Research Article

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50% H_2SO_4 TEST: A SIMPLE TEST TO DIFFERENTIATE BETWEEN PUSHKARMOOL (*Inula racemosa* Hook.f.) AND KUSTHA (*Saussurea lappa* C. B. Clarke)

Nagar Lalit *[1], Lamo Ringzin [2], Rath Sudipt Kumar [3]

[1]PhD Scholar, Department of Dravyaguna, Faculty of Ayurveda, IMS, BHU, Varanasi, India

[2]Assistant Professor, Department of Agadtantra, Faculty of Ayurveda, IMS, BHU, Varanasi, India

[3]Assistant Professor, Department of Dravyaguna, NIA, Jaipur, India

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***Corresponding author**
E-mail: drlalitnagar@gmail.com

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ABSTRACT

Himalaya is the source of many valuable herbs like Pushkarmoola (*Inula racemosa*), kustha (*Saussurea lappa*), katuki (*Picrorhiza kurroa*), Ativisha (*Aconitum heterophyllum*), Chirayata (*Swertia chirata*), Vatsanabha (*Aconitum ferox*) etc. These herbs are present in the limited pocket which leads to the scarcity of Himalayan herbs. But due to the globalization, demand is increasing and production is decreasing. This decrease in production gives chance to the raw drug traders to adopt unscrupulous trade. There is a vast document available with regard to morphology of green drugs; it is not of much relevance for physicians who are totally dependent on market for the procurement of medicinal plant raw materials**.** Many raw materials, in dry form shows common features thus creating lot of confusion and controversy in identification of the crude drug. Same is the case with Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*) both of these herbs are difficult to differentiate from each other. In this test a small amount of powdered Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*) treated with solution of 50% sulphuric acid. The resultant mixture was allowed to stand for 5-10 minutes and the colour characteristics were obtained under day light. Test tube having sample of Pushkarmool (*Inula racemosa*) gave golden rod colour whereas test tube having sample of Kustha (*Saussurea lappa*) gave red colour. Through this article an attempt is made to develop a simple chemical test to differentiate between Pushkarmoola (*Inula racemosa*) and kustha (*Saussurea lappa*) which can be easily done by any procurer at the time of purchasing.

Keywords: Pushkarmool (*Inula racemosa*), Kustha (*Saussurea lappa*), Controversy.

INTRODUCTION

The Globe requires immense help from the Himalayas for Health for all (WHO). Alpine range of Himalaya is the source of many valuable herbs used extensively in Ayurvedic, Tibetan and Chinese system of medicine. Major time of the year, these hills are kept under ice and for the vegetative growth, herbs gets only five to six months. Important medicinal plants like Pushkarmoola (*Inula racemosa*), kustha (*Saussurea lappa*), katuki (*Picrorhiza kurroa*), Ativisha (*Aconitum heterophyllum*), Chirayata (*Swertia chirata*), Vatsanabha (*Aconitum ferox*) etc. are found in alpine range of Himalaya. Also, these herbs are present in the limited pocket which leads to the scarcity of Himalayan herbs. But due to the globalization, demand is increasing and production is decreasing. This decrease in production gives chance to the raw drug traders to adopt unscrupulous trade. Modern day Ayurvedic physician depend on these drug traders for procurement of herbs. Moreover, treatment with adulterated drugs leads to therapeutic unpredictability. Therefore, quality assurance of medicinal plant starting materials is of paramount importance to offer predictable efficacy of the Ayurvedic formulations. Hence, the need for identification of these herbs through botanical surveys, pharmacognostic studies and the assessment of the quality of the material available in a particular area or market is essential.

Aim of study

There is a vast document available with regard to morphology of green drugs. However, for physicians who are totally dependent on market for the procurement of medicinal plant raw materials, it is not of much relevance even if he has sound knowledge of identification of green drug. Different parts of medicinal plant raw materials, in dry form, show different features most of which are being common to many drugs thus creating lot of confusion and controversy in identification of the crude drug. Same is the case with Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*) both of these herbs are difficult to differentiate from each other. Thus there is an urgent need to develop Practical methods to assess their genuineness in the dry form.

Objective

Several studies have been done for a correct identification and to distinguish the genuine Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*) from adulterant and also from their substitute. But more often than not these researches are oriented towards sophisticated laboratory methods creating a practical barrier in easy use for authentication of plant materials from its substitute and adulterants. Due to the macroscopic morphological similarities it is not easy to differentiate Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*) by organoleptic tools, also known as the practical tool or on the spot tool for identification. But with the help of a simple chemical test with 50% H_2SO_4 we can easily differentiate Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*) from each other.

Controversies between Kustha and Pushkarmool

Both Kustha (*Saussurea lappa*) and Pushkarmool (*Inula racemosa*) are the plants from Alpine range of Himalaya and their uses are prevalent in therapeutics since ancient times. The

controversy about the identification of Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*) is as old as Vedic culture and literature. Some authors consider that Pushkarmool (*Inula racemosa*) was mentioned in the Vedas under the name 'Nadyamara'. Many scholars however, considered 'Nadyamara' as the synonym of Kustha (*Saussurea lappa*). Hiralal Vishwakarma opined that Nadyamara may be the Pushkarmool (*Inula racemosa*) of Vedic literature. The same might be described with the synonyms viz. Padmapatra and Kushthabheda. According to Thakur Balwant Singh and K. C. Chunekar, Pushakarmool (*Inula racemosa*) may be the Pushkara of Vedic literature. Whereas P.V. Sharma consider Pushkar as Neelotpala.[1] Moreover, more controversies regarding these were implicated by different Acharyas. Few examples are as follows-

1. Acharya Dalhana- (12th century)
Acharya Dalhana was confused about Kustha (*Saussurea lappa*) and Pushkarmool (*Inula racemosa*) to identify these plants. He interprets that in formulations where Kustha (*Saussurea lappa*) and Pushkarmool (*Inula racemosa*) has been mentioned; make the formulation by taking root as a Pushkarmool (*Inula racemosa*) and other than root, the whole plant as Kustha (*Saussurea lappa*). This statement indirectly indicates that, Kustha (*Saussurea lappa*) and Pushkarmool (*Inula racemosa*) are denoted as different parts of same plant. This creates controversy regarding these medicinal plants.[2]

2. Acharya Bhavamishra-(16th century).
Bhavamishra mentioned that Pushkarmool (*Inula racemosa*) is the variety of Kustha (*Saussurea lappa*) and can be used as substitute drug, for Tagar, Pushkara (*Inula racemosa*), Langali and Sthouneyaka. [3]

3. Sharangadhara Samhita-(16th century)
According to Sharangadhara samhita, in case of non-availability of Pushkarmool (*Inula racemosa*), Kustha (*Saussurea lappa*) can be considered as a substitute drug.[4]
Beside this, some other attributes contribute the controversies between Kustha (*Saussurea lappa*) and Pushkarmool (*Inula racemosa*) as follows-

1. Similarity in synonyms & Place of origin- Some synonyms are same for both drugs like Pushkar, Vapya, and Kashmir; this creates confusion to proper use and identification of drug. Moreover, both the drugs having the same place of origin as 8000-12000 ft. from mean sea level.

2. Morphological similarities- Both Kustha (*Saussurea lappa*) and Pushkarmool (*Inula racemosa*) belong to same family as Asteraceae. Moreover, the morphological features of roots of both plants are very identical.

3. Market contribution- In market, the drug seller divided Kustha (*Saussurea lappa*) into bitter Kustha (kaduwa kutha) and sweet Kustha (mitha kutha). They considered kaduwa (bitter) Kutha as a Kustha (*Saussurea lappa*) and Mitha (sweet) Kutha as Nagauri Ashwagandha or sometimes Pushkarmool (*Inula racemosa*).

From the above references it is evident that both Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*) are described in all the Samhita and Sangraha granthas and there is controversy regarding the identification of Kustha (*Saussurea lappa*) and Pushkarmool (*Inula racemosa*) also there is shortage in supply since Nighantu Kala. Whenever there is scarcity of a particular herb or when a drug is not identified correctly, the suppliers started adulterating the market samples of Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*) as well.

Limitations in using Substitute drug

Bhavamishra and other Authors mentioned that Pushkarmool (*Inula racemosa*) is the variety of Kustha (*Saussurea lappa*) and can be used as substitute drug. But there are limitations in substituting one drug with other.
1. Bhavprakash mentioned, the limitation and restriction in uses of substitute, as substitute is not to be adopted for principle drug in a formulation but it can be done in case of such drugs which are subsidiary.
2. The substitute drugs can not fullfill the whole properies of original drug[5].

MATERIALS AND METHOD

Sample Drug Material

The genuine root samples of Pushkarmool i.e. roots of *Inula racemosa* Hook. F. was collected from Bhadarwa Distt. Doda, State- Jammu and Kashmir and of Kustha i.e. *Saussurea lappa C. B. Clarke* roots were collected from the hills of Shatargala Tehsil- Bhaderwa, Distt. Doda, State- Jammu and Kashmir. From these sources as mentioned above, samples were collected, Herbarium were made and authenticated at IIIM Jammu with herbarium sheet no 13697 (*Inula racemosa* Hook. f.) and 17279 (*Saussurea lappa C.B Clarke*).

Method

500 mg of powdered sample drug material was taken in separate test tubes and then 3 ml of 50 % H_2SO_4 was added. After 5 minutes both the samples were seen under day light and difference in colour were observed. Same test is then repeated with the market samples of Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*) results were reproducible with the original samples of Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*).

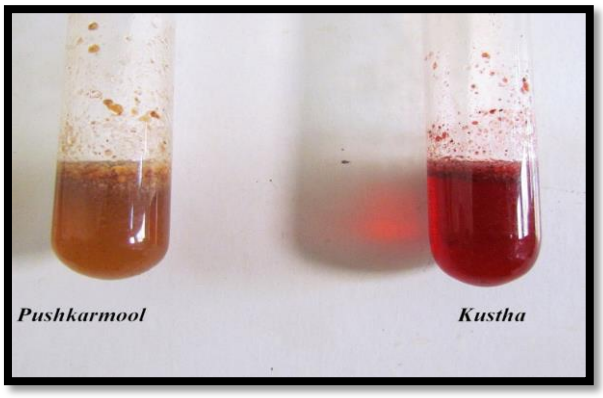

Figure 1

RESULT AND DISCUSSION

Test tube having sample of Pushkarmool (*Inula racemosa*) gave golden rod colour whereas test tube having sample of Kustha gave red colour (Figure 1). 50% H_2SO_4 test is very simple and can be used as tool to differentiate Pushkarmool (*Inula racemosa*) and Kustha (*Saussurea lappa*). Moreover, this tool can be used as an on the spot tool during the procurement of samples from the market. This tool can be used by physicians, researchers, pharmacies etc. partly or fully as per the resources available to reasonably identify authentic samples. During the study sample size is very small and all the findings were based on seven to eight samples of each drug. So, it is suggested that

the users should use this tool to further validate and require modifications can be appended.

CONCLUSION

Based on the findings the study has developed an economic and practical tool to differentiate roots of Kustha (*Saussurea lappa*) and Pushkarmool (*Inula racemosa*) from each other, in dry form. Moreover, this chemical test does not require sophisticated laboratory and costlier equipments and can be performed by physicians, researchers, pharmacy, etc. to identify samples at the time of purchasing.

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