

A Pharmacognostical and Phytochemical study of *Sookshma Eladi Choornam*

Research Article

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Abstract

Introduction: *Sookshma Eladi choornam* is one of the Ayurvedic formulations specially mentioned for *Kaphaja Hridroga* in *Hridroga prakarana* of Bhaishajya Ratnavali. *Dhamani pratichaya* (Atherosclerosis) is one of the diseases of *Kaphaja nanatmaja vaydhi* which is the more important cause for Ischemic Heart Disease. The cause for Atherosclerosis could be Hyperlipidemias. *Eladi choornam* is a compound preparation which contains powders of *Sookshma ela* (*Elettaria cardamomum* Maton.) and *Pippali moolam* (root of *Piper longum* L.). As these drugs are *Katu vipaka* in nature they can be used in Hyperlipidemia. To know the efficacy of the drugs their quality parameters are highly essential to manufacture in the large scale. **Method:** The present study deals with the Pharmacognostical and phyto-chemical study of *Sookshma eladi choornam* including Thin Layer chromatography study (TLC) as per the standard literature. **Result:** Consistency of *Sookshma eladi choornam* is fine powder. Colour was brown, odour was aromatic spicy smell, Taste was pungent, touch was smooth powder form, Qualitative study showed that pH is 4.9, total ash value 12 %, loss on drying is 4.5%, Water soluble matter 17%, Alcohol soluble matter 8%, Acid insoluble ash 8.5%. Thin Layer chromatography (TLC) revealed one yellow spot. Dissolution time is 4 minutes and Moisture content was 8%. Phytochemicals as Alkaloids, Glycosides, Tannins, Flavonoids and Phenols were found. **Conclusion:** Pharmacognostical, phyto-chemical and TLC studies inferred that the formulation meets the minimum quality standards. The study may be used as reference standard in the further quality control researches.

Key Words: *Hridroga, Hyperlipidemia, Dhamani Pratichaya, Atherosclerosis.*

Introduction

Hyperlipidemia is defined as an elevation of one or more of the following in the blood: cholesterol, cholesterol esters, phospholipids, or triglycerides. Abnormalities of plasma lipids can result in predisposition to coronary, cerebrovascular, and peripheral vascular arterial diseases (1).

This is considered as one of the major risk factors for Cardiovascular diseases (CVDs). One third of the total deaths around the world are believed to be due to CVDs(2).

Hyperlipidemia is one of the major causes of atherosclerosis which is strongly related to the ischaemic heart disease (IHD). Atherosclerosis is a process in which arteries become hard due to deposition of cholesterol in their wall and cause narrowing of the arteries. In addition, hyperlipidemia along with oxidative stress may cause oxidative modifications in low-density lipoproteins, which play an important part in the initiation and development of atherosclerosis and related cardiovascular diseases (3). Lipid lowering drugs

like fibrates, statins and other anti-lipidemic drugs reduce the hyperlipidemia but has minimum effect on the oxidative stress and also are not free from toxic side effects (4). World ethno-botanical information stated that a number of herbal medicines from plants and vegetables are used for controlling hyperlipidemia and related complications in patients (5).

Ayurvedic medicine, a natural based medicine system followed mainly in India and some other South Asian countries proposes to use the herbal and mineral based medicines for the effective reduction of the hyperlipidemia with minimal adverse effects. It deals with the treatment of the whole body by correcting the three major humors called as *Vata, Pitta and Kapha*. Many formulations are mentioned for the effective treatment of various ailments of the body.

Sookshma eladi choornam is one of the Ayurvedic preparations mentioned in *Hridrogaprakarana* of *Bhavaprakasha* indicated in *Kaphaja hridroga*. *Kaphaja hridroga* is similar in clinical features with the cardiovascular diseases. The etiological factors like excessive intake of the oily and heavy foods which increase kapha in the body also increase medo dhatu because of their similarities in their physical nature. They also lead to conditions like *dhamani pratichaya*. *Dhamani pratichaya* (atherosclerosis) is said to be one of the *nanatmaja vikaras* of Kapha where in accumulation of *medodhatu* is also seen in the srotas which cause depletion of

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circulation and nutrition the target tissue. The pathology and the symptoms of the dhamani pratichaya are having major similarities with the Atherosclerosis. *Sookshma eladi choornam* is one such Ayurvedic remedy which can be given in hyperlipidemia (kaphaja hridroga) to prevent atherosclerosis (dhamani pratichaya). This is a compound herbal preparation contains two herbal drugs 1. *Sookshma ela* (*Elettaria cardamomum* (L.) Maton) and 2. *Pippali moolam* (*Piper longum* L.). Both the ingredients are highly indicated for the treatment of both the conditions of atherosclerosis and hyperlipidemia. The *Dipana*, *Pacana*, *Hridya* and *soola prashamana* actions of both the drugs help to overcome the cardiovascular disorders.

Before proceeding to the clinical activity of the drug, it is important to authenticate the samples and to select the best possible raw drugs for the better clinical results. Hence the present study is planned to identify the raw material for its authenticity and also set some standard for the complete preparation.

Aims and Objectives

- To study the Pharmacognostical aspects of individual drugs used in the preparation of *Sookshama eladi choornam*.
- To study the Phyto-chemical aspects of individual drugs used in the preparation of *Sookshma eladi choornam*
- To compare the Pharmacognostical and Phyto-chemical results with the standard literature available.

Materials and Methods

Collection of the drug *Sookshma eladi choornam*: Ingredients have been collected from the local market of Tirupati and authenticated by the Dept. of Dravya Guna, S.V. Ayurvedic College, TTD, Tirupati, using the standard literature available from the Ayurvedic Pharmacopoeia of India. The ingredients and the part used are given in Table no.1.

Table No.1: Ingredients of Sookshma eladi choornam

Sl.No.	Drug Name	Botanical name	Part used	Ratio
1	<i>Sookshma ela</i>	<i>Elettaria cardamomum</i> (L.) Maton.	Fruit and seeds	1 part
2	<i>Pippali moolam</i>	<i>Piper longum</i> L.	Root	1 part

Method of Preparation of Sookshma eladichoornam Ingredients enlisted in Table 1 are procured from the local market of Tirupati and are dried well in shade. After complete drying the ingredients (*Sookshma ela* and *Pippali moola*) are powdered individually in a grinder and sieved to collect the fine powder. They are then taken in equal quantities (1:1 ratio) and mixed together to make a homogenous mixture. For clinical application the medicine was manufactured in a bulk quantity by the Sahasrayoga Pharmacy in a single batch with batch no : SYSEC 1,

manufacturing date: JULY 2019, Expiry date : JUNE 21, Licence no:T2122/AYUR.

The powder was analyzed using various standard physicochemical parameters as per Ayurvedic Pharmacopoeia of India (API) at the Varun Herbals Research and Testing Lab, Hyderabad, Telangana.

Observations and Results

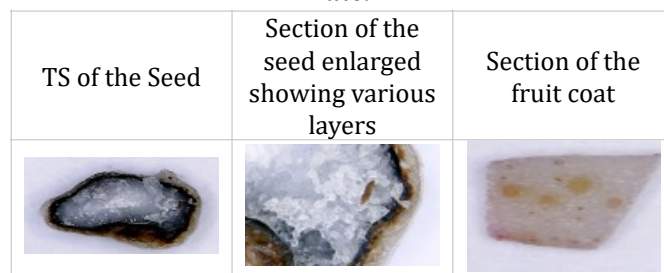
The drugs were observed for their morphological and microscopic characters and are compared as per the Ayurvedic Pharmacopoeia of India.

Morphological and microscopic observations of ingredients of Sookshma eladi choornam

Ela:

Samples of ela fruit showed the morphological characters like long ovoid shape around 2 cms long, greenish in colour, three sided containing around 4 seeds in three chambers accounting to around 12-15 seeds in a fruit. The seeds are dark brown to black, aromatic and have characteristic taste. Microscopic section of the seeds showed outer epidermis with thick walled cells. Parenchyma contained volatile oil in rectangular cells. Many rounded polyhedral starch grains are observed.

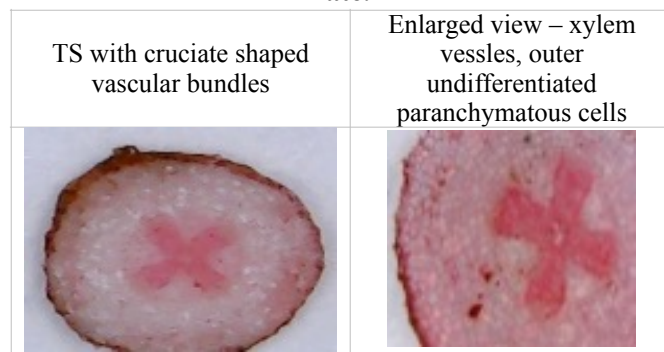
Plate.1



Pippali moola:

Transverse section of the root of *Piper longum* L. showed outermost cork as a narrow strip followed by wide parenchymatous cortex. Starch grains, oxalate crystals and secretory cells are observed. Central pith is observed around which four radiating strips of the vascular bundles are observed.

Plate.2



Organoleptic parameters

Organoleptic parameters(6)like, Colour, odour, taste and touch were scientifically studied and results were depicted in the table no.2.

Table. No. 2: Organoleptic properties of *Sookshma eladi choornam*

Odor	Aromatic spicy smell
Colour	Brown
Touch	Smooth
Consistency	Fine powder
Taste	Pungent

Physico-chemical analysis:

Physicochemical parameters of *Sookshma eladi choornam* like Uniformity of the weight, Loss on drying, pH, Ash Value, Water soluble extract, Methanol soluble extract, Acid insoluble ash, TLC was evaluated. The results are depicted at Table no.3.

Table No.3. Physico-Chemical investigations of *Sookshma eladi*

S, No.	Investigation	API /AFI Standards	Test results	Reference
1	Foreign matter	Nill	Complies	AFI-2.2.2
2	Total ash	Not more than 6%	6%	AFI-2.2.3
3	Acid insoluble ash	Not more than 4%	3.82%	AFI-2.2.4
4	Alcohol soluble extractive	Not less than 2%	2.32%	AFI-2.2.6
5	Water soluble extractive	Not less than 10%	11.2%	AFI-2.2.7
6	Volatile oil	Not less than 4%	4.32%	AFI-2.2.10

Table No.4. Physico-Chemical investigations of *Pippali moola*

S, No.	Investigation	API /AFI Standards	Test results	Reference
1	Foreign matter	Nill	Complies	AFI-2.2.2
2	Total ash	Not more than 6%	6%	AFI-2.2.3
3	Acid insoluble ash	Not more than 4%	3.82%	AFI-2.2.4
4	Alcohol soluble extractive	Not less than 2%	2.32%	AFI-2.2.6
5	Water soluble extractive	Not less than 10%	11.2%	AFI-2.2.7
6	Volatile oil	Not less than 4%	4.32%	AFI-2.2.10

Table No.5: Physico-chemical parameters of *Sookshma eladi choornam*


S.No.	Test Parameters	Method/ SOP No.	Results	Unit of measurement
1	Loss of drying	API	4.5	%
2	Water soluble matter	API	1.7	%
3	Alcohol soluble matter	API	8	%
4	Total ash	API	12	%
5	Acid insoluble ash	API	8.5	%
6	PH	API	4.9	-

Thin layer chromatography study:

TLC study was carried out by VHIP method using Toulene and Ethyl acetate (9:1) during the mobile phase and Silica gel during the stationary phase. Vanillin and H₂SO₄ reagent was the spraying agent used for the TLC Study. The chromatograph showed one spot at Rf 0.18 (Yellow). Rf values of the spot obtained was at a comparable level which indicates the presence of some definite constituents in the sample.

Table No.6: Results of TLC of *Sookshma eladi choornam*

Table No.6: Results of TLC of <i>Sookshma eladi choornam</i>			Plate.3: TLC Study of <i>Sookshma Eladi Choornam</i>
Method	VHIP method		
Reagent	Vanillin and H ₂ SO ₄		
Solvent	Mobile phase	Toulene and Ethyl acetate (9:1)	
	Stationary phase	Silica gel	
Bands	One spot		
Rf values	0.18 (Yellow)		



Phytochemical screening of *Sookshma eladi*, *Pippali moola* and *Sookshma eladi choornam*

Sookshma eladi, *Pippali moola* and the finished drug *Sookshma eladi choornam* aqueous and alcohol extracts were subjected to phytochemical analysis to analyse the presence of various phytochemicals as flavonoids, saponins, amino acids, phenols, alkaloids, tannins, terpenoids, quinone and glycoside as per the following protocols:

- i. All the three sample solutions were treated with 10% NaOH. Formation of greenish brown colour indicates the presence of flavonoids
- ii. (Froth test): Each of the three sample solutions added to water and shaken well. Formation of froth indicates the presence of saponin.
- iii. Each of the three sample solutions were boiled with 0.2% ninhydrin solution. Formation of purple colour indicates the presence of free amino acids .
- iv. Each of the three sample solutions were treated with alcohol and ferric chloride. Formation of greenish yellow colour indicates the presence of phenols
- v. 1ml of each test solution was treated with 1ml of Hagger's reagent. Formation of yellow colour precipitate indicates the presence of alkaloid
- vi. : Each of the three sample solutions were treated with 20% boiled water and 0.1%FeCl₃. Formation of brownish green colour indicates the presence of tannin

- vii. Each of the three sample solutions were treated with chloroform and conc. H₂SO₄. Formation of orange colour indicates the presence of terpenoids
- viii.: Each of the three sample solutions were treated with HCl. Formation of a red precipitate indicates the presence of quinone.
- ix. Each of the three sample solutions were treated with 2 ml of glacial acetic acid containing few drops of FeCl₃ and 1ml H₂SO₄ added. Formation of a brown layer at interfere indicates glycoside

chromatography (TLC) revealed one yellow spot (plate.3). Dissolution time was 4 minutes and Moisture content was 8%. After the preparation of *Sookshma eladi choornam* all the phytochemicals were found except saponins.

Conclusion

The ingredients of *Sookshma eladi choornam* were identified and authenticated pharmacognostically and were used for the preparation. The ingredients taken were pharmacognostically authentic in comparison with the standard literature available. The phytochemicals present in the individual drugs were present in the compound formulation which is evident from the phytochemical study except for the quinones and saponins. Thus this pharmacognostical study of *Sookshma eladi choornam* will help for further standardization of the medicine with more latest parameters.

Table No:7. Phytochemical analysis of Sookshma ela, Pippali moola and Sookshma eladi choornam

S. No	Components	<i>Sookshma ela</i>	<i>Pippali moola</i>	<i>Sookshma eladi choornam</i>
1	Flavonoids	+	+	+
2	Saponins	+	+	-
3	Aminoacids	+	+	+
4	Phenols	-	+	+
5	Alkaloids	-	+	+
6	Tannins	-	+	+
7	Terpenoids	+	+	+
8	Quinones	-	-	-
9	Glycoside	+	-	+

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Discussion

Phytochemical and pharmacognostical evaluation of *Sookshma eladi choornam* showed the specific characters of all the ingredients which were used in the preparation. The enlarged transverse section of seed of *Sookshma ela* (plate.1) showed outer thick walled epidermis followed by parenchymal layer of cells. The inner epidermis is thin walled with an inner integument and outer sclerenchyma (7). The phytochemical analysis of *Sookshma ela* showed the presence of flavonoids, saponins, amino acids, triterpenoids and glycosides. The transverse section of *pippali moola* showed (plate.2) cruciate shaped vascular bundles. The enlarged transverse section of *pippali moola* showed xylem vessels and outer undifferentiated parenchymatous cells (8). The phytochemical analysis of *pippali moola* showed the presence of flavonoids, saponins, amino acids, phenols, alkaloids, tannins and terpenoids. The Phytochemical analysis of *Sookshma eladi choornam* showed flavonoids, amino acids, phenols, alkaloids, tannins, terpenoids and glycosides. Physico-chemical analysis of *Sookshma eladi choornam* showed that pH was 4.9; total ash value 12 %, loss on drying was 4.5%, Water soluble matter 17%, Alcohol soluble matter 8%, Acid insoluble ash 8.5%. Thin Layer
