COMPARATIVE PHARMACOGNOSTIC STUDY OF TWO SPECIES OF CHLOROPHYTUM KER-GAWL.

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Abstract:

Chlorophytum bharuchae Ans., Ragh. & Hem. and Chlorophytum laxum R. Br. belong to family Liliaceae and is being used in the indigenous systems of medicine as a galactogogue and aphrodisiac. These species are commonly known as safed musali. The drug part is usually used as the white tuberous roots. The present studies include the macroscopic, microscopic characters, histochemistry and phytochemistry. The phytochemical screening is also confirmed by HPTLC analysis for saponins and stegmasteroids.

Keywords:

Chlorophytum, Pharmacognosy, phytochemical analysis, HPTLC.

Introduction:

Chlorophytum bharuchae Ans., Ragh. & Hem. and Chlorophytum laxum R. Br. belongs to family Liliaceae. In India, it is found in rainfed areas. The plant generally grows along the forest margins, grassy slopes and rocky places along valleys (between 1300 and 2800m)1. C. bharuchae is an erect plant growing up to a height of 1.5–2ft with sheathing leaf base acute to acuminate with entire margin. The roots are tuberous with ellipsoid tubers hanging from them, 10–12 cm long and 1–1.9 cm in diameter and C. laxum is also the erect plant growing up to a height of 1ft with sheathing leaf base acute to acuminate with entire margin. Tuberous roots are cylindrical and are measuring 10 -14 cm long and 1–1.4 cm diameter2. The tuberous roots of both the species are medicinally important and are commonly known as safed musali in indigenous system of medicine. It is used as an aphrodisiac and galactogogue3,4,5 as well as for its

nutritive, health promoting properties and immunoenhancing, hepatoprotective and antioxidants activities6,7,8,9,10. The tubers are also used in fever, leucorrhoea and also as an aphrodisiac (Kirtikar and Basu, 1975). The species Asparagus, Bombax and Orchids are also known as safed musali in the literature3,4. Therefore, it is important to define specifications that will allow the correct identification of the plant which is being sold as safed musali. In addition, there are 17 species of Chlorophytum recorded in India of which 11 species of Chlorophytum are found to be growing in Maharashtra11. Hence, C. bharuchae Ans., Ragh. & Hem. and C. laxum R. Br. choose for the present investigation as it is being sold widely in the market under the common name safed musali because of its white tuberous roots.

Material and Methods:

The plant materials were collected from in and around Pune district of Maharashtra during the rainy season for correct botanical identification. Efforts were made to collect the plants in flowering and fruiting condition for the correct botanical identification. It was identified with the help of Flora of The Presidency of Bombay2. Herbarium specimens were prepared and authenticated from Botanical Survey of India, Western Circle, Pune (India). The voucher specimens number for C. bharuchae Ans., Ragh. & Hem. and C. laxum R. Br. are PAVICH1/2009 and PAVICH5/2009 respectively12.

Result and Discussion:

Macroscopic evaluationThe details of the macroscopic examination are mentioned in Table 1 and illustrated in Figures 1 (a & b) and 2 (a & b).Microscopic characters:In both the species, transverse section of the roots had a circular outline. The outermost layer is the epidermis consisting of uniseriate trichomes followed by a very large zone of the cortex. The outermost layer of the cortex just below the epidermis consists of cells which are mostly rectangular, appearing longer than wide. The rest of the cortex are rounded to

polygonal parenchymatous cells and have no intercellular spaces. The innermost layer of the cortex is a single-layered endodermis. The stellar structure shows that the endodermis is followed by the pericycle layer. The xylem is exarch variety and the phloem is in between the xylem along with the parenchyma. The central region is occupied by large pith mostly polygonal in shape (Figure 3a & b respectively). Histochemical screening:Histochemical screening showed the presence of starch, protein, fat, saponins, tannin, sugars and alkaloids (Table 2).Phytochemical studies:The tubers had a total ash acid insoluble ash content is more in C. bharuchae as compare to C. laxum (Table 3). The values of percentage extractives were higher in chloroform and lower in benzene solvent (Table 4). Fluorescence analysis was carried out to check the purity of the drug. The powder drug was observed in visible light, and then powder was treated with nitrocellulose, 1 N sodium hydroxide, 1 N sodium hydroxide in nitrocellulose and dried for 30 min. After this it was observed under ultraviolet light and it emits the color as shown in Table 5 for both the species. Qualitative analysis of the roots indicated the presence of proteins, reducing and non-reducing sugars, saponins, fats, tannin, glycoside and alkaloids (Table 6). The quantity of proteins is higher than saponins and carbohydrates in C. bharuchae as compare to C. laxum (Table 7). Saponins are the important chemical and justify the use of tubers of these plants and are used as a well-known health tonic, aphrodisiac and galactogogue3,4,6,25. In HPTLC study, the methanolic extract is ultrasonic for 15 min and filtered. The filtrate is used as an application for saponins and stegmasteroids. For each application 20 µl, 10 µl and 5 µl extracts were used and loaded on instrument comprising of Linomat 5 for application using Densitometer-TLC Scanner 3 with “WINCATS” software (Camag, Switzerland). These studies were carried out on pre-coated aluminum fluorescent plates (E. Merck). The plates were scanned at 254 and at 366 nm23,24. Analytical studies (Saponins):The HPTLC analysis showed that the saponins are confirmed from C. bharuchae and from C. laxum root samples. The plates were scanned at 254 and 366 nm. When

images were compared with the graph and table values, it showed maximum area at 366 nm after derivatization. The table also indicates the Rf values (Figure 4; Graph 1; Table 8). Analytical studies (Stegmasteroids): In HPTLC analysis, revealed the presence of stegmasteroids in both the species. The plates were scanned at 254 and 366 nm. It covered the area indicated in the table 9. The tables also indicate the Rf values for all the peaks scanned by "WINCATS" software (Figure 5; Graph 2; Tables 9).

Conclusion:

The plant C. bharuchae and C. laxum showed the correct taxonomy which is helpful for the standardization of drug. The morphological characters and histochemical study with double staining of the root, percentage extractives, fluorescence and ash analysis and the phytochemical screening of the plants. As in case of saponins and stegmasteroids, the peaks are denoted by the Rf values. These investigations will be useful for the correct botanical identification and authentication of the drug. After getting the overall results of C. bharuchae and C. laxum and if data is comparable with the above mentioned species of safed musali, it can be used as a substitute for them.

Reference:

Hara H, The Flora of Eastern Himalaya, Japan, Tokyo University Press, 1966, 407.