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Standardization of Mulaka (*Raphenus sativus* Linn.) Kshara: a herbal alkaline preparation

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ABSTRACT
Herbal remedies are having a vital role in health care systems, because these drugs are easily available at low cost, safe and people have faith in them. As the usage of these herbal medicines has increased, issues regarding their quality, safety, and efficacy have raised up. The purpose of standardization of medicinal plants is to ensure the therapeutic efficacy. Mulaka Kshara is a caustic alkaline preparation of the drug Mulaka (*Raphenus sativus* Linn.). Physico-chemical studies, like powder microscopy, total ash, water soluble ash, acid insoluble ash, loss on drying at 105 °C and determination of pH were carried out as per the WHO guidelines has to be carried out in order to standardize the Mulaka Kshara.

Keywords: mulaka kshara, *Raphenus sativus* Linn., herbal alkaline preparation, herbal remedy.

1. Introduction
The World Health organization has appreciated the importance of medicinal plants for public health care in developing nations. The quality assessment of herbal formulations is having huge importance in order to justify their acceptability in modern system of medicine. In the present context, herbal remedies are having a vital role in health care systems, because these drugs are easily available at low cost, safe and people have faith in them. As the usage of these herbal medicines has increased, issues regarding their quality, safety, and efficacy have raised up. At present, the quantity of raw material is not sufficient in the market. Most of the pharmaceutical industries are using substitute drugs instead of authentic drugs. So to prepare best quality drugs it is necessary to authenticate raw drugs. Keeping the current trend in mind, Mulaka (*Raphenus Sativus* Linn.) drug was subjected for standardize procedures. From the current study, genuinity indicating parameters for Mulaka Kshara was derived.

2. Materials and Methods
Physico-chemical studies, like powder microscopy, total ash, water soluble ash, acid insoluble ash, loss on drying at 105 °C and determination of pH were carried out as per the WHO guidelines [1], Ayurvedic Pharmacopoeia [2] and Indian Pharmacopoeia [3].

2.1. Plant Material
Mulaka (*Raphenus Sativus* Linn.) Kshara [7] was collected from the general market, Hassan, Karnataka. The Kshara was prepared from the same [8] and was identified and authenticated (no: 13043001) by the experts at SDM Ayurveda Pharmacy, Kuthpady, Udupi and Hassan. The prepared Kshara was stored in wide mouthed polypropylene bottles. The bottles were stored away from sunlight and rain.

2.2. Methodology
The studies were done at SDM Centre for Research in Ayurveda and Allied Sciences, Kuthpady, Udupi as per standard procedure.

1. **Powder microscopy:** A pinch of the sample was mounted on a microscopic slide with a drop of glycerin-water. The Characters were observed using using Zeiss AXIO trinocular microscope attached to Zeiss AxioCam camera under bright field light. Magnifications of the figures are indicated by the pre-calibrated scale-bars using Zeiss Axio Vision software.[4]

2. **Total Ash:** 2 gram of sample was incinerated in a tared platinum crucible at temperature not exceeding 450 ˚C until carbon free ash is obtained. Percentage of ash was calculated with reference to the weight of the sample [5].

3. **Acid insoluble Ash:** To the crucible containing total ash, add 25 ml of dilute HCl. Collect the insoluble matter on ashless filter paper (Whatman 41) and wash with hot water until the filtrate is neutral. Transfer the filter paper containing the insoluble matter to the original crucible, dry on a hot plate and ignite to constant weight. Allow the residue to cool in a suitable desiccator for 30 minutes and weigh without delay. Calculate the content of acid insoluble ash with reference to the air dried drug [5].

4. **Loss on drying at 105 ºC:** 10 gram of sample was placed in the tared evaporating dish. It was dried at 105 ˚C for 5 hours in hot air oven and weighed. The drying was continued until difference between two successive weights was not more than 0.01after cooling in desiccator. Percentage of moisture was calculated with reference to the weight of the sample.

5. **Determination of pH:** Taken 1 gram of sample (Liquids filtered). 10 ml of distilled water was added, stirred well and filtered. The filtrate was used for the experiment. The instrument was switched on. 30 minute time was given for the warming pH meter. The pH 4 solution was first introduced and the pH adjusted by using the knob to 4.02 for room temperature 30 °C. The pH 7 solution was introduced and the pH meter adjusted to 7 by using the knob. Introduced the pH 9.2 solution and checked the pH reading without adjusting the knob. Then the sample solution was introduced and reading was noted. Repeated the test four times and the average reading were taken as a result [6].

3. Results and Discussion

The macroscopy of the Mulaka Kshara sample has been shown in figure 1. The microscopy of the Mulaka Kshara sample has been detailed in figure 2. The physicochemical parameter of Mulaka Kshara has been detailed in table 1.The physicochemical standards would serve as a preliminary test for the standardization of the formulation. Ash value is useful in determining authenticity and purity of the drug and also these values are important quantitative standards. Percent weight loss on drying or moisture content was found to be 7.87% w/w. The less value of moisture content could prevent bacterial, fungal or yeast growth.

Fig 1: Macroscopy of Mulaka Kshara sample.

Table 1: Physicochemical parameters of Mulaka Kshara.

Parameter	Result n = 3 (% w/w)
Total ash	87.764
Acid insoluble ash	0.195
Water soluble ash	86.826
Loss on drying	7.87
pH	10.71

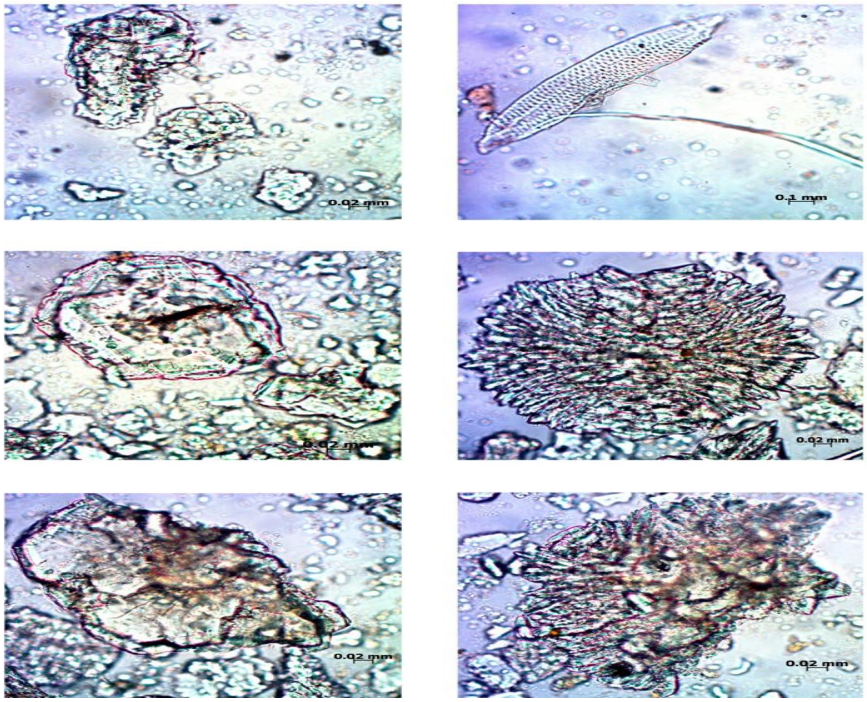

Fig 2: Microscopy of Mulaka Kshara sample.

4. Conclusion

Despite the advent of modern technology in standardization of Ayurvedic formulations, only a few are standardized so far. With the current standardization procedure, we get substantial information for proper identification. The purpose of standardization of medicinal plants is obviously to ensure therapeutic efficacy. Therefore, maintaining the quality of these plant products is an essential factor. Mulaka (*Raphenus Sativus* Linn.) is an important drug with various biological properties. Hence, efforts have been made to provide scientific data on standardization of Mulaka (*Raphenus Sativus* Linn.).

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