

# Pharmaco Botanical Studies on Some Powdered Herbal Drugs for Their Diagnostic Characterization-I

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## Abstract

Identity of herbal drug is a paramount aspect of quality and established on the basis of pharmaco- botanical studies which comprise organoleptic, macro and microscopic characterization studies. In the present studies, powdered herbal drugs viz *Cissampelos pareira* Linn., *Cyperus rotundus* Linn. and *Desmodium gangeticum* DC. are subjected to pharmaco-botanical studies leading to their diagnostic characterization. These findings are a tool to establish the identity of powdered ingredients in a formulation or dosages form.

**Keywords:** *Cissampelos pareira* Linn., *Cyperus rotundus* Linn., *Desmodium gangeticum* DC., Powdered herbal drug.

## Introduction

Herbal drugs are powdered for the manufacturing of different dosages forms in Ayurveda, Siddha and Unani medicines. Most common powdered dosages forms are Churna, Kvatha Churna (in Ayurveda), Sufoof (in Unani system of medicine), Churnam and Kudineer Churnam (in Siddha system of medicine). These medicinal powders are single ingredient or multi ingredients (combination of plant, mineral/metal or animal origin drugs). Besides medicinal powders, powdered ingredients are further processed to formulate other dosages forms of respective systems and modern dosages forms. The quality of powdered ingredients is foremost to ensure the quality of medicine. In the exercise of quality assessment, identity of the ingredients is an essential requirement. In this communication diagnostic characteristics of powdered root or rhizome of *Cissampelos pareira* Linn., *Cyperus rotundus* Linn. and *Desmodium gangeticum* DC. are studied. These herbal drugs are specifically used in a number of formulations of Ayurveda, Siddha and Unani systems of medicine (Table-1).

*Cissampelos pareira* Linn. (Family-Menispermaceae) is known as 'Patha'. The drug consists of dried roots of this twining perennial shrub. The roots are also commercially exploited as 'false pareirabrava'. However, the true 'pareirabrava' is reported to be derived from *Chondodendron tomentosum* Ruiz et Par. (Family-Menispermaceae), which is a tropical African species. *Cissampelos* Linn. genus (*Kissos*-ivy and *ampelos*-a vine) have the characters of ivy in its resembling branches that of the vine from the fruits being in racemes. *C. pareira* Linn. is native of south America. *C. pareira* Linn. is anthelmintic, antidote to poison, antilithic, astringent, cardiac, carminative, diuretic, expectorant, febrifuge, sedative, supportive and toxic in action. It is medicinally used for asthma, cold and cough, colic, diarrhoea and dysentery, fever, indigestion, inflammatory

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**Table 1:** Status of Herbal drugs in different official compendium and systems of medicine

Sl. No.	Botanical Name	Official Name	Pharmacopoeia	Formulary
1.	<i>Cissampelos pareira</i> Linn	Patha	Ayurvedic Pharmacopoeia of India, Part-I, Vol.-I	Ayurvedic Formulary of India, Part-I
2.	<i>Cyperus rotundus</i> Linn.	Ponmusuttai	-	Siddha Formulary of India, Part-I
		Musta	Ayurvedic Pharmacopoeia of India, Part-I, Vol.-III	Ayurvedic Formulary of India, Part-I
		Sad kufi	Unani Pharmacopoeia of India, Part-I, Vol.-I	National Formulary of Unani Medicine, Part-I
		Korai	-	Siddha Formulary of India, Part-I
3.	<i>Desmodium gangeticum</i> DC.	Salparni	Ayurvedic Pharmacopoeia of India, Part-I, Vol.-III & IV	Ayurvedic Formulary of India, Part-I
		Peraamalli	-	Siddha Formulary of India, Part-I
		Desmodium-gangeticum	Homoeopathic Pharmacopoeia of India, Vol.-VI	-

affections of the bladder and kidney (chronic cystitis), nephritic disorders, piles and ulcers. Some authors equate 'Laghupatha' with *C. pareira* Linn. and 'Patha' with *Stephania hernandifolia* Walp. In South India *C. pareira* Linn. is accepted as medicinal plant, but not as 'Patha'. *Cyclea peltata* Diels and other allied species belonging to family Manispermaceae are used as patha (Herman, 1868, Kirtikar & Basu, 1933; Anonymous, 1950, Aiyer and Kolamal 1953-66 Chopra *et al.*, 1956; Day, 1980).

*Cyperus rotundus* Linn. (Family- Cyperaceae) is an annual weed of the pasture lands, road sides and other moist places and grows throughout Indian sub-continent. The dried tubers of plants are officially regarded as 'Musta' in Ayurveda and 'sad kufi' in Unani system of Medicine. Besides its medicinal potentialities, it is also used in certain dye preparations to impart perfume to the fabrics. In

Bengal, dried and pounded tubers are largely used as perfume in the weddings of natives. The generic title of the plant '*Cyperus*' is supposed to be derived from '*Cypris*' – a name of lord venus, as the underground parts of some of the species of *Cyperus* being aphrodisiacal. It is reported that Romans used it as emmenagogue in uterine complaints. The drug is mentioned in AshtangHridya, Bhav Prakash Nighantu, Charak Samhita, DhanvantariNighantu, Sushruta Samhita etc. and also mentioned as 'Nagarmotha' in Unani system of medicine, The drug is often adulterated with allied species and other generic members of family Cyperaceae. (Herman, 1868, Watt, 1889-93; Anonymous, 1969; Chunekar, 1972).

*Desmodium gangeticum* DC. (Family - Leguminosae) is most valued in Ayurveda, being an ingredient of the famous Ayurvedic combination of 'Dasmoool' (combination of roots of ten different medicinal plant species). It is officially titled as 'Shalparni'. This drug is elaborated with its medicinal potentialities in Ashtanghridaya, Bhav Prakash Nighantu, Nighantu Ratnakar, Sushruta Samhita, etc. of Ayurvedic classical literature. The identity of the drug has been a subject of controversy. In Travancore –Cochin, *D. gangeticum* is considered as 'Prisniparni and *Pseudarthia viscida* W. & A. as 'Shalparni. Other species such as *D. latifolium* DC. and *Uraria lagopoides* DC. are also used as 'Shalparni'. However, majority of workers have mentioned *D. gangeticum* as Shalparni (Anonymous, 1952, 1978; Aiyer and Kolamal, 1953-66; Chunekar 1972).

## Material and Methods

The herbal drugs selected for present study were collected from the natural habitats and authenticated by complying the macroscopical characteristics of these drugs with that of standard reference drug samples available in the museum-cum-herbarium of the Pharmacopoeial Laboratory for Indian Medicine, Ghaziabad, India. To study the powder microscopy, the drugs were first washed under running tap water to remove any dust or soil particles and then air dried for few days at room temperature or in shade,. The dried drugs were then powdered and pass through 120 µm sieve. The fine powder obtained through sieve 120 µm was then subjected to various histo-chemical tests and the temporary mounts of powder prepared to observe under light microscope (Jackson and Snowdon, 1968; Johansen, 1940; Youngken, 1951).

## Results and Conclusion

The herbal drugs (entire and powdered) selected for present study was subjected for organoleptic characteristics (Table-2). The powder microscopy was also carried out and characteristics cellular elements and ergastic contents observed in these drugs are given in Table-3. The characters observed may serve as

**Table 2: Organoleptic characteristics of herbal drugs**

Sl. No.	Botanical Name	Organoleptic Characteristics	
		Entire drug	Powdered drug
1.	<i>Cissampelos pareira</i> Linn	The drug occurs in the form of dried, cylindrical cylindrical pieces of perennial and seldom branched matured tap roots. The drug varies in size and measures 15.0-24.0 cm in length and 1.0-2.5 cm in diameter. The pieces of roots obtained from the closer portion of shoot system are woody in comparison to other portions obtained from deeper parts of the root. The other portions are generally more fleshy and tuberous. The dried roots are brownish to grey in colour, corky in texture, compressed, entire or splitted longitudinally. The external minute pits and wavy. It also shows vertically branched cracks or fissures. The older pieces of drug exhibits longitudinally ridged surface with transverse cracks. The fracture of the root is short and splintery. There is faint aromatic odour. The taste is at first sweetish and then bitter.	The powdered drug is brown in colour with faint aromatic odour. It has bitter taste which is at first sweetish on chewing.
2.	<i>Cyperus rotundus</i> Linn.	The drug comprises of dried tubers of varying sizes. The tubers are oval to spindle shape, somewhat compressed and tapered at both the ends spreading the root system. The tubers generally range from 1.5-3.5 cm in length and 0.5-2.5 cm in diameter. The tubers are unbranched and sometimes flattened or uniformly cylindrical with comparatively longer center portion. These are slightly semi-succulent when fresh, but turn hard in nature after drying. These are dark brown to black in colour and are covered with numerous rootlets. Some of the tubers have scars or remains of rootlets. Tubers are not easily breakable due to smaller size and hardened nature. The fracture is short exposing white interior with light brown dots. The tubers have an aromatic fragrance and a slightly agreeable taste.	The powdered drug is brown in colour with aromatic odour and agreeable aromatic taste.
3.	<i>Desmodium gangeticum</i> DC.	The dried matured tap roots are utilized as drug. The roots are simple, branched, long, irregularly curved, light yellow in colour and are of varying length usually 10.0 – 30.0 cm long. The roots are cylindrical and have cord-like appearance. The diameter of roots ranges from 0.5 – 2.5 cm. The whole root system is usually cut into smaller and convenient sizes or occasionally formed as compact bundle consisting of whole root system. The surface of the roots are smooth bearing irregularly distributed small brown lenticels. It breaks with short and fibrous fracture. It has no characteristic odour, but the taste is slightly sweetish and mucilaginous.	The powdered drug is dull yellowish brown in colour with slightly sweetish and mucilaginous taste. It is devoid of any characteristic odour.

**Table 3:** Diagnostic microscopic characteristics of powdered herbal drugs

Sl. No.	Botanical Name	Diagnostic Microscopic Characters		
		Cellular elements	Ergastic contents	
			Starch Grains	Calcium Oxalate Crystals
1.	<i>Cissampelos pareira</i> Linn	Fairly common fragments of phellem which occur in both surface and transactional view, thin walled phelloderm cells containing starch grains and occasional crystals of calcium oxalate, small groups of sclerenchymatous cells which are not abundant and fairly common rectangular, thin walled medullary ray cells, containing starch grains. The vessels and trachieds are singly or in groups but usually fragmented. Vessels have articulations with simple pits on wall	Starch grains are mostly simple and some of them are compound with three to five components. Individual starch grains are round to oval some of them are cup shaped.	The occasional calcium oxalate crystals are found scattered or enclosed in cells and are usually in the form of single prisms.
2.	<i>Cyperus rotundus</i> Linn.	Occasional fragments of epidermis, a few of them adhering to the cells of hypodermis, abundant thin walled compact, parenchymatous cells of cortical and steler region filled with starch grains; rarely, cells of endodermis associated with parenchymatous or sclerenchymatous cells and occasional moderately thick walled fibres with tapering or blunt ends. The vessels often fragmented occur singly or usually in groups and have reticulate thickening. Parenchymatous cells containing brown tannin content are also fairly common in powdered drug.	Starch grains are simple and abundant in occurrence.	Absent
3.	<i>Desmodium gangeticum</i> DC.	Fragments of thick brown phellem cells with or without prismatic crystals of calcium oxalate, a few of fragments are associated with parenchymatous cells of phelloderm, abundant thin walled parenchymatous cells of phelloderm, some of the cells contain starch grains or calcium oxalate crystals or resinous mass, thick walled lignified cells of xylem parenchyma, particularly adhering with vessels, medullary ray cells and abundant fibres which are generally in groups. Fibres are usually fragmented, lignified thickened with narrow lumen and also found associated with thin walled or thick walled parenchymatous cells.	Fairly distributed starch grains are simple, elliptical or spherical having central hilum.	The prismatic calcium oxalate crystals are rarely found scattered independently, mostly enclosed in cells and twin crystals are also present.

diagnostic for identification of these drugs in a formulation. TLC/HPTLC are frequently used for detecting and identifying herbal ingredients in formulations, but the pharmaco-botanical evaluation to confirm the presence or absence of the herbal ingredients in the formulations has advantage over chemical methods as later is simple and inexpensive. In addition, the pharmaco-botanical evaluation of herbal preparations is also helpful to detect any deviation from the official formulation not declared on the label.

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