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An approach towards adopting pharmaceutical and analytical standard operative procedures for "Vasavaleha", a classical Ayurvedic semisolid dosage formulation

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Abstract
Vasavaleha is an important formulation in Ayurveda used for various disorders of respiratory tract including asthma, bronchitis, chronic cough. In this paper an attempt has been done to standardize the formulation using standard reference procedure given in Ayurvedic Pharmacopoeia of India e.g. microscopic evaluation, TLC profiling, physicochemical parameters including extractive value, ash value, loss on drying, Ph value.

Keywords: Vasavaleha, Ayurved

1. Introduction

Vasa is an excellent drug in treatment of respiratory disorders like asthma, cough, bronchitis etc. probably this might become the drug of the present millennium as these disorders are on the upswing. Vasa apart from having volatile oils, contains a substance akin to bromohexine chloride that is why it is very effective as expectorant. A poetic wise proves its high esteem amongst physicians which reads like this "*why should patients of kaasa (cough), shwaasa (asthma), raktapitta (bleeding disorders) should ever get depressed when vasa is around ?"* Such is the auspicious effectiveness of the plant. Roots, leaves and flowers of vasa are mainly used. Vasa act as an expectorant i.e. it makes the sticky phlegm dissolved and aids in it easy exit. This gives utmost relief in productive bouts of cough. It reduces inflammation and spasm of bronchial tree thus relieving attacks in asthma. It also soothes the throat, hence relieves pharyngitis, laryngitis, chronic cough. When taken for longer period of time it builds up the whole respiratory system including lungs. Hence it can be used in chronic bronchial asthma and allergic cough [1-4].

Vasa is the main ingredient in the popular preparation known as Vasavaleha. The scientific survey reveals that 18% of the population suffers from one or other kind of respiratory tract infections. Exposure to polluted environment, decreased immunity, altered food habits, contaminated food and beverages, exposure to all allergic agents causes respiratory tract infections. Allergic rhinitis is most common among them. Here is a safe Ayurvedic formulation to counteract the complaint of asthma, chronic cold, rhinitis and similar respiratory tract infections and other diseases like tuberculosis, pain abdomen, bleeding disorders and fever etc. Vasavaleha is a semisolid avaleha preparation (Avaleha is a semisolid preparation of drugs, prepared with addition of jaggery, sugar and boiled with prescribed juices or decoction) that mainly consisting of vasa parta swarasa, along with other ingredients [5-9].

1.1 Ingredients

a) Vasa

Vasa is well known herb in indigenous system of medicine, particularly in bronchitis. Vasa consist of fresh and dried leaves of *Adhatoda vasica*. Vasa contains alkaloids vasicine bronchodilation, expectorant), leaves and root contains other alkailoids, vasicinone, vasicinolone and vasinol etc.

Use: Vasa is useful in bronchitis asthma, cough, tuberculosis, intestinal worms, skin diseases, dental ailment , its local use gives relief in pyorrhea and in bleeding gums.

b) *Sarkara* (*Misri/Sugar*)
Misri refers to crystallized sugar lumps and type of confectionery minerals, which has its origin in India and Persia. Crystals were grown as a result of cooling supersaturated sugar solution. Misri is also called as Rock candy and it is widely used in India with fennel as a mouth freshner after meal.

Uses: It may improve digestion and fight off symptoms of stress. A natural alternative to use for desire to improve health and symptoms of stress and anxiety. Amla and misri together used in weakened immune system and chronic fatigue. It is also increases the production of bile and aiding detoxification of internal organs.

c) *Pippali*
Pippali consist of *Piper longum*. It contains essential oils alkaloids, resins, waxy alkaloids, terpenoids, piperine, piplartine, piplasterol, sesamin, steroid, glycosides.

Use: In Ayurveda pippali is one of the most powerful rasayana herbs, also used longevity enhancer. It is used to cure hiccup, provide better circulation of blood immunomodulator, piles, and fever and used as hair tonic.

d) *Goghrita*
It is obtained from cow's milk. Ghee builds up the internal juices of body-rasa, which is destroyed by aging and increases ojas.

Use: It is used for many disorders like; snehan, nasya, allergic rhinitis, burning sensation, in body ache or heaviness of body due to weakness and muscle laxity.
Goghrita increases intelligence grasping power and also used in various types of wounds or burns, fastens healing and reduce burning sensation.

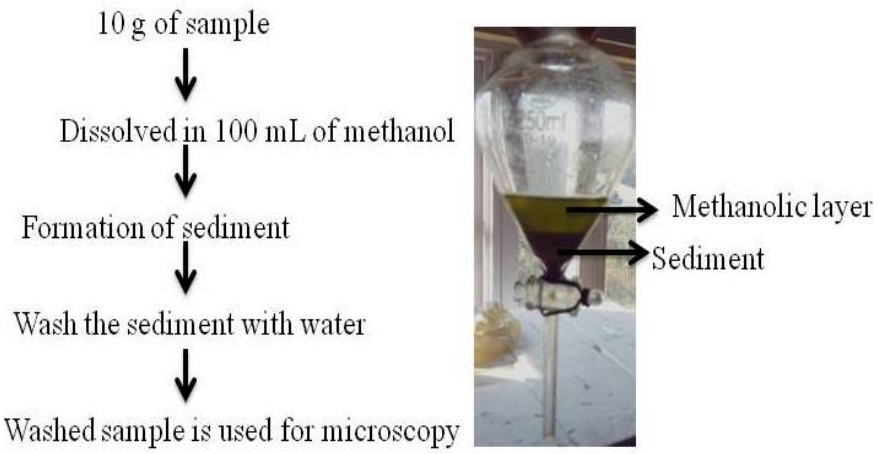
e) *Madhu*
Madhu is commonly used as anupana. It has been described to have properties like lekhna, sandhana, shodana, ropana and tridoshghna. It is hygroscopic in nature having 3.2 to 4.5 pH. It prevents colonization and bacterial growth in tissues. Madhu has been described as having ability to promote phagocytosis, detoxification and proteolytic action [10-15].

Table 1: Formulation composition

Ayurvedic ingredient	English name	Quantity
Vasaka svarasa	*Adhatoda vasica* (Fresh leaves)	768 ml
Sita	Sugar candy	384 gm
Sarpi(Goghrta)	Clarified butter from cow's milk	96 gm
Pippali	*Piper longum* (Fresh)	96 gm
Madhu	Honey	384 gm

2. Material Methods [6]
2.1 Preparation Vasavaleha
Fresh leaves of Vasa were taken and washed with water and the leaves were chopped to about 2.5 cm and finally grounded into a paste and Vasa svarasa was prepared through Puta paka vidhi.
Clean Pippali was dried and ground into fine powder and passed through sieve no. 85. Powdered Sarkara was added to Vasa svarasa followed by mild heating and filtered through muslin cloth, after complete dissolution of Sarkara. The material was stirred continuously while heating on mild fire. The above mixture was Concentrated by continuous stirring on low fire. Ghrita and Pippali were added to the above mixture and mixed well. Heating was continued till the preparation reached the required consistency which was confirmed by the formation of a soft ball that does not dispersed in water and cooled to room temperature. After that honey was added and again mixed well by continuous agitation with stirrer to make a homogeneous mixture. The preparation was packed in a tightly closed container to protect from light and moisture.

Preparation of sample for microscopy



2.2 Thin layer chromatography: 5 g of avaleha was extracted with 100 ml of methanol under reflux on a water-bath for 30 min. It was filtered and concentrated to 25 ml and the thin layer chromatography carried out. Sample extract (10 µl) was applied on TLC plate and the plate was developed to a distance of 8 cm using: *ethyl acetate: methanol: ammonia* (8: 2: 0.2) and *Chloroform: methanol: water* (8: 4: 0.2) as mobile phase. After development the plate was allowed to dry in air and examined under ultraviolet light. Identification of phytoconstituents was carried out by using both non-destructive (UV light, iodine chamber) and destructive visualization techniques (Anisaldehyde sulphuric acid and 10 % sulphuric acid). Vasa Aveleha sample methanolic extract was applied with the help of micro capillary, just 2 cm above from the bottom. The spots were equally sized, dried, and developed and finally the R_f values were calculated.

2.3 Physicochemical parameters [16]

The loss on drying, ash values, extractive values, ash value, Ph was calculated. Tab. No. 2.

3. Results and Discussion

Description

- Color: Dark brown
- Consistency: Semisolid, malleable, sticky preparation
- Odour: Ghee
- Taste: Bitter and pungent.

Dose: 5 to 10 gm

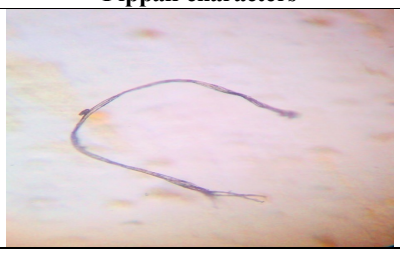
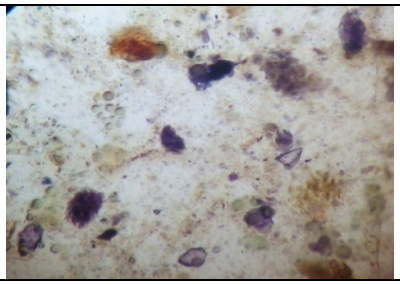
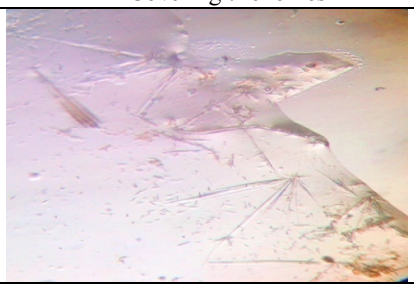
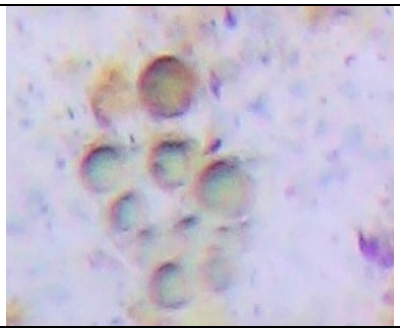
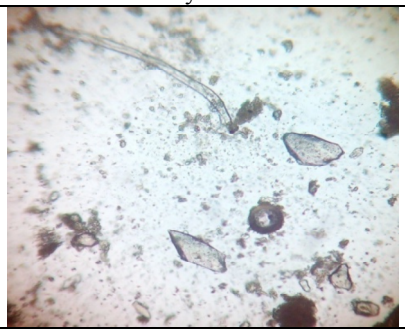
Vehicle: Warm water, Dashmoolakatutrayadikashay, Vasakarishta *etc.*

Action: Bronchodilator, expectorant, coolant, immunomodulator.

Uses: It subsides cough, cold, rhinitis, bleeding disorders, asthma, chest pain, pain in flanks and fever. The patients who are habituated of take the anti-asthmatic drugs, if they consume medicine regularly better therapeutic efficacy can be obtained. For its best result in cold and rhinitis, the formulation is taken with Nagagutika or Pushkaramoolasava. In case bleeding from nostrils vasavaleha is administered along with cow's milk. In the condition of phlegm, nasal blockage and sinusitis, vasavaleha is found effective by its potent expectorant and bronchodilation effect. Utmost care should be excercised while administering it in diabetic patients.

Yield of Vasavaleha = 960 gm

Microscopic examination: The microscopic examination of Vasa Avaleha revealed the presence of fibres, starch grains, crystals, perisperm cells, endocarp in Pippali and covering trichome, needle shaped calcium oxalate crystals, cystoliths, epidermal cells in Vasaka.

Pippali characters	Vasaka characters
	
• Fibres	• Covering trichomes
	
• Starch grains & crystals	• Needle shaped calcium oxalate crystals
	
• Perisperm cells	• Calcium oxalate crystals

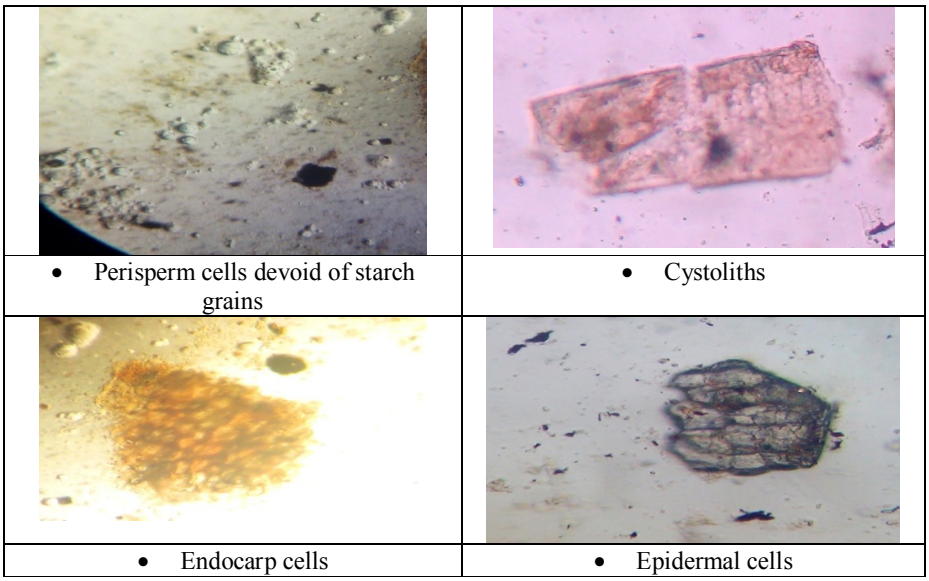


Fig 1: Represents various characters of Vasa Avleha

Identification by TLC: TLC of prepared Vasa Avaleha sample extract on Silica gel 'G' plate using different mobile phases resulted into various results as shown below in Fig. a, b, c.

I. **Mobile phase:-** *Ethyl acetate :methanol : ammonia* (8:2:0.2):- After development the plate was allowed to dry in air and sprayed with anisaldehyde sulphuric acid reagent it shows major spots at R_f 0.77 (brownish), R_f 0.96 (brownish).

II. **Mobile phase:** *Chloroform: methanol: water* (8: 4: 0.2):- After development the plate was allowed to dry in air and examine under ultraviolet light. It shows two purplish spots of R_f value 0.24, 0.34, & two blue colored spots of R_f 0.66 and at R_f value 0.77. The plate was derivatised with 10% H_2SO_4 *reagent* and anisaldehyde sulphuric acid reagent it shows prominent two dark brown colored spots of R_f value 0.24 and 0.34 and two less prominent spot of light brown colored of R_f value 0.66, R_f 0.77.

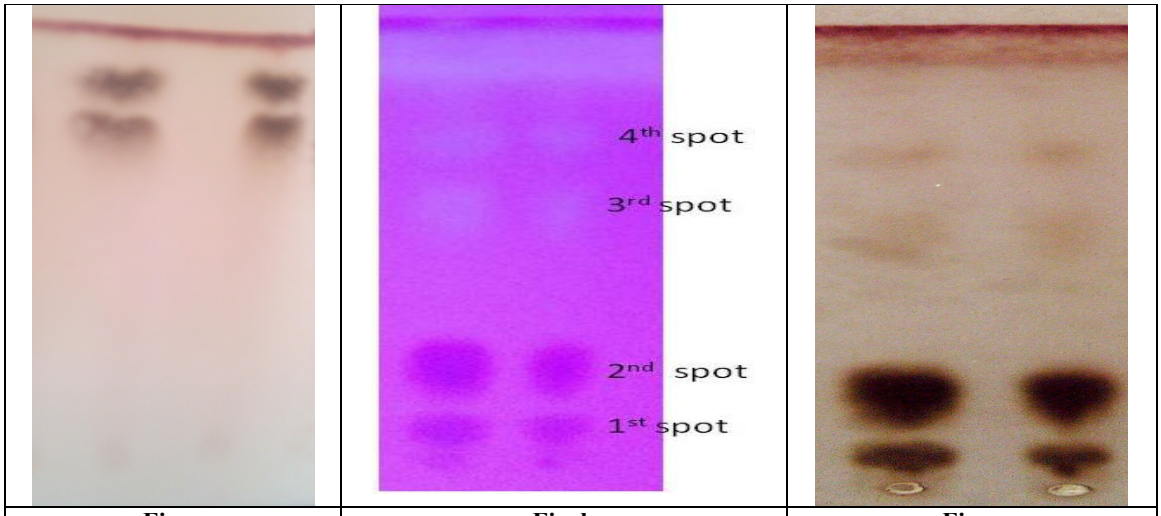
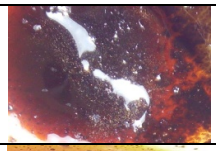
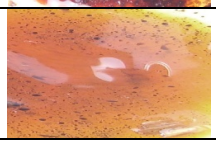


Fig. a	Fig. b	Fig. c
Mobile phase: ethyl acetate :methanol : ammonia (8 : 2 : 0.2) **Detection**: Sprayed with Anisaldehyde sulphuric acid reagent	**Mobile phase**: Chloroform :methanol : water (8 : 4 : 0.2) **Detection**: Long UV (366 nm)	**Mobile phase**: Chloroform :methanol : water (8 : 4 : 0.2) **Detection**: Sprayed with 10 % H_2SO_4

III. Physicochemical parameters

Various physicochemical parameters in comparison with standard values mentioned in Ayurvedic Pharmacopoeia of India are mentioned in Table 2.

Table 2: Result of various physicochemical parameters

Parameter		Determined value	API value
Water soluble extractive		63.65 % w/w	Not less than 60 %
Ethanol soluble extractive (Oily consistency)		55.85 % w/w	Not less than 20 %
Loss on drying		3.44 % w/w	Not more than 12.16 %
Total ash		1.99 % w/w	Not more than 2.5 %
Acid insoluble ash		0.054 % w/w	Not more than 0.15 %
Ph (10% aqueous solution)		4.48	4.35 to 4.9

4. Conclusion

From this study it is concluded that physicochemical parameters were within the limits of Ayurvedic Pharmacopoeia of India and results of other parameters of standardization are mentioned below:

- Defatting of extract: In API it is mentioned to use the sample for micrcoscopic study only after defatting but there is no defatting occurs with Hexane, Chloroform, Ethyl acetate of the sample extract. So the sample was treated directly with methanol so as to make sample available for microscopic procedure.
- Microscopy of pippali: Perisperm cells are present but devoid of starch grains.
- TLC studies: The mobile phase as Chloroform: methanol: water (8: 4: 0.2) gives adequate separation on TLC plate.

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