

Preliminary Phytochemical Evaluation of *Euphorbia Fusiformis* Buch-Ham.

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ABSTRACT

The present investigation was undertaken to analyze the physicochemical and chromatographic profile of dried tuberous roots of *Euphorbia fusiformis*. Physicochemical parameters like loss on drying, total ash value, acid insoluble ash, water insoluble ash, various extractive values, pH etc., were carried out. Further, qualitative tests for various functional groups like alkaloids, glycosides etc., were carried out in methanol and water extracts. The results of the preliminary phytochemical screening indicated the presence of carbohydrates, starch, flavanoids and steroids. Thin layer chromatography was carried out using different solvent systems which revealed two common spots indicating the presence of some common phyto-constituents. The parameters of present study can be used as a reference for further scientific investigations.

Key words: *Euphorbia fusiformis*, Euphorbiaceae, chromatography, total ash, caudicifolin

INTRODUCTION

The use of medicinal plants still plays a vital role to cover the basic health needs in both developed and developing countries.^[1,2] The medicinal value of these plants lies in some chemical active substances that produce a definite physiological action on the human body. Each and every plant has got its own chemical characteristics which help in separating it from other closely related species.^[3] To explore the hidden secrets of the plant kingdom such as their complex compounds or active principles which are thought to be responsible for their effectiveness, it is necessary to undertake the analytical evaluation.

Euphorbia fusiformis Buch.-Ham. (Family: Euphorbiaceae) is a rare medicinal plant found in Tropical Himalaya up to 1500 ft. from Garhwal to Nepal. It is also found in Konkan and Deccan Hills.^[4] In Gujarat state it is found in Dang, Rajpippala and Chotadaipur regions,^[5] where traditional

healers extensively use this plant to treat abdominal tumors. Further, the ethnobotanical value of the tuberous root of this plant refers to its recognized action as a remedy for several diseases like rheumatism, gout, paralysis and arthritis^[6,7] with proven anti-inflammatory^[8] and anti-bacterial activities.^[9] Previously we have explored analgesic activity of tuberous roots of this plant.^[10] Regarding the phytochemical profile only constituents like diterpene lactone caudicifolin, methylellagic acid and euphol were reported.^[11,12] However no reports are available regarding physicochemical and chromatographic profiles of this drug till date. Hence the present study was undertaken to evaluate preliminary phytochemical and chromatographic profile of tuberous roots of *E. fusiformis*.

MATERIALS AND METHODS

Plant materials: The tuberous roots of *E. fusiformis* were collected from Waghai forest, Dang, Gujarat, India in fully matured condition in the month of November and the material was authenticated by the taxonomist of our institute. The tuberous roots were made into slices and shade dried for 12 days. The dried root slices were pulverized to fine powder and utilized for phytochemical analysis.

Analysis of physicochemical parameters: Physicochemical parameters like loss on drying at 105 °C, total ash value,

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acid insoluble ash, water insoluble ash, water soluble extractive value, alcohol soluble extractive value and pH value were carried out by referring standard procedure.^[13,14]

Qualitative test for various functional groups: Qualitative tests for various functional groups like alkaloids, glycosides etc., were carried out by using the aqueous and methanol soluble extracts of the sample.^[15-17]

Chromatographic evaluation: The chromatographic studies were performed using various solvent systems to confirm the phytochemical studies. Silica gel GF 254 (precoated plates) were used for the chromatographic evaluation.^[18,19]

Sample preparation

Methanol Extract: About 5 g of accurately weighed powder sample was taken in a conical flask and 100 ml Methanol was added to it, shaken and kept overnight. Next day it was filtered. Then it was concentrated to 5 ml and sample was used for spotting (a).

Petroleum Ether Extract: About 5 g of accurately weighed powder sample was taken in a conical flask and 100 ml Petroleum ether was added to it, shaken and kept overnight. Next day it was filtered. Then it was concentrated to 5 ml and sample was used for spotting (b).

Chloroform Extract: About 5 g of accurately weighed powder sample was taken in a conical flask and 100 ml chloroform was added to it, shaken and kept overnight. Next day it was filtered. Then it was concentrated to 5 ml and sample was used for spotting (c).

Chromatographic conditions:

A. For steroids:

Mobile Phase: Toluene: Ethyl acetate (9:1)

Stationary Phase: Silica gel GF 254 (precoated plates)

Detection: a) Short U-V (254 nm): Figure 1,
b) Long U-V (366 nm): Figure 2,
c) Spraying with Vanillin sulphuric acid followed by heating at 110 °C for 10 min. Figure 5

B. For flavonoids

Mobile Phase: Ethyl acetate: Formic acid: water (6.7:1.5:2.6)

Stationary Phase: Silica gel GF 254 (precoated plates)

Detection: a) Short U-V (254 nm): Figure 3
b) Spraying with Vanillin Sulphuric acid followed by heating at 110 °C for 10 min. Figure 4

RESULTS

The results of physico-chemical parameters have been depicted in table-1. The results of the preliminary phytochemical screening for various functional groups indicated the presence of carbohydrates, starch, flavanoids and steroids (Table -2). The Rf values of different extracts have been tabulated in table 3, where Rf values 0.95 and 0.97 were common to all the three extracts.

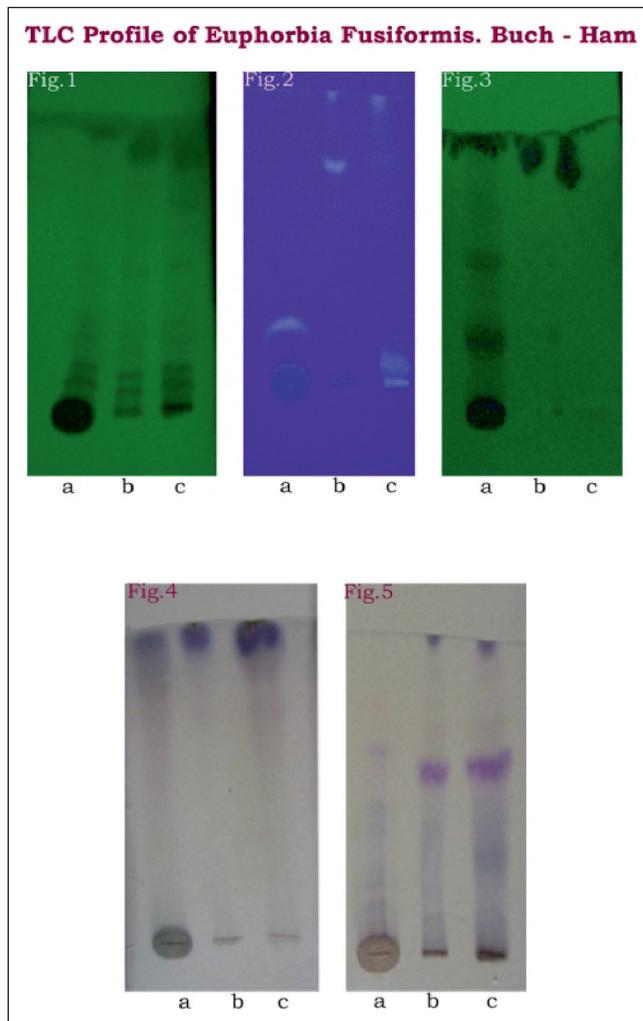


Figure 1: TLC profile of *E. fusiformis* root

Table 1: Physico-chemical parameters of roots of *E. fusiformis*

Parameters	Results
Loss on drying at 105 °C	11.50% w/w
Ash value	7% w/w
Acid insoluble Ash	0.6% w/w
Water insoluble ash	4% w/w
Water soluble extractive	8.38% w/w
Methanol soluble extractive	5.56% w/w
pH	6.9

DISCUSSION

The plants of Euphorbiaceae family are known for their therapeutical interest in both organized (such as Ayurveda and Unani) and un-organized (Folklore) system of medicine.^[20-21] They exhibit great chemical diversity and several of them have been listed as source of valuable drugs.^[22] One of the genus of this family *Euphorbia* comprises a large and diverse group of plants, which are characterized by the presence of white milky latex and reported to have a number of interesting biological agents.^[20,23-25]

Many substances absorb moisture on storage, presence of moisture may affect the preservation quality of the drug. Loss on drying in a sample corresponds to moisture content and volatile matter content in it. The loss on drying at 105 °C was 11.50% w/w, indicative of some moisture content in drug.

Total ash content of crude drug is the inorganic residue remaining after incineration. It represents the inorganic salts occurring naturally in the drug and also inorganic matter from external sources. The ash value is determined

to ensure the absence of an undue proportion of extraneous mineral matters introduced accidentally or mixed at the time of collection or in subsequent treatment. In present study test drug have shown total ash content of 7% w/w.

Treatment of ash with hydrochloric acid leaves virtually only silica. Hence it is done to detect the silica in the drug. The ash obtained was further analyzed for acid insoluble particles in ash. In present study values of acid insoluble ash and water insoluble ash were 0.6% w/w and 4% w/w respectively.

The information obtained from preliminary phytochemical screening will be useful in finding out the genuity of the drug and also to find out the phytoconstituent present in the test drug. The results indicated the presence of carbohydrates, starch, flavanoids and steroids which may be responsible for various biological expressions. The preliminary phytochemical test results were rationalized by the thin layer chromatographic studies, which revealed only two common spots in three different extracts, indicating the presence of some common components.

CONCLUSIONS

At our best knowledge this is the first preliminary physico-chemical and chromatographic study on dried tuberous roots of *E. Fusiformis* and this will be helpful for the identification of this drug in powder form.

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Table 2: Qualitative tests for various functional groups

Functional groups	Tests performed	Results
Carbohydrates	Molish's test	+
	Reducing Sugar test	+
	Keller Kiliani test	+
	Test for starch	+
Alkaloid	Dragendorff's test	-
	Mayer's reagent test	-
Flavonoid	Shinoda test	+
Steroid	LB reagent	+
	Sarkowski reaction:	+
Tannin	Neutral FeCl ₃	-
	Gelatin test	-
Resin	acetic anhydride	-
Glycoside	Molisch's Test	-
Saponin	Distilled water	-
	Lead acetate	-
Coumarin	Ammonia test	-

Table 3: TLC profile of roots of *E. fusiformis*

Conditions	Rf values of samples			Figures
	a	b	C	
Steroids:				
Short U-V (254 nm):	0.13, 0.19, 0.97 [3]	0.10, 0.15, 0.93 [3]	0.10, 0.16, 0.88 [3]	Figure 1
Long U-V (366 nm)	0.26 [1]	0.17, 0.99 [2]	0.99 [1]	Figure 2
Derivatization: Vanillin sulphuric acid	0.16, 0.24, 0.42, 0.66 [4]	0.13, 0.55, 0.97 [3]	0.33, 0.61 [2]	Figure 5
Flavonoids:				
Short U-V (254 nm):	0.38, 0.63, 0.97 [3]	0.97 [1]	0.97 [1]	Figure 3
Derivatization: Vanillin sulphuric acid	0.89, 0.95 [2]	0.95 [1]	0.95 [1]	Figure 4

Total numbers of spots are provided in parenthesis next to Rf values.

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