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Pharmacognostical and preliminary phytochemical evaluation of *Alysicarpus longifolius* W. and A. Prodr

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Abstract

Ayurveda, the science of life, deals with the drugs of animal, herbal, or mineral origin. Drugs of plant origin occupy more than 90% of the constituents of the *Ayurvedic* formulations used during treatment. Due to over exploitation and non-availability of medicinal plants, certain classical drugs are being substituted by locally available ethnomedicinal plants that are being claimed to possess similar activity by the tribal and local practitioners. The authentic source of *Prishniparni* is *Uraria picta* Desv. (Fabaceae) and is being substituted by *Alysicarpus longifolius* W. and A. Prodr. (Fabaceae) by some traditional healers of Gujarat (Saurashtra region). Both the plants are locally known by the names Samervo or Pithvan and both have similar characteristics with reference to leaves and flowers (inflorescence type). Pharmacognostical and Phytochemical evaluation of Alysicarpus longifolius W. and A. Prodr has been carried out and results are reported.

Key words: *Alysicarpus longifolius*, pharmacognosy, phytochemistry, *Prishniparni*, Samervo, *Uraria picta*

Introduction

Plant resources, particularly medicinal plants are disappearing at an alarming rate and not enough attention is being given to seek alternate sources or substitutes for many of these plants. Most important medicinal plant species have been enlisted under endangered species.[1] India is blessed with the richest flora having many medicinal plant species which can be used as substitute for endangered species.

Alysicarpus longifolius W. and A. Prodr. (Fabaceae) is a slender, erect, 25-150 cm tall, glabrous herb found throughout, along the margins of cultivated fields, among grasses in wastelands, and in the hedges in Gujarat state. It is locally known as motosamervo/ubhosamervo.[2] Some traditional healers of Saurashtra region are using this plant in the place of *Uraria picta* (*Prishniparni*). But no scientific data is available on this plant till date; hence, the present study was designed to determine the macroscopic and microscopic characters, powder microscopy and preliminary phytochemical profile of *A. longifolius*.

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Materials and Methods

Materials

The root and root powder of *A. longifolius* were used in this study. Photomicrographs were taken by using Canon digital camera attached to Zeiss microscope in Pharmacognosy department, I. P. G. T. and R. A., Jamnagar.

Collection of sample

Roots of *A. longifolius* were collected from Dhinchada village, Jamnagar on 28 September 2009. The village is located approximately 10 km west of Jamnagar, between 22°47" latitude and 70°07" longitude, at an altitude of 65 m above mean sea level (MSL).[3]

From 1.76 kg of the collected roots, 640 g of dried material was obtained. The authenticity of these samples was confirmed by comparing their characters with various floras, and standard herbarium sample available at the Pharmacognosy Laboratory, I. P. G. T. and R. A., G. A. U., Jamnagar with the help of subject experts. The roots were pulverized to prepare fine powder (mesh 120) and preserved in airtight containers.

Preservation of sample

The root samples were preserved in a solution prepared from glacial acetic acid, alcohol, formalin, and distilled water.[4]

Pharmacognostical study

Organoleptic study

Roots and their powder were individually evaluated through relevant organoleptic characters like taste, odor, color, and touch.

Macroscopic study

Macroscopic characters were studied systematically as mentioned in the standard textbooks.[5,6]

Microscopic study

Photomicrography of transverse section of the root was done after proper mounting and staining. Powder microscopy was also done to evaluate the characteristics.

Microchemical tests

Microchemical tests were performed to identify starch grains, crystals, and lignified elements.[7] Tests for starch grains (treatment with a drop of iodine), crystals of calcium oxalate (addition of hydrochloric acid), and for lignified fibers were done.

Physicochemical study

Physicochemical analysis of the sample was carried out to highlight important quality parameters.[8]

Various qualitative tests were carried out to evaluate the presence of alkaloids, steroids, amino acids, carbohydrates, flavonoids, tannins, and glycosides in the root powder.[9]

Results and Discussion

Organoleptic study

It is whitish yellow colored [Figure 1a] fine powder with bitter, astringent taste and characteristic odor [Table 1].

Macroscopic study

They are slender, erect, 25-150-cm-tall, glabrous herbs [Figure 1b]. Tap root is hard, cylindrical, and yellowish white with many rootlets, and root nodules in branches. They measure about more than 30 cm in length [Figure 1c]. Leaves are 1.4-7.2 × 0.6-3 cm, elliptic-oblong, ovate-oblong, ovate-lanceolate, or linear lanceolate, with appressed hairy beneath [Figure 1d]. Flowers are bright reddish purple in color and germinate in 5-35-cm-long spicate racemes [Figure 1e]. Pods are 0.4-1.2 cm long, 3-6 jointed, reticulately veined, and glabrous [Figure 1f]. Seed is globose, brown, smooth, and polished.

Microscopic study

TS of the root

Cork, an outermost brownish-colored layer, consists of one

Table 1: Organoleptic study of roots of *Alysicarpus longifolius*

Parameters	Results
Texture	Coarse powder
Color	Whitish yellow
Taste	Bitter (*Tikta*), astringent (*Kashaya*)
Odor	Characteristic

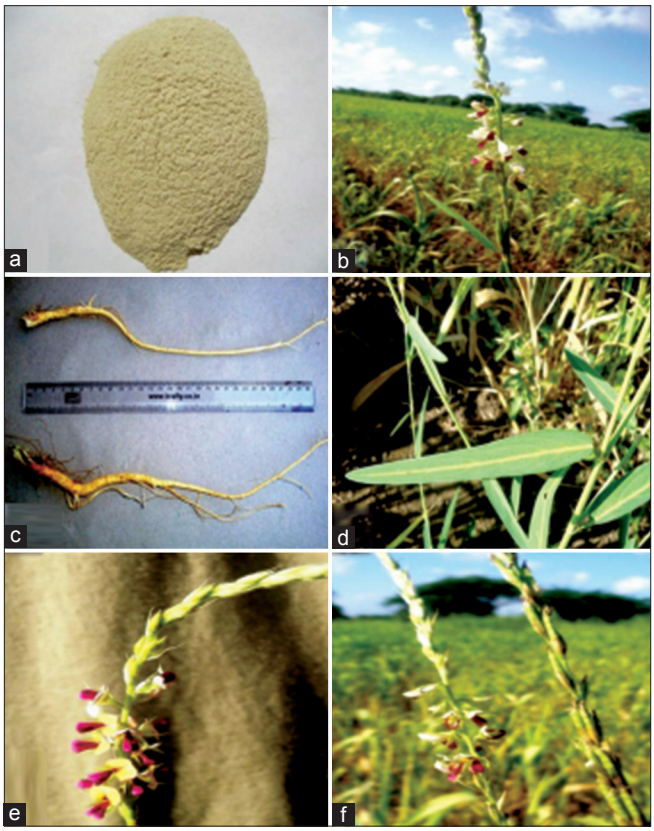

Figure 1: Macroscopic study

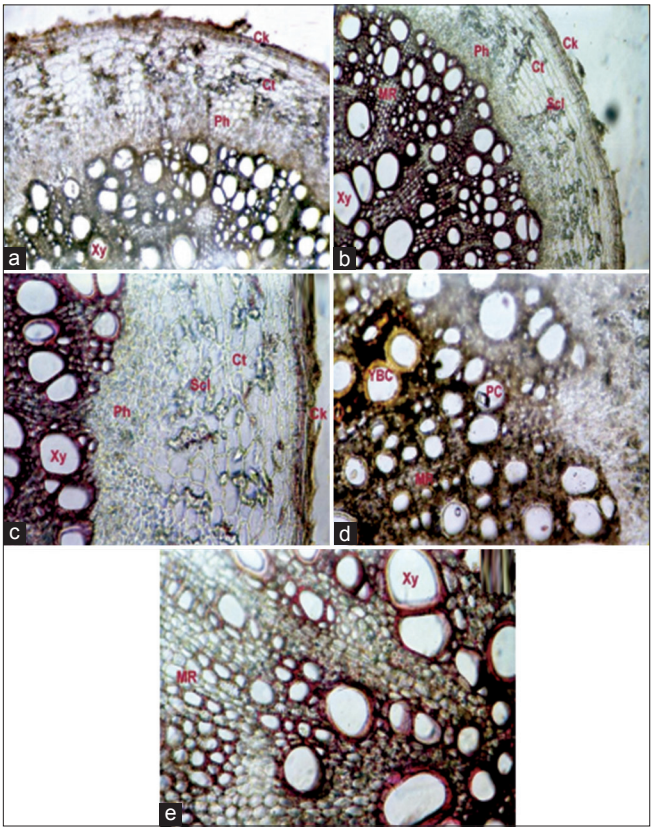

Figure 2: Microscopic study

to three layers of tangentially elongated parenchyma cells. Inner to the cork is cortex which is a wide zone with patches of sclerenchyma fibers and starch grains [Figure 2a-c]. Phloem tissue is found next to the cortex. Ring of phloem is made up of irregular-shaped phloem parenchyma that covers the whole of central xylem portion [Figure 2a-c]. Xylem is made up of xylem vessels, fiber, and parenchyma with medullary rays showing storage of starch grains. It also shows cell inclusions like prismatic crystals of calcium oxalate and yellowish brown content [Figure 2c-e]. Medullary rays extend from the cortex region to the wood, uniseriate to multiseriate, with simple pits and are heterogeneous. The ray cells are thin walled and also embedded with starch grains [Figure 2d, e].

Powder microscopy

Powder microscopy of A. *longifolius* W. and A. Prodr. showed cork cells in the surface view [Figure 3a] and tangential view [Figure 3b], pitted vessels [Figure 3c], starch grains with hilum [Figure 3d], prismatic crystals of calcium oxalate [Figure 3e], aleurone grains [Figure 3e], and group of fibers [Figure 3f].

Microchemical tests

Addition of few drops of iodine resulted in bluish discoloration, indicating the presence of starch in the material. Addition of a drop of hydrochloric acid to the powder resulted in dissolution of calcium oxalate crystals. Powder treated with phloroglucinol and hydrochloric acid resulted in pink color, indicating the presence of sclerenchymatous fibers. These basic studies indicate the presence of starch, calcium oxalate, and fibers in the root of A. *longifolius* [Table 2].

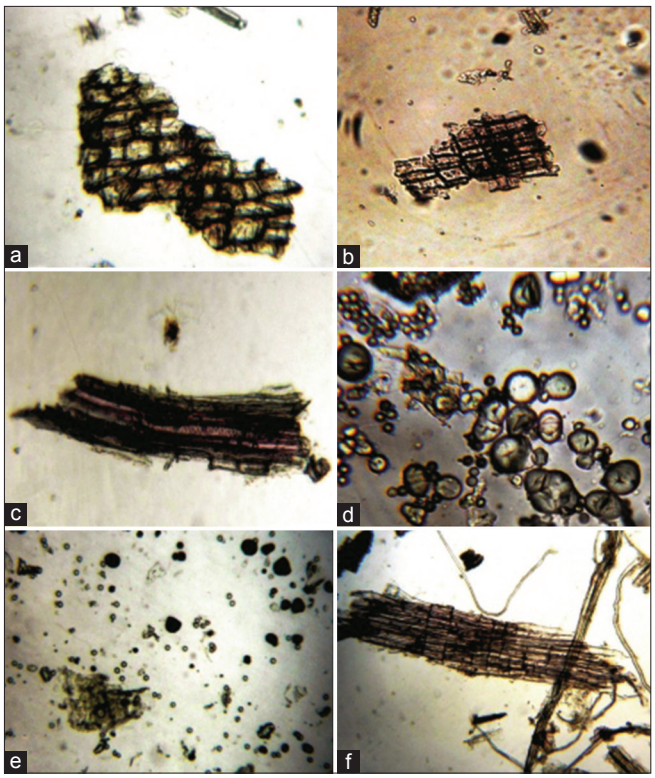

Figure 3: Powder microscopy

Physicochemical analysis

Physicochemical analysis of the root powder of A. *longifolius* revealed loss on drying 3.81% w/w, total ash content 1.09% w/w, water-soluble extractive 10.31% w/w, alcohol-soluble extractive 7.79% w/w, and pH 5.38 [Table 3].

Qualitative analysis

Qualitative analysis of the root powder of A. *longifolius* showed presence of alkaloids, steroids, carbohydrates, Flavonoids, and tannins. Amino acids and glycosides were not present in the samples [Table 4].

Conclusion

The pharmacognostical and preliminary phytochemical evaluation of the roots of A. *longifolius* W. and A. Prodr. would be of great value in the identification, quality control, and formulation development. These findings may be useful to supplement existing information with regard to the identification and standardization of A. *longifolius* W. and A. Prodr., even in the powdered form of the plant drug.

Table 2: Results of microchemical tests in roots of *Alysicarpus longifolius*

Test for	Test	Observation	Results
Starch	Section/powder+ iodine solution	Starch turned blue in color	+
Calcium oxalate	Section/powder+ HCl	Effervescence not seen	+
Lignified elements	Section/powder+ phloroglucinol+HCl	Lignified tissues turned pink in color	+

Table 3: Results of physicochemical parameters in roots of *Alysicarpus longifolius*

Parameters	Results
Loss on drying	3.81
Total ash content % w/w	1.09
Water-soluble extractive value % w/w	10.31
Alcohol-soluble extractive value % w/w	7.79
pH	5.38

Table 4: Results of qualitative analysis in roots of *Alysicarpus longifolius*

Parameters	Results
Alkaloids	+
Steroids	+
Amino acids	–
Carbohydrates	+
Flavonoids	+
Tannins	+
Glycosides	–

References

1. Ravikuamr K, Ved DK. 100 Red listed medicinal plants, 1st edition, Bangalore: frlht; december 2000.
2. Shah GL. Flora of Gujarat state, Part I. 1st ed. Vallabh Vidyanagar-388120. India: Sardar Patel University; 1978. p. 180.
3. Available from: http://pastebin/com/cz0/us95 [Last accessed on 2010 Nov 29].
4. Bendre A. Practical Botany, Meerut: Rastogi Publication; 2007. p. 8-11.
5. Dutta AC. Botany for degree students. 22nd ed, United Kingdom: Oxford University Press; 2007. p. 576.
6. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 36th ed. India: Nirali Prakashan; 2006. p. 1.3.
7. Khandelwal KR. Practical pharmacognosy-techniques and experiments. 19th ed. India: Nirali Prakashan; 2008. p. 26-7.
8. Anonymous. The Ayurvedic Pharmacopoeia of India, Part-1, Vol. 1-4, Govt. of India, Ministry of Health and FW, Dept. of ISM and H. New Delhi: Dept. of Ayush; 1999. p. 155-6.
9. Shukla VJ, Bhatt UB. Methods of qualitative testing of some Ayurvedic formulations, Jamnagar: Gujarat Ayurvedic University; 2001. p. 5-10.

हिन्दी सारांश

वन्य गैलिया (एलिसिकार्पस लॉन्गिफोलिअस)–का फार्मकोग्नोस्टिकल एवं फाइटोकेमिकल अध्ययन

भावेश पाटील, बी. आर. पटेल, पी. पण्ड्या, सी. आर. हरिशा

युगानुरूप, होनेवाले परीवर्तन एवं वनस्पतियों की दुर्लभता के कारणों से स्थानिक प्रजातियों का शास्त्रोक्त प्रजातियों के स्थान पर प्रयोग करने का रुझान परंपरागत चिकित्सको में देखा जा रहा है । सौराष्ट्र प्रदेश (गुजरात राज्य) के कुछ वैद्य दशमूल गण में समाहित होनेवाली पृश्निपर्णी के अभाव में जंगली गैलिया (एलिसिकार्पस लॉन्गिफोलिअस), वर्ग – फॅबासी का प्रयोग करते है । इन दोनों प्रजातियों का कुल, प्रादेशिक नाम तथा पत्र एवं पुष्प की रचना में काफी साधर्म्य प्रतीत होता है । अब तक एलिसिकार्पस लॉन्गिफोलिअस का फार्मकोग्नोस्टिकल एवं फाईटोकेमिकल अध्ययन प्रकाशित नहीं किया गया है, अतः यह अध्ययन किया गया है ।