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Research Article

A PRELIMINARY PHARMACOGNOSTICAL AND PHYSICO-CHEMICAL EVALUATION OF ASHWAGANDHA AND PLACEBO TABLETS

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ABSTRACT
Ashwagandha (*Withania somnifera* Dunal) is one of the most commonly used medicinal plants in Indian Medicine for varied range of physical and psychological ailments. It is an important medicinal plant that has been used in Ayurvedic and indigenous medicine for over 3,000 years. Ashwagandha roots are a constituent of over 200 formulations in Ayurveda, Siddha and Unani medicine, which are used in the treatment of various physiological disorders. Previously several workers have characterized the roots of Ashwagandha pharmacognostically but till date no work has been done on standardization of tablets prepared with Ashwagandha root powder. The present study was planned to evaluate the Ashwagandha root powder pharmacognostically and to standardize the Ashwagandha tablets on various scientific parameters like organoleptic characters and physico-chemical parameters. Pharmacognostical evaluation of Ashwagandha root powder revealed Scaliform vessels, simple hair, pitted vessels, simple and compound starch grains and trichomes. Pharmaceutical analysis of Ashwagandha and placebo tablets showed, average weight of the tablet (565 mg, 593 mg), loss on drying (3 %, 5 %), hardness of the tablet (0.7 kg/cm^2, 0.6 kg/cm^2), disintegration time (5 sec, 55 min), water extract (28.6 % w/w, 28.3 % w/w), alcoholic extract (4.5 % w/w, 1.72 % w/w) respectively and ash value of Ashwagandha tablet was 7.5 %. The present preliminary findings may useful for future studies dealing with Ashwagandha or placebo tablets.
Keywords: Ashwagandha, *Withania somnifera*, Pharmacognostical, Pharmaceutical, Ashwagandha tablets, Placebo tablets

INTRODUCTION

Ashwagandha (*Withania somnifera* Dunal) is one of the most commonly used medicinal plants in Indian Medicine for varied range of physical and psychological ailments. It is mentioned in almost all classical compendia of Indian medicine. It is an important medicinal plant that has been used in Ayurvedic and indigenous medicine for over 3,000 years.[1] In view of its varied therapeutic potential; it has also been the subject of considerable modern scientific attention. Ashwagandha roots are a constituent of over 200 formulations in Ayurveda, Siddha and Unani medicine, which are used in the treatment of various physiological disorders. Ashwagnadha roots are characterized by a strong odor, hence the Indian name for the plant, which translates as ―horse's smell.[2] Standardized extract of Ashwagandha known to increase energy, reduce fatigue, promote better sleep, and enhances sense of well-being. Several measurable improvements were observed by Ashwagandha, including a reduction of cortisol levels up to 26 % .[3] Research results showed that Ashwagandha decreased the frequency and severity of stress-induced ulcers, reversed stress-induced inhibition of male sexual behavior, and inhibited the effects of chronic stress on retention of learned tasks.[4] Ashwagandha is widely claimed to have potent aphrodisiac, sedative, rejuvenative, and life prolonging properties.[5] Previously several workers have characterized the roots of Ashwagandha pharmacognostically[6,7] but till date no work has been done on standardization of tablets prepared with Ashwagandha root powder. The present study was planned to evaluate the Ashwagandha root powder pharmacognostically and to standardize the Ashwagandha tablets on various scientific parameters like organoleptic characters and physico-chemical parameters.

AIMS AND OBJECTIVES

- Pharmacognostical study of Ashwagandha root powder
- Physico-chemical analysis of Ashwagandha and placebo tablets

MATERIALS AND METHODS

Collection of raw material

The dried roots of *Withania somnifera* and roasted wheat powder were collected from the pharmacy, Institute for Post Graduate Teaching and Research in Ayurveda (I.P.G.T and R.A), Gujarat Ayurved University (G.A.U), Jamnagar, India.

Method of preparation of Ashwagandha and Placebo Tablets

Dried roots of Ashwagandha were cleaned and pulverized in to a fine powder of size of 60 mesh. Powder was filtered through mesh to remove fibers and coarse particles. Then, this powder was mixed with 5 % gum, and it was kept in end runner for the purpose of binding. After proper addition of binding agent it was subjected to granular machine to convert it to granules. This product was then added with 5 % starch before it was made into 500 mg tablets in tablet making machine. Placebo tablets were also prepared by same procedure with roasted wheat powder. Both the tablets were prepared at pharmacy of I.P.G.T and R.A, GAU, Jamnagar, India.

Pharmacognostical study

Morphological or macroscopic study of Ashwagandha roots comprising of their shape, size, texture, odor, color, consistency, surface characteristics etc; and microscopic study of the Ashwagandha root powder was done according to the guidelines of Ayurvedic Pharmacopoeia of India (API)[8] at Dept. of Pharmacognosy, I.P.G.T and R.A, GAU, Jamnagar, India.

Physico-chemical study

Ashwagandha tablets and placebo tablets were analyzed on various parameters like, weight variation or tablet uniformity, loss on drying, hardness of the tablet, total ash value, disintegration time, water soluble extract and methanol soluble extract at pharmaceutical chemistry laboratory of I.P.G.T and R.A, GAU, Jamnagar, India.

RESULTS AND DISCUSSION

The pharmacognostic study is the major reliable criteria for identification of herbal drugs. The pharmacognostical parameters are necessary for confirmation of the identity, determination of quality and purity of the crude drug.[9]

Macroscopic features

Dried roots of Ashwagandha were straight with varying thickness, consisting fibre like secondary branches, wrinkled outer surface, having characteristic odor and bitter taste (Plate 2, Figure A).

Organoleptic features

Ashwagandha root powder was light buff, creamy in color, smooth fine powder with characteristic odor and slightly bitter in taste (Plate 2, Figure B).

Powder microscopy

Small quantity of Ashwagandha root powder was dissolved in small quantity of distilled water, studied under carl zeiss trinocular microscope (20X) attached with camera with stain and without stain. The micro photographs were also taken under the microscope. Scaliform vessels, simple hair, pitted vessels, simple and compound starch grains and trichome (Plate 1, Figure A, B, C, D, E and F) were found and photographs taken. All the microscopic characteristics identified in powder were equivalent to standard profile.

Table 1: Results of physico-chemical parameters of Ashwagandha and placebo tablets

S. No.	Name of the Parameter	Ashwagandha Tablets	Placebo Tablets
1	Color Taste Odor	Off White Bitter and Astringent Pungent	Light Brown Sweet Sweet
2	Average weight of the Tablet	565 mg*	593 mg
3	Loss on Drying	3 %**	4.5 %
4	Hardness of the Tablet	0.7 kg / cm²***	0.6 kg / cm²
5	Ash Value	7.5 %	_
6	Disintegration time	5 seconds	55minutes
7	Water extract	28.6 % w / w****	28.3 % w / w
8	Alcoholic extract	4.5 % w / w	1.72 % w / w

*milligram; **percentage; ***kilogram per square centimeter; ****weight/weight

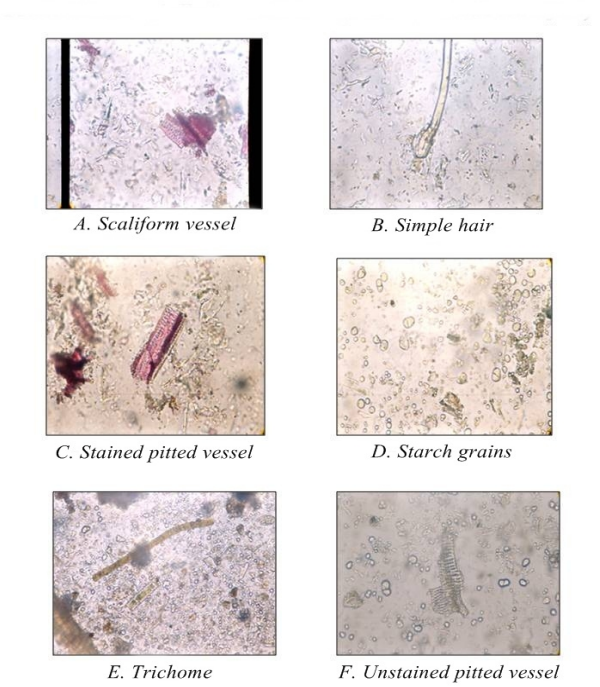

Plate 1: Powder microscopic features of Ashwagandha root (*Withania somnifera* Dunal)

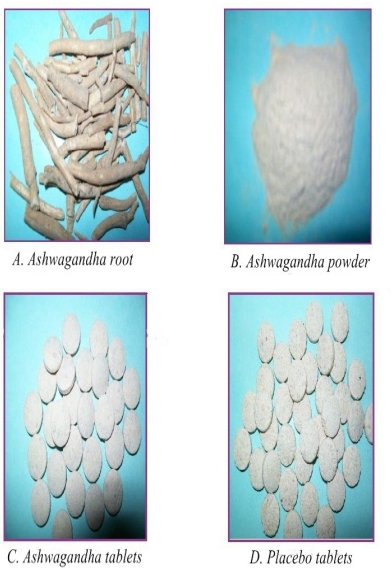

Plate 2: Photographs of Ashwagandha and Placebo

Physico-chemical study

Physico-chemical parameters like weight variation or tablet uniformity, loss on drying, hardness of the tablets, total ash value, disintegration time, water soluble extract and methanol soluble extract were studied on Ashwagandha and placebo tablets (Table 1). The objective of the current article is to explore, analyze and standardize both Ashwagandha and placebo tablets (Plate 2, Figure C and D) through various physic-chemical parameters. Even though Thin Layer Chromatography (TLC) and High Performance Thin Layer Chromatography (HPTLC) are indicated, unfortunately in the present study these were not performed. In present study, to prepare Ashwagandha tablets 5 % gum was used as binding agent but in the preparation of placebo tablets more than 5 % gum was used (to make the roasted wheat powder in tablet form). Due to this, the average weight of the placebo tablet (593 mg) and its disintegration time (55 minutes) was more than the Ashwagandha tablet. The color of both Ashwagandha and placebo tablets was almost similar and the characteristic odor of Ashwagandha root or its powder was not found in the tablet form. Because of similarity in color, size, shape and odor of Ashwagandha and placebo tablets, single blind or double blind placebo controlled trials can be conducted or planned in future. By administering Ashwagandha in tablet form could be more convenient and palatable to the patient compared to other forms.

CONCLUSION

The present study may be useful to supplement the information with regard to the identification of Ashwagandha root powder and standardization of Ashwagandha and placebo tablets. The preliminary findings of the present study can be used for reference in future studies.

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