Evalution of pharmacognostical and physical parameters of Ayurvedic formulations containing *Trachyspermum ammi* Linn.

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Abstract

One of the impediments in the acceptance of the herbal products worldwide is the lack of standard quality control profiles.Hence various methods are developed by WHO for the standardization of polyherbal formulations. The present study deals with the standardization of *Trachyspermum ammi* and its marketed polyherbal formulations "Ajmodadi churna" of four different companies. An attempt has been made to develop standardization method based on the Pharmacognostic and physicochemical parameters of *Trachyspermum ammi* and its marketed polyherbal formulations " Ajmodadi churna" of four different companies. The Pharmacognostic and physicochemical profile of *Trachyspermum ammi* is taken as a reference standard in comparing with four marketed formulations of Ajmodadi churna. Histological parameters like endodermis, epidermis,fibers, cortex, sclereids ,oil globules etc are seen . Extractive value, ash value ,moisture content is found to be 7.4 ,1.2, 4.3 %w/w respectively. The following study will improve the quality of drugs and also motivates the practioners to get more involved in the standardizations of formulations.

Key words: Ajmodadi churna, *Trachyspermum ammi*,, Polyherbal formulation, pharmacognostic, physicochemical .

Introduction

Most of the herbal formulations, especially the classical formulations of traditional medicine, are polyherbal. Each formulation contains 10-20 or more ingredients; a few have even 50-75 ingredients. For such formulations it is very difficult to establish parameters for quality control The unique processing methods followed for the manufacture of these drugs turn the single drugs into very complex mixture, from which separation, identification and analysis of the components is very difficult.[1,2] Standardization is an important aspect for establishing the quality and/or efficacy of Ayurvedic formulations or any multiple ingredient herbal formulations. One of the impediments in the acceptance of the herbal products worldwide is the lack of standard quality control profiles.[3]Hence various methods are developed by WHO for the standardization of polyherbal formulations. They include Macroscopic and microscopic evaluation and chemical profiling of the herbal materials for quality control and standardization. Macroscopic identity of medicinal plant materials is based on sensory evaluation parameters like shape, size, colour, texture, odour and taste while microscopy involves comparative microscopic inspection of powdered herbal drug, Ash values, extractive values,loss on drying, and physical characteristics of polyherbal formulations.[4,5,6] Furthermore, various advanced methods such as chromatographic, spectrophotometric and combination of these methods, electrophoresis, polarography, and the use of molecular biomarkers in fingerprints are currently employed in standardization of herbal drugs.[7-11]

Ajmodadi churna is a polyherbal ayurvedic medicine used as a carminative and an antispasmodic, is a strong wormifuge, and helps in all painful conditions like sciatica and stiffness in back and also restores normal digestive functions[12]. *Trachyspermum ammi* is recognized as the marker compound in Ajmodadi churna formulations.

Trachyspermum ammi Linn. (Umbelliferae), known in India as Ajowan, is widely distributed in northern part of the India. In India, the fruit are used as remedy for indigestion and colic and also used in poultices to relieve asthma and arthritis. It is also having aphrodisiac properties. It is used in a steeped liquid form against diarrhea and flatulence. It is mostly used for indigestion and dyspepsia[13]. It is the main ingredient of Ajmodadi churna.In present research work an attempt was made to standardize four marketed herbal formulation (Ajmodi churna) containing *Trachyspermum ammi* by their organoleptic ,microscopic,physicochemical and physical parameters.

Materials and methods

The entire chemicals used in the experiment were of analytical grade. All the solvents used in the experiment were procured from RFCL Pvt.LTD, New Delhi, India.

Plant material

Trachyspermum ammi was (See Figure No.6) procured from the local market of Jaipur, Rajasthan, India from the ayurvedic store Jagram Gangasahay, Tripolian bazaar, Jaipur, shop number.362 and their identity was confirmed by correlating their morphological microscopical characters with their literature review .[14] (Fig 1)

Preparation of Powder

Crude drug has taken and roasted in a stainless steel pan at low temperature till it becomes free from Moisture. The sample of *Trachyspermum ammi* (seeds) was powdered in a pulverizer and pass through sieve number 80 ≠. It is packed in tightly closed containers to protect from light and moisture.

Marketed formulations

The marketed samples of various brands of Ajmodadi churna i.e., Jamuna pharmaceuticals, Krishna pharmaceuticals, Navjeewan pharmaceuticals & Sadhana chemicals (See Figure No.7) were used in the present research work which were purchased from a registered ayurvedic Pharmacy in Jaipur, Rajasthan.(Fig 2)

Pharmacognostic evaluation

Organoleptic evaluation

The Organoleptic evaluation was carried out to assess the color, odour, taste of the marketed formulation [15]

Microscopic evaluation

For microscopic study, 5 g of the churna was taken. The powdered material was taken on a 85 mesh sieve and allowed in slow running water for washing away the minerals. The materials were cleared in chloral hydrate, wash with distilled water and mounted in glycerin, then observed characters.[16]

Physico-chemical Standardization:

The various Physico-chemical values of *Trachyspermum ammi* and its containing marketed formulations (churnas) ash values, loss on drying, extractive values were determined according to the Pharmacopoeial method. [17,18,19]

Determination Of Physical Characteristics Of Powder

Physical characteristics like bulk density, tap density, angle of repose, Hausner's ratio and Carr's index were determined for different formulations.[20-24]

Results and discussion

The studies were performed on the *Trachyspermum ammi* and the marketed samples of various brands of Ajmodadi churna i.e., Jamuna pharmaceuticals, Krishna pharmaceuticals, and Navjeewan pharmaceuticals (Fig.1)

Initially their organoleptic characters were noted and shown in Table no.1. In this table the parameters used are color, odour, taste, touch, and appearance. All the organoleptic characters of three formulations are same except the bitter taste of Navjeewan pharmaceuticals.

After the study of Organoleptic properties, the drugs were subjected for microscopy. The results of the powder microscopy showed the presence of calcium oxalate crystals, epidermis ,endodermis ,xylem vessels and trichomes in all the formulations but cortex and sclrenchyma cells are present only in Jamuna pharmaceuticals formulation.

The comparative microscopic characterization is shown in Table no.2 and the representative photomicrographs are shown in Fig No.2

The moisture content of Krishna pharmaceuticals is less as compared to other marketed formulation (Table no. 3) The extractive values of Krishna Pharmaceuticals is again found to be less as compared to other two formulation.(Tabel no.4)

The ash values of the samples were comparable

(Tabel no.5).The physical parameters of all the three formulation are comparable ant there is significant difference.

Conclusion

The results of Organoleptic evaluation, Powder microscopy, Physicochemical parameters like ash values, extractive values, loss on drying, Physical parameters like bulk density, tapped density, Hausner's ratio, car's index and angle of repose, shows significant difference in their values.This may be because of the adulteration.

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Fig 1. *Trachyspermum ammi* and the marketed samples of various brands of Ajmodadi churna i.e., Krishna pharmaceuticals, Jamuna pharmaceuticals, and Navjeewan pharmaceuticals

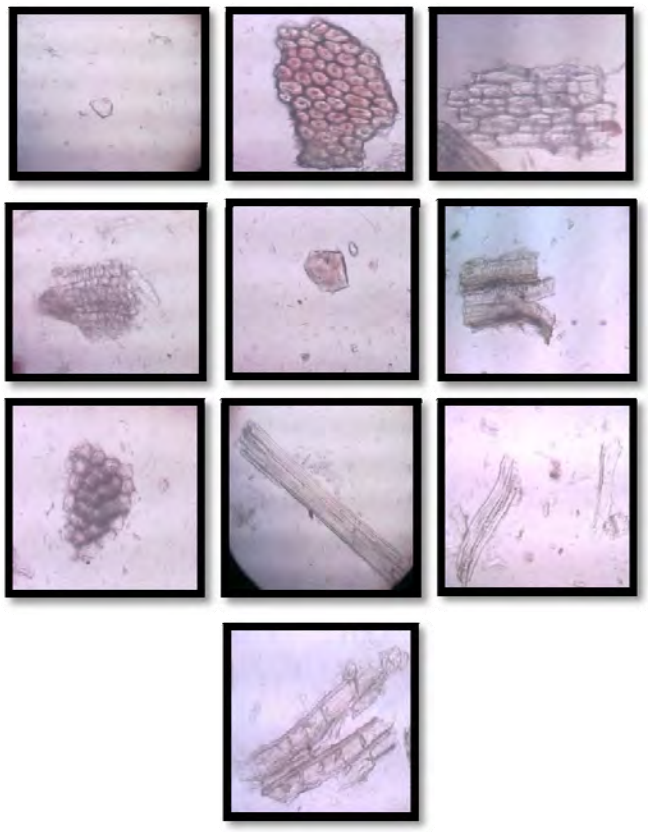

Fig 2.Various photomicrographs taken during poder microscopy : Calcium oxolate crystals,endodermis ,parenchyma,sperophides stone cells,xylem vessels,cork cells, fibers tracheids by Projection microscope (At 10x & 40x)

S.No	Property	*Trahyspermum ammi*	Jamuna	Krishna	Navjeewan
1	Color	Light brown	Light brown	Buff color	Brown
2	Odor	Spicy	Characteristic	Characteristic	Characteristic
3	Touch	Soft	Soft	Soft	Soft
4	Taste	Pungent	Pungent	Spicy	Bitter
5	Appearance	Powder	Powder	Powder	Powder

Table-1:Organoleptic characters of *Trachyspermum ammi* and its formulations

S.No	Features	*Trachyspermum ammi*	Jamuna	Krishna	Navjeewan
1	Calcium oxolate crystals	+	+	+	+
2	Endodermis	+	+	+	+
3	Epidermis	+	+	+	+
4	Cortex	–	+	–	–
5	Fibres	–	+	–	+
6	Oil globules	+	+	+	+
7	Scleroids	–	–	+	–
8	Starch grains	–	+	+	+
9	Parenchyma cells	–	–	+	+
10	Sclerenchyma cells	–	+	–	–
11	Trichomes	+	+	+	+
12	Xylem vessels	+	+	+	+
13	Cork cells	–	+	+	–
14	Pitted vessels	+	–	–	–
15	Stone cells	+	+	+	+
16	Vittae	+	–	–	–
17	Vascular strands	+	–	–	–
18	Endosperm	+	–	–	+
19	Tracheids	–	–	–	+

Table-2:Powder microscopy of *Trachyspermum ammi* and its formulations by Projection microscope (At10 x & 40x)

S.No	FORMULATIONS	LOSS ON DRYING
1	***Trachyspermum ammi***	**4.3%**
2	**Jamuna**	**5.6%**
3	**Krishna**	**4.2%**
4	**Navjeewan**	**5.8%**

Table-3: Loss on drying of *Trachyspermum ammi* and its formulations

S.No	FORMULATIONS	Water Soluble Extractive Value (w/w)	Alcohol Soluble Extractive Value (w/w)	Petroleum ether Soluble Extractive Value (w/w)
1	*Trachyspermum ammi*	1.2 %	3.2 %	3.6 %
2	Jamuna	10 %	8 %	9 %
3	Krishna	8 %	7 %	6%
4	Navjeewan	10 %	11 %	8 %

Table-4:Extractive values of *Trachyspermum ammi* and its formulations

S.No	FORMULATIONS	Total Ash values (w/w)	Water soluble Ash values (w/w)	Acid Insoluble Ash values (w/w)
1	***Trachyspermum ammi***	**7.4%**	**5 %**	**0.17 %**
2	**Jamuna**	**7%**	**4%**	**4%**
3	**Krishna**	**8.9%**	**5%**	**3%**
4	**Navjeewan**	**7.6%**	**4%**	**3%**

Table-5: Ash values of *Trachyspermum ammi* and its formulations

S.No	Formulations	True density	Bulk density	Tapped density	Haussner's ratio	Carr'sindex	Angle of repose
1	*Trachyspermum ammi*	2.19	0.35	0.48	1.38	27.46	52
2	Jamuna	1.35	0.33	0.58	1.75	43.10	42.92
3	Krishna	3.03	0.40	0.62	1.55	35.48	48.99
4	Navjeewan	4	0.41	0.65	1.58	36.92	42.30

Table-6: Physical characteristics of *Trachyspermum ammi* and its formulations