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Phyto physico chemical profile of ashwagandhadi choorna

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Abstract
Introduction: The present article deals with the study of physicochemical analysis of Ashwagandhadi choorna. Ashwagandhadi choorna is a formulation which contains Ashwagandha *(Withania somnifera)*, Shatavari *(Asparagus racemosus)*, Ragi (*Eleusine coracana)*, Mudga *(Vigna radiata)*, Jeeraka (*Eleusine coracana)* and Shunti (*Zingiber officinale)* and it improves the physical fitness leading to health promotion.
Objectives: Evaluation of physico-chemical and phytochemical analysis of Ashwagandhadi choorna.
Materials and Methods: The current investigation deals with the extraction and detection of active phytochemical components from different extracts of Ashwagandhadi choorna. Physicochemical Standardisation and Phytochemical tests were carried out.
Result and Conclusion: The result of standardization parameters demonstrated the loss of drying 7.99%, total ash 4.38%, acid insoluble ash 0.01%, water soluble ash 2.40%, alcohol soluble extractive ash 3.88% and water soluble extractive ash 42.05%. The phytochemical analysis showed the presence of various phytochemical constituents such as alkaloids, steroids, carbohydrates, tannins, flavonoids, terpenoid, and coumarins. Hence Ashwagandhadi choorna can be used as a health supplement for improving physical fitness leading to health promotion.

Keywords: ashwagandhadi choorna, ashwagandha, jeeraka, mudgha, ragi, shatavari, shunti

Introduction
Physical fitness is a state of health and well-being and more specifically, the ability to perform aspects of sports, occupations and daily activities [1]. Physical fitness is generally achieved through proper nutrition, moderate physical exercise, hygiene and sufficient rest [2]. Considering nutritional aspect of physical fitness, supplements are required to bridge the nutritional gap due to busy work schedule and faulty food habits. But in the present scenario the supplements available in the market are not meeting the required standards and many are not scientifically researched for its nutrient content. Hence a health supplement is the need for the hour which is tasty, will meet the daily requirements and provide optimum nutrients for improving the physical fitness. Ashwagandha *(Withania somnifera)*, Shatavari *(Asparagus racemosus)*, Ragi (*Eleusine coracana)*, Mudga *(Vigna radiata)*, Jeeraka (*Eleusine coracana)* and Shunti (*Zingiber officinale)* are formulated into choorna and will be evaluated for its Physicochemical and Phytochemical analysis.

Objective of the study
Evaluation of physico: chemical and phytochemical analysis of Ashwagandhadi choorna.

Ethics committee clearance: Approval no: SDM/IEC/57/2020
CTRI No- CTRI/2020/12/029595

Materials and Methods
Source and authentication of raw drug and analysis - The identity of the plant was confirmed by Department of Dravyaguna, Sri Dharmasthala Manjunatheshwara College of Ayurveda & Hospital, Hassan and SDM centre for research in Ayurveda and allied Sciences, Kuthpady, Udupi (Analysis Report 1257/21013002).

Method of Preparation: Ashwagandhadi choorna was prepared in the teaching pharmacy of Rasa Shastra and Bhaishajya Kalpana Department of Sri Dharmasthala Manjunatheshwara Teaching Pharmacy Hassan.

Ashwagandhadi Choorna Ingredients

Table 1: Ashwagandhadi Choorna ingredients

Sl. No.	Name of Drug	Botanical name	Part used
1.	Ashwagandha	*Withania somnifera*	Root
2.	Shatavari	*Asparagus racemosus*	Root
3.	Ragi	*Eleusine coracana*	Seed
4.	Mudga	*Vigna radiate*	Seed
5.	Jeeraka	*Cuminum cyminum*	Seed
6.	Shunti	*Zingiber officinale*	Root

Physicochemical studies: Physicochemical parameters were determined as per guidelines of WHO. Total ash value, loss on drying, water soluble ash, acid insoluble ash, alcohol soluble extractive value and water soluble extractive value were determined [3, 4, 5].

Loss on drying at 105ºC

10 g of sample was placed in tared evaporating dish. It was dried at 105˚C for 5 hours in hot air oven and weighed. The drying was continued until difference between two successive weights was not more than 0.01 after cooling in desiccator. Percentage of moisture was calculated with reference to weight of the sample [6].

Total Ash

2 g of sample was incinerated in a tarred platinum crucible at temperature not exceeding 450˚C until carbon free ash is obtained. Percentage of ash was calculated with reference to weight of the sample [7].

Acid insoluble Ash

To the crucible containing total ash, add 25ml of dilute HCl and boil. Collect the insoluble matter on ashless filter paper (Whatmann 41) and wash with hot water until the filtrate is neutral. Transfer the filter paper containing the insoluble matter to the original crucible, dry on a hot plate and ignite to constant weight. Allow the residue to cool in suitable desiccator for 30 mins and weigh without delay. Calculate the content of acid insoluble ash with reference to the air dried drug [8].

Water soluble ash

Boil the ash for 5 min with 25 ml of water; collect insoluble matter on an ashless filter paper, wash with hot water, and ignite for 15 min at a temperature not exceeding 450˚C. Subtract the weight of the insoluble matter from the weight of the ash; the difference in weight represents the water soluble ash with reference to the air-dried sample.

Alcohol soluble extractive

Weigh accurately 4 g of the sample in a glass Stoppard flask. Add 100 ml of distilled Alcohol (approximately 95%). Shake occasionally for 6 hours. Allow to stand for 18 hours. Filter rapidly taking care not to lose any solvent. Pipette out 25ml of the filtrate in a pre-weighed 100 ml beaker. Evaporate to dryness on a water bath. Keep it in an air oven at 105°C for 6 hours, cool in desiccator for 30 minutes and weigh. Calculate the percentage of Alcohol extractable matter of the sample. Repeat the experiment twice, and take the average value [9].

Water soluble extractive:

Weigh accurately 4 g of the sample in a glass Stoppard flask. Add 100 ml of distilled water, shake occasionally for 6 hours. Allow to stand for 18 hours. Filter rapidly taking care not to lose any solvent. Pipette out 25ml of the filtrate in a pre-weighed 100 ml beaker. Evaporate to dryness on a water bath. Keep it in an air oven at 105°C for 6 hours. Cool in desiccators and weighed. Repeat the experiment twice. Take the average value [10].

Results

Table 2: Results of standardization parameters of Ashwagandhadi choorna.

Parameter	Results n = 3 %w/w
	Avg ± SEM
	Ashwagandhadi choorna
Loss on drying	7.99±0.01
Total Ash	4.38±0.07
Acid Insoluble Ash	0.01±0.00
Water soluble Ash	2.40±0.01
Alcohol soluble extractive value	3.88±0.04
Water soluble extractive value	42.05±0.05

Table 3: Results of preliminary phytochemical screening of Ashwagandhadi choorna

Test	Inference
Alkaloid	+
Steroid	+
Carbohydrate	+
Tannin	+
Flavanoids	+
Saponins	-
Terpenoid	+
Coumarins	+
Phenols	-
Carboxylic acid	-
Amino acids	-
Resin	-
Quinone	-
(+) – present; (-) – negative	

Table 4: Results of preliminary phytochemical screening of Ashwagandhadi choorna

Tests	Color if positive	Alcoholic extract of Ashwagandhadi choorna
Alkaloids		
Dragendroff's test	Orange red precipitate	Orange red precipitate
Wagners test	Reddish brown precipitate	Reddish brown precipitate
Mayers test	Dull white precipitate	Dull white precipitate
Hagers test	Yellow precipitate	Yellow precipitate
Steroids		
Liebermann-buchard test	Bluish green colour	Bluish green colour
Salkowski test	Bluish red to cherry red color in chloroform layer and green fluorescence in acid layer	Bluish red to cherry red color in chloroform layer and green fluorescence in acid layer
Carbohydrate		
Molish test	Violet ring	Violet ring
Fehlings test	Brick red precipitate	Brick red precipitate
Benedicts test	Red precipitate	Red precipitate
Tannin		
With $FeCl_3$	Dark blue or green or brown	Green color
Flavanoids		
Shinoda's test	Red or pink	Pink color
Saponins		
With $NaHCO_3$	Stable froth	No stable froth
Triterpenoids		
Tin and thionyl chloride test	Pink	Pink color
Coumarins		
With 2 N NaOH	Yellow	Yellow color
Phenols		
With alcoholic ferric chloride	Blue to blue black	Green color
Carboxylic acid		
With water and $NaHCO_3$	Brisk effervescence	No brisk effervescence
Amino acid		
With ninhydrine reagent	Purple colour	No purple color
Resin		
With aqueous acetone	Turbidity	No turbidity
Quinone		
Conc. sulphuric acid	Pink/purple/red	Yellow color

Discussion

Ashwagandha (*Withania somnifera)* is explained under Balya [11] Brimhaneeya [12] and Madhuraskandha [13]. It is considered as one of the best Rasayana (Rejuvenator) drug, is an important herbal root that is used in various

preparations of Ayurvedic supplements to enhance the physical and mental performance, improve learning ability and decrease stress and fatigue [14]. It possess, antioxidant, immunomodulation, rejuvenation, anti-inflammatory, antitumor and anti-stress properties [15]. It is Tikta, Katu, Madhura Rasa, Madhura Vipaka, Ushna Virya, Laghu, and Snigdha. It act as Balya, Brimhana, Mamsa Vardhaka (increases the muscle bulk) and Dhatuposhana (nourishment of bodily tissues).

It nourishes Sukra and Mamsa Dhatu being Madhura Rasa Vipaki and Snigdha. It stimulates Dhatvagni of the Dhatus by its Tikta rasa and Ushna Veerya [16]. It has nutritive value(in 100gm) protein (3.9gm), carbohydrate (49.9gm), fat (0.3gm), crude fibers (32.3gm), Energy (245Kcal), Calcium (23mg),Vitamin C(3.7mg) and Iron (3.3mg) [17].

Shatavari (*Asparagus racemosa*) being one among the immunomodulator, is explained under Balya, [11] Vayasthapana [18], Madhuraskandha [13] and Vidarigandadhi [19]. It has Madhura Tikta rasa, Madhura Vipaka, Sheeta Virya and Guru, Snigdha and Mrudu Guna. It is Dhatvagnideepana by its Tikta rasa and nourishes the Dhatus by its Madhuradi gunas. It increases Rasa, Mamsa, Sukra, causes Balamamsavriddhi, increases resistance to diseases and acts as Vayastapana [20]. It has nutritive value(in 100gm) protein (2.47gm), carbohydrate (3.39gm), fat (0.11gm), crude fibers (2.5gm), Energy (22Kcal), Calcium (26mg)Vitamin C(5.8mg) and iron (3.3mg) [17].

Ragi *(Eleusine coracana)* is explained under Trunadhanya [21] and it has Madhura Rasa, Sheeta

Virya, Snigdha, Laghu, Brimhana and also Patya [22]. It possesses several health benefits due to its polyphenol and dietary fiber content and it possesses antioxidant, anti-diabetic, anti-tumorigenic properties [23]. It has nutritive value (in 100gm) protein (7.3gm), carbohydrate (72.0gm), fat (1.3gm), minerals (2.7gm), crude fibers (3.6gm), Energy (328Kcal), calcium (344mg), phosphorous (283mg) and iron (3.9mg) [24].

Mudga (*Vigna radiata)* is explained under Shimbi Dhaanya and it has Madhura, Kashaya

Rasa, Katu Vipaka, Laghu, Ruksha Guna [25]. It is highly rich in proteins and other macro and micronutrients, when sprouted gets enhanced with metabolites with many health benefiting bioactive compounds which endows it with antioxidant, antihyperlipidemic, anti-diabetic, anti-cancerous properties [26]. Mudga has nutritive value (in 100gm) Protein(24.0gm), fat (1.3gm), minerals(3.5gm), carbohydrate (36.6gm), calcium (1080mg) crude fibers (12.0gm), energy (356 Kcal), phosphorus (511mg) and iron (11.7mg) [24].

Jeeraka (*Cuminum cyminum)* is Katu Rasa, Tikshna Ushna Guna. It is good Deepana and Pachana Dravya, Shleshmanilahara and is Krimihara [27]. It has nutritive value (in 100gm) Protein (18.7gm), fat (15.0gm), minerals (5.8gm), carbohydrates (36.6gm), crude fibers (12.0gm), energy (356Kcal), calcium (1080mg), phosphorus 326 mg) and iron (11.7 mg) [24].

Shunti (*Zingiber officinale)* is Katu Rasa, Ushna Veerya, Madhura Vipaka, Laghu, Snigdha, Rochaka, Vrishya, Hrudhya and Deepana [28]. It has nutritive value (in 100gm) Protein (2.3gm), carbohydrate 12.3gm), fat (0.9gm) , minerals (1.2gm) , crude fibers (2.4gm), energy (67Kcal), calcium (20 mg) , phosphorous (60mg) , and iron (3.5mg) [24].

Anabolic effect

The steroids present in Ashwagandha and Shatavari are anabolic nature. Many clinical studies have demonstrated that Ashwagandha can help to cut down the stress hormone, cortisol by 30% & reduce anxiety by nearly 50% within 60 days of use. This helps to shift the production of more anabolic hormones like DHEA and Testosterone. Testosterone is important anabolic hormone which aids to build muscle tissue, strength, promotes regeneration of tissues, while enhancing mental vigor and vitality. [29] Shatavari possesses nutritive, anabolic and performance enhancing properties. It contains four steroid saponins, Shatavarins 1 to 4 which possesses anabolic activity. [30]

Immunomodulatory effect

Ashwagandha possesses two primary withanolides, Withaferin A (WA) and Withanolide D (WD) having immuno stimulatory effect. [29] Shatavari possesses steroidal sapogenins and steroidal saponins having immuno-stimulatory effects. Thus helps to prevent the occurrence of diseases further leading to health promotion. [30]

Anti-oxidant effect: Ashwagandha possess 26 alkaloids and steroidal lactones called as withanones which shows antioxidant property [29, 31, 32]. Shatavari has antioxidant compound named Racemofuran, together with known compounds asparagamine A, and racemosol [30]. The major antioxidant principle, catechin is present in ragi [33]. The sprouted Mudgha contains enormous amount of macro and micronutrients (flavinoids, phenolic acids, sterols, triterpenes) which exerts potent anti-oxidant properties.[34] Polyphenols as the major antioxidant principle present in Jeeraka and shunti [35, 36].

Metabolic effect

Jeeraka contains bioactive constituents such as terpenes, phenols, and flavonoids. The dietary cumin lowers the activity of pancreatic lipase, and enhances the activities of pancreatic trypsin, chymotrypsin, amylase and a small intestinal higher maltase activity [35]. Ginger has beneficial effect on insulin resistance due to its effect on increasing glucose uptake by some adipocytes and muscle tissue cells. It decreases the blood glucose by antagonistic effect against serotonin receptors, inhibiting the activity of intestinal glucoside and amylase and increases the energy metabolism.Studies have shown that ginger components such as gingerols, shogaols and paradols can increase the protein content of GLUT-4 and accelerate b cell function that improve the insulin sensitivity. [36]

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Nil

Conflicts of interest

There are no conflicts of interest.

Conclusion

The present study was carried out with an aim to evaluate the physico – chemical standardization and phytochemical analysis of Ashwagandhadi choorna. The result of standardization parameters demonstrated the loss of drying 7.99%, total ash 4.38%, acid insoluble ash 0.01%, water soluble ash 2.40%, alcohol soluble extractive ash 3.88% and water soluble extractive ash 42.05%.The phytochemical

analysis showed the presence of various phytochemical constituents such as alkaloids, steroids, carbohydrates, tannins, flavonoids, terpenoid, and coumarins.

Ashwagandha, Shatavari, Jeeraka, Shunti are possessing anabolic, immuno-modulatory, antioxidant and metabolic property. It is added along with the foods such as Ragi, Mudga which are rich in proteins, micro and macronutrients and when sprouted gets enhanced with metabolites and many health benefiting bioactive compounds which endows it with antioxidant property. It also enhances the palatability and acceptance of the compound. Hence Ashwagandhadi choorna can be used as a supplement which may increase the physical fitness and thus leading to health promotion.

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