both herbal powders contains steroidal saponins, flavonoids, phytoestrogens, phenolic compounds, tannins and antioxidants. Provided Chocolate coating has increased consumer acceptability and it gave good taste to final product.

References

1. Akhtar J, Bano I, Pandey RK, Husainb A, Malik S. Effect of different level of pectin and starch on quality and storage stability of apple-date fruit bar. Journal of Food Products Development and Packaging. 2014; 1:31-36.
2. Alok S, Jain SK, Verma A, Kumar M, Mahor A, Sabharwal M. Plant profile, Phyto chemistry and pharmacology of Asparagus racemosus (Shatavari): A review. Asian Pacific journal of tropical disease. 2013; 3(3):242-251.
3. Baixauli R, Salvador A, Fiszman SM. Textural and colour changes during storage and sensory shelf life of muffins containing resistant starch. European Food Research and Technology. 2008; 226(3):523-530.
4. El-Sohaimy SA. Functional foods and nutraceuticals-modern approach to food science. World Applied Sciences Journal. 2012; 20(5):691-708.
5. Joshi RK. Asparagus racemosus (Shatawari), phytoconstituents and medicinal importance, future source of economy by cultivation in Uttarakhand: A review. Inter. J Herb. Med. 2016; 4(4):18-21.
6. Keservani RK, Kesharwani RK, Vyas N, Jain S, Raghuvanshi R, Sharma AK. Nutraceutical and functional food as future food: a review. Der Pharmacia Letter. 2010; 2(1):106-116.
7. Parekha JH, Senapatia AK, Balb LM, Pandita PS. Quality evaluation of mango bar with fortified desiccated coconut Powder during storage. Journal of Bioresource Engineering and Technology Year. 2014; 1:40-47.
8. Saka EA, Nyarko HD, Asante F, Tortoe C. Utilization of Locally Produced Desiccated Coconut in Plain and Milk Chocolate. Journal of Sustainable Development. 2017; 10(1):82-90.
9. Santosh Kumar S. Teerthe Mohanraj Pattar, Sharanabasappa, Kerur BR. Elemental Contents in Ayurvedic Medicinal plants Using AAS Technique, 2015, 110-112.
10. Satyanarayana Rao, Kaverappa TS, Hemaprakash NM, Reddy T, Jayaraman KS. Development of ready-to-eat traditional Indian sweet dishes based on jaggery and coconut. Journal of food science and technology. 1990; 27(6):355-358.
11. Sivapalan SR. Biological and pharmacological studies of Tribulus terrestris Linn-A review. Int. J Multidiscip Res Dev. 2016; 3(1):257-265.
12. Sivasakthi M, Sangeetha N. A Comparative Study of the Physico-Chemical Characteristics of the Ready-to Eat Coconut Based Snack. Journal of Food Processing & Technology. 2015; 6(9):1.
13. Zhu W, Du Y, Meng H, Dong Y, Li L. A review of traditional pharmacological uses, Phyto chemistry, and pharmacological activities of Tribulus terrestris. Chemistry Central Journal. 2017; 11(1):60.