

Pharmacognostic studies and physicochemical properties of the *Dactylicapnos scandens* (Family: Papaveraceae) leaf

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Abstract

A large number of the plants are claimed to possess the medicinal properties in the traditional system and are also used extensively by the tribal people worldwide. The present study deals with the macroscopic and microscopic studies of the leaf of *Dactylicapnos scandens* (Family: Papaveraceae). The anatomy of the leaf was studied by taking transverse section which showed anomocytic stomata, unicellular trichomes, etc. Physicochemical parameters of the powder were also carried out. The present investigation on *Dactylicapnos scandens* leaf might be useful to supplement information in regard to its identification parameters. Such studies are important in the way of acceptability of herbal drugs in present scenario of lacking regulatory laws to control quality of herbal drugs.

Keywords: *Dactylicapnos scandens*, Family: Papaveraceae, anomocytic stomata, unicellular trichomes

1. Introduction

Plants have formed the sophisticated traditional medicine systems since thousands of years [1]. Pharmacognosy basically deals with the standardization, authentication and study of natural drugs. In villages ethnic people depend on this medicinal plant for their primary healthcare. It is locally used for the treatment of hypertension, inflammation, bleeding, pain in the teeth, stomach and neuropathy for centuries [2]. It also shows high relaxant effects. There is a strong need to utilize their traditional knowledge and establish a standard protocol which in future help developing a potent natural drug. That also helps in conservation of these highly valuable medicinal plants. This Indigenous medicine will also provide considerable economic benefits to these ethnic village people. Pharmacognosy is a simple and reliable tool, by which complete information of the crude drug can be obtained [3]. Today with the present surge of interest in the phytotherapeutics, the availability of genuine plant material is becoming scarce. Since crude plant drugs form the basis for the manufacture of numerous medicinal preparations, accurate determination of drug identity forms an essential part of its study. It becomes extremely important to make an effort towards standardization of the plant material as medicine. The process of standardization can be achieved by stepwise pharmacognostic studies [4]. These studies help in identification and authentication of the plant *Dactylicapnos scandens* (Family: Papaveraceae) leaf. Its whole plant parts are used in multiple disorder specially in case of fever and wound healing by the local people. The objective of the present study is to evaluate various pharmacognostic properties including macro and microscopic and physicochemical characterization of the leaves.

2. Materials and methods

2.1 Plant collection and extraction

Fresh leaves of *Dactylicapnos scandens* (Family: Papaveraceae) were collected from Nagaland, North Eastern region, India. The plant was identified by Botanical Survey of India, Shillong, Meghalaya. The fresh and mature leaves were used for pharmacognostics study. The leaves were separated, washed thoroughly with tap water, shade dried, homogenized to fine powder and stored in air tight bottles [4].

2.2 Pharmacognostic studies

Macroscopic characteristics

Macroscopic studies of the plant was carried-out as per the methods of Evans. The plant was macroscopically examined for shape, size, surface characteristics, texture, color, consistency, odour, taste, etc [5].

2.3 Microscopic characteristics:

Microscopic studies were done by preparing a thin hand section of midrib and lamina region of leaf of *Dactylicapnos scandens*. The section was stained by safranin. The powder of the dried leaf was used for observation of microscopic characters [5].

2.4 Thin layer chromatography

Thin layer chromatography was carried out with the methanolic extract and maximum spots been separated on precoated silicagel G TLC plate with trial and error methods.

2.5 Physicochemical properties

Physicochemical parameters were determined as per guidelines of WHO. Total ash value, loss on drying, water soluble ash, acid insoluble ash, solubility of the extract in different solvents, melting point, boiling point, pH, heavy

metal analysis, petroleum ether soluble extractive, alcohol soluble extractive and water soluble extractive values were determined [6].

3. Result and discussion

3.1 Macroscopic characteristics

Dactylicapnos scandens (Family : Papaveraceae), a tuberous rooted perennial, is mainly distributed in NW India, Thailand, Yunnan province and Tibet Autonomous Region of China. *Dactylicapnos scandens* (syn. *Dicentrascandens*) is a good perennial climber and growing to about 12'. Prefers moist humus rich soil and cool conditions, avoid hot or sunny locations that dry out in summer [2]. Looks lovely clambering over shrubs in the second half of summer.

Leaves reflexed on a zigzag stem; petiole 0.5-3 cm; leaf blade glaucous abaxially, light green adaxially, with 1 pair of primary pinnae usually displaced (alternate); rachis ending in a thin branched cirrose tendril; Corolla yellow, often pinkish toward apex, oblong-cordate to obtusely triangular in profile, outer petals saccate, ± sharply keeled or narrowly winged at base; sinus at petiole insertion narrow, 3-4 mm deep; dorsal crest of inner petals overtopping petal apex 1-2 mm; nectary sigmoidally curved, 3-4 mm, apex acute [7]. Stigma almost square, slightly notched at apex, with small papillae in forward corners and more prominent rounded papillae in basal corners.

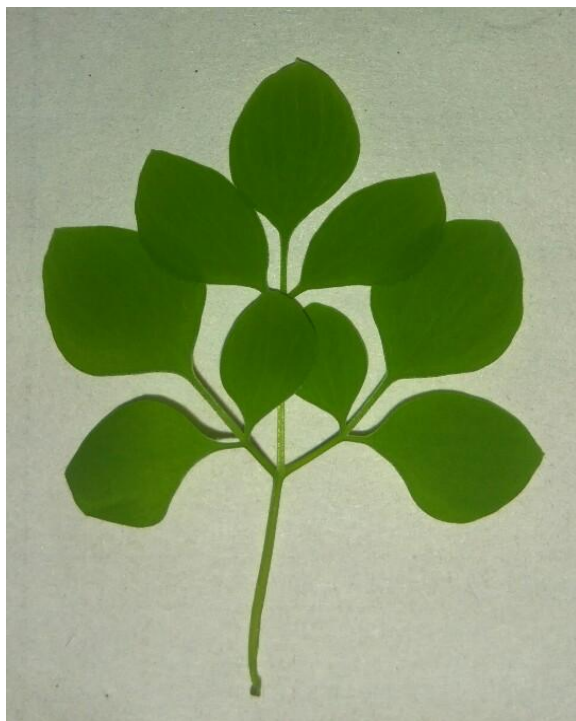
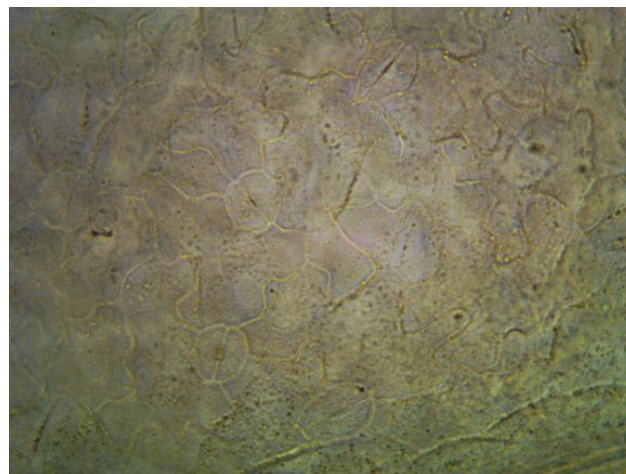


Fig 1: *Dactylicapnos scandens* leaf.

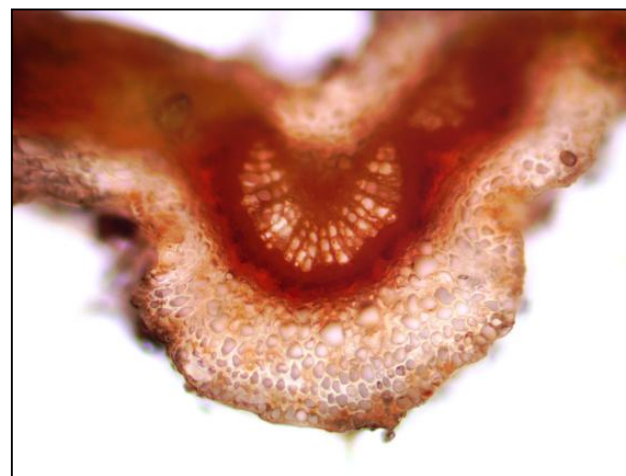
3.2 Microscopic characteristics

Transverse section of leaf is shown in Fig. 2. Leaf is dorsiventral. The upper and lower epidermis are single layered. The palisade was two layered. Prismatic crystals of calcium oxalate are found. The mesophyll is small, circular and spherical celled with plenty of air spaces. The collenchyma is 2-3 layered. Oil glands are found in palisade and in lower midrib (Figure- 2). The lower epidermis had more number of trichomes than the upper epidermis. The

anomocytic stomata were present in lower epidermis. The stomata were surrounded by subsidiary cells, whereas the guard cells were comparatively larger in size and each stoma was surrounded by epidermal cells.



Stomata



T S. of the leaf

Fig 2: Microscopic study of *Dactylicapnos scandens* leaf.

3.3 Physicochemical properties

Studies of physicochemical constant can serve as a valuable source of information and are usually used in judging the purity and quality of the drug. The physical constant evaluation of the drugs is an important parameter in detecting adulteration or improper handling of drugs [8]. The residue remaining after incineration of plant material is the ash content or ash value, which simply represents inorganic salts, naturally occurring in crude drug or adhering to it or deliberately added to it, as a form of adulteration. The ash value was determined by three different forms viz., total ash, acid-insoluble methanol followed by ethanol and water. Lowest yield was in petroleum ether (Table 1). The variation in extractable matter in various solvents is suggestive of the fact the formation of the bioactive principle of the medicinal plant is influenced by number of intrinsic and extrinsic factors. High alcohol soluble and water soluble extractive values reveal the presence of polar substance like phenols, tannins and glycosides. The solubility of the methanolic extract of *Dactylicapnos scandens* leaf was more in methanol

followed by dimethylsulphoxide and less in acetone. All these parameters are useful for the compilation of a suitable monograph for its proper identification (Table 2).

Table 1: Physicochemical characterization of leaves of *Dactylicapnos scandens*

| Parameters | Sample | Value |
|------------------------------------|--------------------|-------|
| Loss on drying | Crude powder | 17.5% |
| Total ash | Crude powder | 3.9% |
| Acid insoluble ash | Crude powder | 2.3% |
| Water soluble ash | Crude powder | 0.7% |
| Petroleum ether soluble extractive | Crude powder | 3.5% |
| Alcohol soluble extractive | Crude powder | 4.8% |
| Methanol soluble extractive | Crude powder | 4.5% |
| Water soluble extractive | Crude powder | 24% |
| pH | Methanolic extract | 6.8 |
| Melting point | Methanolic extract | 88°C |
| Boiling point | Methanolic extract | 89°C |



TLC of methanolic extract

Fig 3: Chromatographic Profile of Crude Extract of *Dactylicapnos scandens*

The details of solvent system and the Rf values are mentioned in the Table-2.

Table 2

| Extract | Solvent System | No. Of Spots | Rf Values |
|----------|-------------------------------|--------------|-----------|
| Methanol | n Hexane : Dichloromethane | 4 | 0.4 |
| | | | 0.5 |
| | | | 0.6 |
| | | | 0.7 |

4. Discussion

No detailed standardized work has been reported in literature for this plant. The leaves of this plant were used by local people in the treatment of various disease conditions without standardization. The standardization of a crude drug is an integral part for establishing its correct identity. Before any crude drug can be included in an herbal pharmacopoeia, pharmacognostic parameters and standards must be established. Microscopic method is one of the simplest and cheapest methods to start with for establishing the correct identity of the source materials [8]. The pharmacognostic standards for leaves *Dactylicapnos scandens* found in this North Eastern region are carried out for the first time in this study. Leaves powder subjected for microscopic, pharmacognostical and physicochemical analysis provides relevant information which may be helpful in authentication of the crude drug and check adulteration for quality control of raw material. The current observation will be helpful in differentiating the leaves of this species from closely related species of same genus and family.

5. Reference

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