Pharmacognosy of Aerial Parts of Cynodon dactylon Pers. (Graminae)

by

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ABSTRACT: Cynodon dactylon commonly known as Durva is considered as a sacred herb by the Hindus and is used in religious rites. It is widely used by the people of India as a traditional medicine for diarrhea, dysentery, catarrhal ophthalmia, dropsy, etc. This paper discusses the pharmacognostical and preliminary phytochemical studies of the herb.

INTRODUCTION

Plants have provided mankind a large variety of potent drugs to alleviate suffering from diseases. Cynodon dactylon commonly known as derive is one such herb used in Indian system of medicine1,2,3,4. Some important preparations using this drug are Tejras, Kailash Jeevan, Durvaditilam, Gandhatailam. The present work aims at understanding the pharmacognosy and phytochemistry of the aerial parts of C. dactylon.

MATERIALS AND METHODS

Collection and Identification of Plant

The aerial parts of C. dactylon were freshly collected from Ghatkopar, Mumbai between October to January. The sample was identified at Blatter Herbarium, St. Xaviers colleges Mumbai. The plants when thoroughly dried and powdered (#40) and taken for preliminary phytochemical studies.

HISTOLOGICAL STUDIES

Thinnest possible section of leaf and stem was taken and treated with chloral hydrate solution to make the section clear, sections were treated with saffranin.

T.S. OF LEAF

The transverse section of the leaf (Fig 1) shows Lamina along with large number of vascular bundles. The lamina has thin epidermis wit covering trichomes followed immediately by vascular bundles surrounded by spongy parenchyma. The vascular bundles are conjoint, collateral, closed with y-shaped xylem. Y- shaped xylem in characteristic of monocotyledons.

T.S. OF STEM

The transverse section of stem (Fig 2) shows our epidermis followed by endodermis. It shows fibrovascular bundle and vascular bundle which are conjoint, collateral, closed wit y-shapd xylem. The section also shows central pith.

POWDER CHARACTERISTICS
The powder is green in color, sweetish and astringent to taste. It shows following powder characteristics (Fig 3).

1. Dumbbell shaped stomata.
2. Unicellular covering trichomes measuring 60 µ
3. Xylem vessels (5µ diameter) with scalariform thickening.

DETERMINATION OF EXTRACTIVE VALUES

1) Water soluble and alcohol soluble extractive values of dried powder of C. dactylon was determined5. The average of 3 readings are as shown in Table -1.
2) The dried powder of C. dactylon was extracted successively in the soxhlet apparatus by using petroleum ether (60-80oc), benzene, chloroform, ethanol and distilled water. The successive extractive values are as shown in Table -2.

QUALITATIVE PHOTOCHEMICAL ANALYSIS

The extracts were subjected to qualitative chemical tests for detection of various plant constituents 6, 7. The various qualitative chemical tests indicate the presence of carbohydrates, glycosides, proteins and aminoacids, flavonoids, steroids, tannic-phenolic compounds, alkaloids.

QUALITATIVE ESTIMATION OF PHYTOCONSTITUENTS8,9

Preliminary photochemical screening detected the presence of glycosides, tannins, alkaloids, carbohydrates, etc. Hence these estimation of these phytoconstituents were carried out and results are tabulated in Table-3.

HPTLC FINGERPRINTING

The cold water extract of fresh plant, hot water extract of dried plant and soxhlet were subjected to HPTLC fingerprinting. 10 µl of each extract was spotted. Precoated silica gel (GF254’ E. Merck) plates were used. The plates were developed in ammonia: Chloroform: Ethanol (5:8:15) and scanned at a wavelength of 254 nm fig 4,5,6 & 7.

RESULTS AND DISCUSSIONS

The histological studies and powder characteristics showed no characteristic diagnostic features. It only showed Y-shaped xylem and dumbbell shaped stomata which is characteristic of monocots.

The water extractive value is higher than alcohol extractive thus indicating presence of polar constituents.

Successive extractive values varied from 3% for petroleum ether to 7.04% for water. 3% extractive value for petroleum wither indicates presence of phytosterols, fixed oils and fats, Quantitative estimation of phytoconstituents showed higher percentage of glycosides and tannins.

HPTLC fingerprinting of 3 different water extracts was mainly done to see the difference in phytoconstituents. The 3-dimensional overlapping revealed that the components in all the 3 extracts are almost same. The plate was sprayed with folins reagents, vanillin sulphuric acid reagent and NP reagent. Most of the spots answered these reagents indicating presence of phenolic components.

| Table 1- water and Alcohol Extractive value |
|--------------------------------------------|
| Extractive value (% w/w of crude drug)     |
| Water                                      | 18.88% |
| Alcohol                                    | 8%     |

| Table-2-Successive Extractive value         |
|---------------------------------------------|
| Solvents                     | Extractive value (% w/w of crude drug) |
| Petroleum ether              | 3%                                   |
| Benzene                      | 1.34%                                |
Chloroform 1.49%  
Acetone 5.68%  
Methanol 8.54%  
Water 7.04%  

| Constituents         | % w/w |
|----------------------|-------|
| Glycosides           | 12.2% |
| Tannins              | 6.3%  |
| Alkaloids            | 0.1%  |
| Resins               | 1.0%  |
| Free reducing sugar  | 10%   |
| Total reducing sugar | 12%   |

Table-3- Quantitative Estimation of Phytoconstituents

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Figure 6 - HPTLC fingerprint of hot soxhlet extract of dried plant of *C. daucylum* at 254 nm.

Figure 7 - The 3-dimensional overlapping of HPTLC fingerprint:

A. Cold extract of fresh plant.
B. Hot extract of fresh plant.
C. Soxhlet extract of dried plant.
Figure 6 - HPTLC fingerprint of hot soxhlet extract of dried plant of *C. dactylon* at 254 nm.

Figure 7 - The 3-dimensional overlapping of HPTLC fingerprint

- A Cold extract of fresh plant.
- B Hot extract of fresh plant.
- C Soxhlet extract of dried plant.