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# Morphological Studies and Physicochemical Studies of Flowers and Roots of *Leonotis Nepetifolia* (Linn.) R. Br.

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**ABSTRACT**

*Leonotisnepetaefolia* (Linn.) R.Br. is a plant belonging to the family lamiaceae. The common names of this plant are lion's Ear, annual lion's ear, christmascandlestic etc.Medicinal plants have been a valuable source of medicines for a long period of time.The macroscopy of different parts of the plant such as color, odor, size, shape and taste were carried out. Physicochemical studies viz. pH value, loss on drying, foreign organic matter, total ash value, water soluble ash value, acid insoluble ash value, water soluble extractive value, alcohol soluble extractive value and swelling index have been carried out.In the present study, morphological and physiochemical studies of flowers and roots of *Leonotisnepetifolia* have been done.

**Keywords:** Valuable, macroscopy, fractures, swelling index.

## INTRODUCTION

*Leonotisnepetifolia*, also known as klip dagga, Christmas candlestick, or lion's ear, is a species of plant in the genus leonotis and the family lamiaceae (mint).It is native to tropical Africa and southern India. It can also be found growing abundantly in much of Latin America, the West Indies and the Southeastern United States.*L. nepetifolia* is considered an invasive plant in Australia, Florida, and Hawaii, though its tendency to grow in disturbed areas led researchers in Hawaii to conclude it's not likely to be an ecological threat.
India is one of the countries where various traditional systems of herbal medicines are practiced. These systems are highly dependent on plant resources for raw materials. Herbal medicines continue to be the most preferred by approximately 75-80% of the world's population (mostly in developing countries) for primary health care due to better cultural acceptability, better compatibility with the human body, and fewer side effects. It is estimated that about a quarter of prescribed medicines contain herbal extracts or active ingredients derived or modeled from herbal substances.[1-10]

### *Selection of plant materials*

*Leonotisnepetaefolia* (Linn.) R.Br. flowers and roots were selected for the present study, based on their utility. There are no scientific reports available depicting their efficacy or bioavailability, hence the present study was aimed.

### *Collection and authentication of plant materials*

All the plants parts were collected in the month of July from local market of Indore (M.P.). All these plants parts were identified and authenticated. Voucher specimens of the plant parts were submitted with voucher specimen no. for reference purpose.

### *Morphological studies*

The morphology or macroscopical parameters like; size, shape, colour, odourand taste were studied by sensory organs. The studies of organoleptic characters provide the simplest and quickest means to establish identity, purity and possibly, quality of crude drugs. If a sample is found to be significantly different, in terms of color, consistency, odor or taste, from the specifications, it is considered as not fulfilling the requirements.

**Color:**

All the samples were taken in to watch glass and examined untreated under diffuse daylight. They were observed for their color by naked eye.

**Odor:**

The odor of all the samples was examined. The time interval of two minutes was kept among the two smelling, in order to nullify the

effect of previous smelling.

**Taste:**

The samples were examined separately for their taste on taste bud of the tongue. The time interval among each sample was kept 15 minute, so as to make taste buds available fresh every time.

**Shape and Size:**

Shape and size were examined of the sample.[11, 12]

***Physicochemical Studies:***

In the standardization of herbal material, physical and physico-chemical factors play an important role in the establishment of purity and quality. Different physicochemical parameters were studied as listed below.

**a) Determination of pH Value:**

The pH was determined using a calibrated pH meter. One gram of each samples were accurately weighed and transferred into 100 ml beaker containing 100mL of DM water and stirred for 5 minutes to mixthe samples uniformly. The pH of each plant extracts were checked by using the pH electrode. 2 to 3 times readings were noted, then average of 3 readings was taken of each samples.

**b) Determination of loss on drying (LOD)**

LOD weighing bottles were taken which had been dried for 30 min under the same condition to be employed in the determination and cooled in a desiccator. Then 2.0 g of each plant extract samples were accurately weighed and transferred into the LOD bottle and immediately closed the lid. Now noted all the weights with stopper bottle (A). Placed the loaded bottles in the drying chamber, removed all the stoppers and leaving it also in the chamber. At 105 ± 2°C dried the samples for about 1 hour. Opened the drying chamber (Hot air oven) at the end of one hour and immediately placed the lid back on the bottles. Transferred each sample bottles back into the desiccator and allowed it to cool. The exact weight (B) was noted once the bottles were cooled. Percentage loss on drying was calculated by using the formula:

$$\% \text{ of Loss on Drying} = \frac{(B - A)}{\text{Wt. of taken}} \times 100$$

**c) Ash Values**

Inorganic content of the crude drugs was determined through the determination of various ash values.

- **Determination of total ash**

One gm. of each air-dried sample was accurately weighed and transferred into a pre weighted crucibles. Now exact weight of each samples were noted of weighed crucibles with the samples. Then at 650°C incinerated all the samples until free from carbon. Removed all the crucibles from the furnace and cooled in a desiccator and weighed the crucibles. Difference in the weight is the weight of the ash. Total ash content in all the samples were calculated by using the formula:

$$\% \text{ of Total Ash} = \frac{\text{Wt. of Ash}}{\text{Wt. of sample}} \times 100$$

- **Determination of Water soluble ash**

Weighed accurately about 1 gm of total ash obtained by above process and boiled with 25ml of water for 5 minutes. The insoluble matters were collected on an ash less filter paper, washed with hot water, ignited for 15 min. at a temperature not exceeding 450$^{o}$C. The weights of the insoluble matters were subtracted from weight of the ash. The difference in the weight represented the weight of water soluble ash. The percentages of water soluble ash was calculated with reference to air dried powder of crude drugs. The experiment was carried out in triplicate and the results are reported as average percentage w/w ± S.D. of the three readings.

$$\% \text{ of Water soluble Ash} = \frac{\text{Wt. of water soluble ash}}{\text{Wt. of the total ash}} \times 100$$

- **Determination of acid insoluble ash value**

The ash was taken from total ash to determine the acid insoluble ash content. 25 ml of 10 % dilute HCl were added into above samples and boiled on water bath for 10 min. Filtered each samples through the ashless filter paper. Insoluble matter of each samples were washed with hot water. Each samples of insoluble matter of ash were transferred with the filter paper in the earlier taken crucibles and dried it on hot plate. At 650°C ignited all the samples for 1 hr. in furnace. All the crucibles were removed from the furnace and cooled in a desiccator, and then crucibles were weighed. Acid insoluble ash content of all samples were calculated in the sample using the formula:

$$\% \text{ of Acid Insoluble Ash} = \frac{\text{Wt. of acid insoluble ash}}{\text{Wt. of the total ash}} \times 100$$

**d) Extractive Values**

Determination of water soluble, alcohol soluble, and petroleum ether (60-80$^{o}$C) soluble extractive values of the fresh and dried crude drug were determined as per the standard pharmacopoeial procedures described below:

- **Determination of water soluble extractive:**

Five gm. of each plant extract samples were accurately weighed and transferred into a 250 ml conical flask. Then 100 ml of DM water were transferred in each conical flask. For 6 hours kept the all flasks on the shaker and then allowed to stand for 18 hours. Filtered all the samples in previously weighed evaporating dish, and then evaporated 25 ml of each filtrate to dryness. Further dried all the samples at 105$^{o}$C to a constant weight and weighed. Percentage of water soluble extractives was calculated by using the formula:

$$\% \text{ of water soluble extractive} = \frac{\text{Wt. of residue}}{\text{Wt. of sample (A)}} \times 100$$

- **Determination of Alcohol soluble extractive:**

Five gm of each plant extract samples were accurately weighed and transferred into a 250 ml conical flask. Then 100 ml of methanol were transferred in each conical flask. For 6 hours kept the all flasks on the shaker and then allowed to stand for 18 hours. Filtered all the samples in previously weighed evaporating dish, and then evaporated 25 ml of each filtrate to dryness. Further dried all the samples at 105$^{o}$C to a constant weight and weighed. Percentage of alcohol soluble extractives were calculated by using the formula:[13-16]

$$\% \text{ of alcohol soluble extractive} = \frac{\text{Wt. of residue}}{\text{Wt. of sample}} \times 100$$

**e) Determination of swelling index**

Swelling index is determined for the presence of mucilage in the plant parts. Accurately weigh 1 g of the seed and placed in 150 ml measuring cylinder, add 50 ml of distilled water and kept separately for 24 hours with occasional shaking. The volume occupied by the seeds after 24 hours of wetting was measured.[17]

## RESULTS AND DISCUSSIONS

**Morphological studies:**

The macroscopy of different parts of the plant such as color, odor, size, shape and taste were carried out. The results were presented in Table No.1.

**Table No. 1. : Morphological characters of selected plant material**

| S. No. | Plant Part | Color | Odor | Taste | Shape | Size |
|---|---|---|---|---|---|---|
| 1 | Flowers | Orange | Musky | Bitter | Round | 1 cm |
| 2 | Roots | Brown | Odorless | Bitter | Long Irregular | 1-2cm |

**5.2.1. Physicochemical Studies:**

The dried plant parts viz. flowers and roots of *Leonotisnepetifolia* (Linn.) R. Br. were subjected to standard procedure for the determination of various physicochemical parameters. The results were presented in Table No. 2.

**Table No. 2.: Physicochemical studies of selected plants materials**

| S. No. | Plant Part | pH Value | LOD | FOM | TA | WSA | AIA | WSE | ASE | Swelling Index |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Flowers | 6.4 | 4.85 | Nil | 12.5 | 8.4 | 2.4 | 18.5 | 13.4 | 4.81 |
| 2. | Roots | 6.8 | 8.7 | Nil | 13.2 | 9.6 | 3.2 | 20.8 | 14.6 | 5.20 |

## CONCLUSION

The present work is based on the exploration of *Leonotisnepetifolia* (Linn.) R. Br. for their morphological and physicochemical characteristics. In the present study, thorough morphological and physicochemicalstudies of *Leonotisnepetifolia* (Linn.) R. Br. was carried out for aim of developing standards that can be served as physico-chemical and biochemical markers which could help in their standardization.

**RESULTS**


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