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COMPARATIVE PHARMACOGNOSTICAL PROFILE OF CULTIVATED, MARKETED AND WILD SAMPLE OF *GAMBHARI* ROOT (*GMELINA ARBOREA*, LINN.)

Dr. Sarika V. Surya* and Dr. Surekha T. Landge

Assistant Prof. Dravyaguna Department, Shri Ayurved Mahavidyalaya, Nagpur.

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***Corresponding Author**
Dr. Sarika V. Surya
Assistant Prof. Dravyaguna Department, Shri Ayurved Mahavidyalaya, Nagpur

ABSTRACT

Population explosion leads to excessive production of medicinal preparations. More or less side effects regarding to other pathies resulting into people rush towards Ayurveda. Now a day authenticity of any drug or formulation is hampered by means of adulteration, Cultivation of herbal drugs is one of the solution towards excessive need of peoples as well as adulteration. Any pathological conditions in the body which is degenerative type are considered under broad terminology i.e. *"Vata Vyadhi"*. *Dashmoola* is the main ingredient in most of the Ayurvedic formulations, as it posses properties like *Vatahara, Pittahara, Bruhana, Balya* etc. Though there are lots of drugs mentioned in Ayurveda by our ancient *Acharyas*, they need to be standardized by the help of modern parameters.

KEYWORDS: Dashmoola, Vata Vyadhi, Bruhana, Balya, Vatahara, Pittahara.

➢ INTRODUCTION

Main purpose of *Ayurveda* is to prevent diseases as well as, Ayurveda is an ancient system of medicine that uses approximately 1587 species of plants. Among the Ayurvedic preparations, *Dashmoola* is one of the most important traded raw drug formulations, with an annual turnover of >1000 MT. It consists of roots of 10 plants, of which five are tree species (*Brihat Panchmoolas*), and five herbs and shrubs (*Laghu Panchmoolas*).

In *Ayurveda t*here are groups of *dravyas* were mentioned on the basis of their similar actions, were called as *Mishrak Gana, Gana* or *Mahakashaya*. The groups were named on the basis of their *Karmas* as *Sandhaniya, Jeevaniya* etc. as well as name of *dravyas* like *Mushakakadi,*

Argwadhadi etc. *Gambhari* is the *dravya* which were used from *Vedik kala,* by the name *Rohini* was mentioned in *Atharvaveda,* where it is considered as *Asthisansthapaka* and *Krumighna*. The name *Kashmarya* is given in *Shatapatha Bramhana*, where it is explained as disinfectant. Useful parts (*Prayogya-anga*) of *Gambhari (Gmelina arborea, Linn)* are *Kanda, Patra, Pushpa, Phala, Beeja, Twaka* and *Moola*. According to Ayurvedic classics uses of *Gambhari* are- Diuretic, anti-inflammatory, tonic, aphrodisiac, hepato-protective, astringent, and antimicrobial, as well as in the treatment of anaemia, leprosy, ulcers, vaginal discharge, alopecia, tumours etc.

➢ OBJECTIVES

1) To collect cultivated, market and wild samples of *Gambhari* root.
2) To authenticate all the samples of *Gambhari* root.
3) To find out adulteration in Market samples, if any present.
4) To observe the difference in content, Morphology & Pharmacognosy of all the samples.

➢ MATERIALS AND METHODS

The whole study is carried out in 3 steps as follows

1) Collection & Authentication

- **Collection**

a) Cultivated sample

Gambhari (Gmelina arborea, Linn.) was cultivated under self supervision along with the guidelines given by WHO for cultivation of medicinal plants. Strict GACP (Good Agricultural and Collection practices) norms were followed during the complete process. This sample is collected at 1 year completion.

b) Market sample- Collected from local market from authenticate drug vendor.

- Wild Sample- Collected from 50 km away from forest area.
- **Authentication-** All the samples were authenticated from Botany Department of government approved laboratory.

2) Pharmacognostic study

➢ Pharmacognostical Study

a) Organoleptic study (*Panchbhautic Parikshan*)

• Organoleptic characters of the specimen are observed simply by sense organs and are desired under microscopy as per Pharmacopoeial method but *Ayurvedic* system itself has its own method of describing the characters of the specimen by the use of five sense organs (i.e. *Panchbhautika Parikshana* by *Pancha gyanendriya Parikshana*, examination by 5 sense organs, according to *Indriya Pancha-Panchaka)*

b) Macroscopic examination

• All the samples were subjected to macroscopic evaluation by observation with naked eyes and by tactile and other sensory inspection. A magnifying lens with a dissecting microscope was used for better evaluation of surface characters.

c) Microscopic examination

• Transverse sections of *Gambhari* root (*Gmelina arborea,* Linn.) samples were taken and photomicrography was done after proper mounting.

d) Foreign matter estimation

• It was examined for the presence of foreign matter like mud, stones, leaves or other part of the plant etc with the help of hand lens.

2) Physico-chemical Analysis

➢ **Determination of pH value**

• The pH value of an aqueous liquid may be defined as the common logarithm of the hydrogen ion concentration expressed in grams.

• The pH value conventionally represents the acidity or alkalinity of an aqueous solution.

• The measurement of pH is generally done with a suitable potentiometer called as the pH meter, fitted with two electrodes, one constructed of glass and sensitive to hydrogenation activity and the other calomel reference electrode.

➢ **Determination of total Ash value**

• The residue remaining after incineration is the ash content of the drug. Ash value represents inorganic matter of herbal drug.

• The results of Ash values signify the purity of drug that is the presence or absence of foreign matter such as metallic salt or silica present in the raw material.

➢ **Determination of Extractive value**

• The extracts obtained by exhausting crude drugs are indicative of approximate measures of their chemical constituents. Considering the diversity in chemical nature and properties of contents of drug, various solvents are used for determination of extractives.

➢ **Determination of water soluble extractive**

• This method is applied to the drugs which contain water soluble constituents like sugars, plant acids, mucilage, glycosides.

➢ **Determination of alcohol soluble extractive**

• Method is applied to the drugs which contain alcohol soluble constituents like resins. Alcohol is an ideal solvent for extraction of various chemicals.

➢ **OBSERVATIONS AND RESULT**

Table No. 1. Shows comparative organoleptic characters of samples.

Characteristics	**W**	**C**	**M**
Shabda (Fracture) Granular/ Soft/ Fibrous	Soft	Soft	Soft
Sparsha (Touch) *Snigdha/ Ruksha / Mrudu/Kathina*	*Mrudu*	*Mrudu Snigdha*	*Ruksha*
Roopa (Colour) Shape	Greyish-brown to light brown, Cylindrical	Dark greenish to light brownish, Cylindrical	Pale yellow colour, half cylindrical
Rasa (Taste) *Madhura/ Amla/ Katu/ Lavana/ Tikta/Kashaya*	*Katu, Tikta, Kashaya*	*Katu, Tikta, Kashaya*	*Katu, Tikta Madhura, Kashaya*
Gandha (Odour) *Sugandha/ Ugra/ Nirgandha/ Manda/ Sadharan*/Typical odour	Typical strong odour	Typical Odour	*Manda gandha*

Table. No. 2 shows comparative macroscopic characters of samples.

Characters	**W**	**C**	**M**
Appearance	Root	Root	Root
Colour	Greenish-yellow to yellowish brown	Greenish grey- to light brown	Pale yellow colour
Odour	Typical odour	Typical odour	Typical odour
Taste	Slightly bitter astringent	Astringent	Bitter
Shape	Cylindrical	Cylindrical	Half Cylindrical
Size	20-50 cm long, 3-7 cm thick	15-20cm long, 1-3 cm thick	5-15 cm long, 3-4 cm thick
Fracture	Short	Short	Short
Texture	Rough	leathery and rough	More rough

➢ **Physicochemical analysis**

Comparative Physicochemical analysis of all three samples of *Gambhari* root with API.

Table. No. 3 shows comparative Physico-chemical values of samples.

Parameters	As per API guideline	W	C	M
Foreign Matter	Not more than 2%	1.7%	1.9%	2.4%
Total ash Value	Not more than 6%	3.05%	4.50%	2.50%
Water soluble Extractive	Not more than 20%	20%	18%	22%
Alcohol soluble extractive	Not more than 1%	0.80%	1.25%	1.35%

➢ DISCUSSION

➢ Organoleptic characters

➢ In organoleptically the root of wild *Gambhari* sample appears grayish-brown to light brown in colour i.e. *Roopa*, but that of cultivated sample appears Greenish grey- to light brown as it was freshly cut down where as the market sample appears pale yellow as it was dry and was stored since long duration by vendor.

➢ *Rasa* of all the samples are *Katu, Tikta, Kashaya* except market sample it posses *Madhura Rasa* along with *Katu, Tikta* and *Kashaya Rasa*.

➢ All sample posses typical *Gandha* except market sample which has *Manda Gandha.*

➢ Two samples (wild and cultivated) had soft *Shabda* as they are freshly collected in wet forms. Market sample has harsh *Shabda*, as it collected as dried form, fractures were seen in all the samples.

➢ Macroscopic characters

• In physical appearance, color of the fully matured wild sample appears greyish brown to light brown in color, cultivated samples greenish gray to light brown in color, market sample appears pale yellow. It shows that color changes according to time duration and dryness of the sample.

• Internal surface of the root of all the samples is brownish cream and fibrous. It shows that color changes according to time duration and dryness of the sample.

• Internal surface of the root of all the samples is brownish cream which is fibrous.

• Texture in market sample was strongly rough as it was dried but that of wild and cultivated sample was leathery and rough as it was freshly collected and then dried.

➢ Discussion on Physicochemical analysis

• Foreign matter was found higher in market sample next in cultivated and least in fully matured wild variety. None of the samples were matched with API standard.

- It was found that the total ash values for all the samples are different and within API standard. Wild and market was closer to each other, cultivated sample has 4.50% Ash value.
- For *Gambhari* root water soluble extractive value was more than alcohol soluble extractive value, from the observation table of water soluble extractive value it is seen that more water soluble chemical constituents were present in market sample as compared to that of cultivated sample, alcohol soluble contents are higher in market sample and cultivated sample, least in wild sample.

➢ CONCLUSION

- *Dashmoola* is group of *Laghu Panchmoola* and *Brihat Panchmoola*, *Gambhari* is included in *Brihat Panchmoola.* Collection of roots of *Brihat Panchmoola* is done at their full growth, from this study it is concluded that in *Ayurvedic* formulations we should use cultivated sample i.e. 12 th month cultivated, rather than we should save time period by waiting for their full growth or minimum 10 year growth**.**

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- **The above study revealed that the fully matured wild sample of *Gambhari* root is very nearer to the parameters given with the API guideline in nearly all aspects,** cultivated sample shows considerable similarities with wild sample. **In *Ayurvedic* formulations we should use 12th month cultivated sample.**

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