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**Ankita Patel**

Research Scholar, Department of Botany, Govt. Girls P.G. College, A.P.S. University, Rewa, Madhya Pradesh, India

**Dr. Sonu Rahi**

Assistant Professor, Department of Botany, Govt. Girls P.G. College, A.P.S. University, Rewa, Madhya Pradesh, India

**Corresponding Author:**

**Ankita Patel**

Research Scholar, Department of Botany, Govt. Girls P.G. College, A.P.S. University, Rewa, Madhya Pradesh, India

## Phytochemical study of *Malachra capitata* medicinal plant

**Ankita Patel and Dr. Sonu Rahi**

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### Abstract

Herbal medicines are natural products and their phytoconstituents vary depending on time and region, processing and storage. Variations in the collection, processing or storage of an herb could impact its efficacy profile. Since prior knowledge regarding appropriate collection and usage of most medicinal plants exists in tradition, it can be used as a guide to quality standardization. The present paper deals the phytochemical screening of Root & Leaf extract of *Malachra capitata*. From the literature survey it is found that a very little work is done on root & leaf part of plant for on these lines. So, our aim is to find out again various standardization limits according WHO guideline. During phytochemical screening it was observed the loss of drying, ash values and extractive values etc. for root & leaf part of drug with a view to control the quality of crude drug.

**Keywords:** Phytochemical, screening, medicinal plant, *Malachra capitata*

### Introductions

Medicinal plants are the nature's gift to human beings to make disease free healthy life. It plays a vital role to preserve our health. India is one of the most medico-culturally diverse countries in the world where the medicinal plant sector is a part of time-honored tradition that is a respected even today. Here, the main traditional systems of medicine include Ayurveda, Unani and Siddha. (Kotnis, *et al.* 2004) <sup>[1]</sup> With the emerging worldwide interest in adopting and studying traditional systems and exploiting their potential based on different health care systems, the evaluation of the rich heritage of traditional medicine is essential (Gupta, 2010) <sup>[2]</sup>. In India different parts of medicinal plants have been used for curing various diseases from ancient times. In this regard, one such plant is *Malachra capitata*.

**Distribution:** *Malachra capitata* is found as a weed throughout the tropics. In South-East Asia it occurs in Indonesia (West Java, Timor), the Philippines (Luzon, Panay) and Thailand. It is cultivated as a fibre plant in India, where it is known as "bhanbendi", and Central and South America. *M. fasciata* has also widely naturalized. In South-East Asia it is widely distributed in the Philippines and rare in West Java, Madura, Timor and New Guinea.

**Botanical Description:** *Malachra capitata* belonging to family Malvaceae is very common erect or underground shrub. Mostly erect, coarse, annual or perennial herb 1-2 m tall, throughout densely whitish- or yellowish-tomentose with stellate hairs and usually also moderately to copiously hispid with simple or stellate hairs to 2 mm long; roots long-petioled; stipules lanceolate, 5-15 mm long; blades orbicular to ovate, 2-10 cm long, palmately sinuate to 3-, 5-, or 7-lobed, lobes mostly obtuse, crenate to serrate, the base obtuse or truncate; flowers in axillary, pedunculate, bracteate heads, bracts 1-2 cm long, stipitate and subtended by paired, filiform bracteoles, conduplicate, suborbicular to ovate, obtuse or acute, entire or once or twice dentate, obtuse to cordate at base, prominently veined and whitish basic centrally; involucre bracts wanting; calyx tubular-campanulate, 4-8 mm long, 5-lobed to below middle, lobes ovate-lanceolate, white with brownish or reddish nerves; petals yellow, obovate, 10-15 mm long, slightly exceeding stamina column; mericarps 3-3.5 mm long, Mucicous, reddish veined, puberulent; seed obovoid-cuneate, about 2.5 mm long, black, whitish-pubescent about hilum. The root of the *Malachra capitata* (L.) is traditional remedies for the many disease condition such as pain, hepatic cirrhosis, inflammation, diarrhea, convulsion, dementia, pyrexia, ulcer, healing of wounds (Harborne,

1973; Joy *et al.* 1998; Okwu, 2001; Jigna *et al.* 2005; Kawale & Chaudhary, 2009) [5-9].

**Traditional Uses:** Almost all the parts of *Malachra capitata* are of medicinal importance and used traditionally for the treatment of various ailments. The roots of the plant are considered as demulcent, diuretic, in chest infection and urethritis. The infusion of the root is prescribed in fevers as a cooling medicine and is considered useful in strangury, haematuria and in leprosy. The leaves are found to be good for ulcer and as a fomentation to painful parts of the body. The decoction of the leaves is used in toothache, tender gums and internally for inflammation of bladder. The bark is used as febrifuge, anthelmintic, Alexeteric, astringent and diuretic. The seeds are used in piles, laxative, expectorant, in chronic cystitis, gleans and gonorrhoea. (Kaushik, *et al.* 2009) [9].

Traditionally the plant is used in inflammation, piles, gonorrhoea treatment and as an immune stimulant. Root and bark are used as aphrodisiac, anti-diabetic, nervine tonic, and diuretic. Seeds are used as aphrodisiac and in urinary disorders. Along with other therapeutic applications, The Ayurvedic Pharmacopoeia of India [10] indicates the use of the root in gout, polyuria and haemorrhagic diseases. (Khare) [11]

## Materials and Methods

**Collection and Authentication of Plant material:** For Root and Leaf of *Malachra capitata* Linn. (Family-Malvaceae), plants were collected in the month of September from Kothi Compound Campus, Rewa. It was authenticated by BSI, Allahabad (U.P.).

**Drying of Plant material:** Roots & Leaf parts were separated from the *Malachra capitata* plant then washed with water. Kept in sun light for thirty minutes and then dried under shade at room temperature for 15 days. Grounded to a coarse powder and passed through a 60# sieve for Uniform particle size.

## Physicochemical Investigation (Khandelwal, 2005) [12].

**Loss on drying:** Loss on drying is the loss of mass expressed as per cent w/w. Loss on drying determines both water and volatile matter in the crude drug. Moisture is an inevitable component of crude drug, which must be eliminated as far as possible. An accurately weighed quantity of about 2 g of powdered drug was taken in a tared glass petridish. The powder was distributed evenly. The petridish kept open in vacuum oven and the sample was dried at a temperature between 100 to 105 °C for 2 hrs. until a constant weight was recorded. Then it was cooled in a desiccator to room temperature, weighed and recorded. % Loss on drying was calculated using the following formula.

$$\% \text{ Loss on drying} = \frac{\text{Loss in weight of the sample}}{\text{Weight of the sample}} \times 100$$

## Determination of Ash values

Ash values are helpful in determining the quality and purity of a crude drug, especially in the powdered form. The objective of ashing vegetable drugs is to remove all traces of organic matter, which may otherwise interfere in an analytical determination.

### a) Total Ash value

It is the total amount of material remaining after ignition. This includes both "Physiological ash", which derived from the plant tissue itself, and "Non physiological ash", which is residue of the extraneous matter. Total ash value was found out after putting the drug (about 2 gm) in crucible by using furnace at temp. of 600 °C for 2hr. Now calculated the percentage yield of ash value with reference to air dried drug.

### b) Acid-Insoluble Ash

It is residue obtained after boiling the total ash with dilute hydrochloric acid, and igniting the remaining insoluble matter. Boiled the ash for 5 to 10 minutes with 25ml of dilute hydrochloric acid, collected the insoluble matter in a crucible on an ash less filter-paper, ignited, and weighed. Now calculated the percentage yield of acid-insoluble ash with reference to the air-dried drug.

$$\% \text{ Acid insoluble ash value} = \frac{\text{Wt. of acid insoluble ash}}{\text{Wt. of crude drug taken}} \times 100$$

### c) Water soluble Ash value

Boiled the total ash for five minutes with 25 ml of water; collected the soluble matter in a crucible, ignited, and weighed. Calculated the percentage or water soluble ash with reference to air dried drug.

## Determination of extractive values

Determination of extractive values is useful for evaluation of crude drug. It given idea about the nature of the chemical constituents present in a crude drug.

### a) Alcohol soluble extractive value

Macerated 5 gm accurately weighed coarse powdered drug with 100 ml of alcohol (90% v/v) in a stoppered flask for 24 h, shaking frequently during first 6 h. Filtered rapidly through filter paper taking precaution against excessive loss of alcohol. Evaporated 25 ml of alcoholic extract to dryness in a tared dish and weighed it. Calculated the percentage w/w of alcohol soluble extractive with reference to the air-dried drug using following formula.

$$\% \text{ Alcohol soluble extractive value} = 80 \times (\text{Wt. of residue})$$

### b) Water soluble extractive value

The procedure as above was followed using chloroform water I.P. instead of alcohol.

## Results and Discussion

**Table 1:** Characteristics of powder of *Malachra capitata* Root and Leaf.

S. No.	Reagents	Observation	Inference	
			Root	Leaf
1.	Iodine solution	Blue colour	Starch grains present	Starch grains present
2.	FeCl <sub>3</sub> solution	Blue black colour	Tannins were present	Tannins were present
3.	Lectochloral	Observed calcium oxalate crystals	Calcium oxalate crystals present	Calcium oxalate crystals present

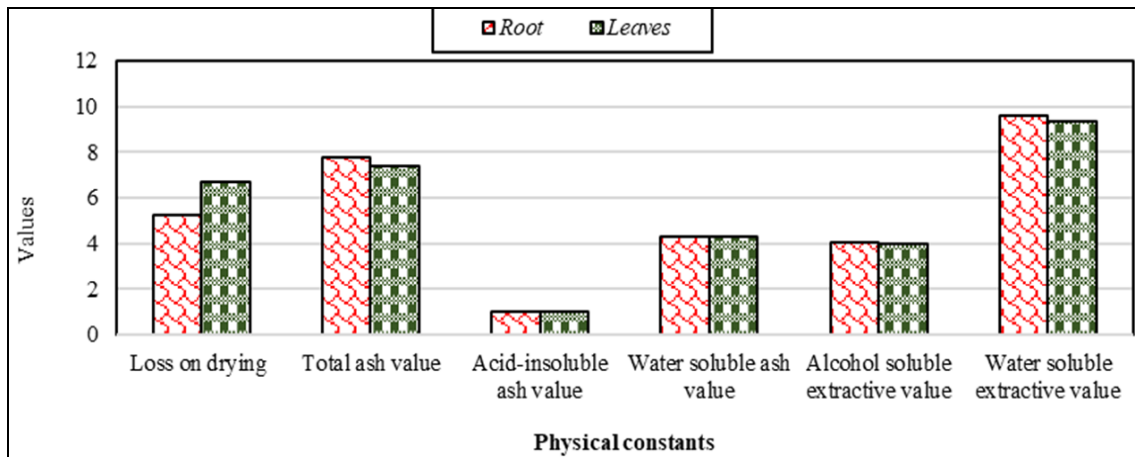
### Physicochemical Evaluation for Root

In the present study, Root powder was investigated for the physicochemical characterization according WHO guideline

and following results were observed for loss on drying, ash values & extractive values.

**Table 2:** Physicochemical Parameters of *Malachra capitata* Root and Leaves.

S. No.	Physical constants	Root	Leaves
1.	Loss on drying	5.23	6.67
2.	Total ash value	7.8	7.4
3.	Acid-insoluble ash value	1.0	1.0
4.	Water soluble ash value	4.30	4.30
5.	Alcohol soluble extractive value	4.07	3.97
6.	Water soluble extractive value	9.6	9.36
	Mean	5.33	5.45
	SD	±3.025	±2.963



**Fig 1:** Graph analysis of physicochemical parameters of *Malachra capitata* Root and Leaves

### Physicochemical Evaluation for Leaves

In the present study, Leaf powder was investigated for the physicochemical characterization according WHO guideline and following results were found of loss on drying, ash values & extractive values.

### Summary and Conclusion

In the present study, Root & Leaf of *Malachra capitata* was subjected to Phytochemical screening study. During the study, various standardization parameters like loss on drying, ash values, extractive values etc. were determined on the Root and Leaf of *Malachra capitata*. The water soluble extractive value of the crude drug was found to be higher than alcohol soluble extractive value.

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