

A report on the quality control parameters of *Cressa cretica* Linn., Convolvulaceae

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ABSTRACT

Introduction: The present study was aimed at pharmacognostical, phytochemical, and pharmacological evaluation of *Cressa cretica* Linn., (fruit) family - *Convolvulaceae*. **Materials and Methods:** Pharmacognostical investigation was carried out by performing organoleptic, microscopical, and physicochemical evaluation, i.e., ash values, extractive values, moisture content, swelling index, foaming index, and foreign matter. The obtained results showed that the moisture content was found to be 2.25%. Similarly, swelling index was recorded to be 0.8 cm. Foaming index (<100). Phytochemical investigation included successive Soxhlet extraction, the obtained extractive values were 1.25%, 0.05%, 5.25%, 29%, and 22.80% for petroleum ether, chloroform, ethyl acetate, ethanol, and distilled water, respectively. The preliminary qualitative phytochemical screening revealed the presence of carbohydrates, phenolic compounds, alkaloids, glycosides, flavonoids, steroids, fixed oils, and fats. **Results:** Pharmacological investigation included the analgesic activity using *C. cretica* (fruit) plant ethyl acetate extract when subjected to Eddy's Hot Plate Model. The obtained results for analgesic activity of *C. cretica* (fruit) plant extract (ethyl acetate) (100 mg/kg and 200 mg/kg) were found positive.

Key words: *Cressa cretica*, fruit, screening

INTRODUCTION

Cressa cretica L. (*Convolvulaceae*) is known as "Rudravanti" in Hindi. It is a widely grown halophytic plant. Different parts of the plant have been claimed to be valuable in a wide spectrum of diseases.^[1,2] The plant is traditionally used in Bahrain as expectorant and antibilious agent.^[3] Dry leaves of *C. cretica* crushed with sugar are used as emetic in Sudan.^[4]

In spite of several advancements in the field of clinical and pharmaceutical investigations have, in fact, elevated the status of medicinal plants by identifying the role of active principles present in them.^[5] *C. cretica* is a plant that is referred to by the name that reflects the features of *Sanjeevani*. Hence, this plant is commonly known in Sanskrit as *Sanjeevani* as it prolongs the life and prevents the onset of old age.^[6-8]

MATERIALS AND METHODS

Plant Material

The dried fruit part of the plant *C. cretica* Linn. was collected from FRLHT Bangalore (India) in September 2015 and authenticated by Dr. Devendrakumar Panday, Assistant Professor, Domain of Botany, Department of Biotechnology and Dr. Udai Chand Agrahari, Assistant Professor, Domain of Pharmacognosy, Department of Pharmaceutical Science, Lovely Professional University Jalandhar - Delhi G.T. Road (NH-1), Phagwara, Punjab,

India - 144 411, at December 16, 2015. The plant material was further size reduced and stored until further use in an airtight container. Fresh plant material was obtained for the macroscopical and microscopical evaluation.^[9]

Macroscopic and Microscopic Analysis

The macroscopy and microscopy of the plant was studied according to the methods of Khandelwal; the cross sections were prepared and stained. The microscopic analysis of powder was done according to the method of brain and tumor.^[8,10-12]

Physicochemical Analysis

Physicochemical parameters such as the total ash, acid-insoluble ash, water-insoluble ash, and moisture content were determined as per reported methods. Anonymous Indian pharmacopeia 1996 considering the diversity of chemical nature and properties of contents of drugs, five different solvents were used for the determination of extractive values as per reported methods by Chopra. Fluorescence analysis of the extract was carried out by the method of Evans.^[11,12,13]

Preliminary Phytochemical Screening

Preliminary phytochemical screening was carried out using standard procedure described by Kokate *et al.* Phytochemical investigation included separation of compounds by thin-layer chromatography by Kaur.^[14]

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RESULTS AND DISCUSSIONS

Macroscopic Characters

Fruit is capsular, ovoid, unilocular, 3-6 valved, usually 1 seeded, seeds 3–4 mm long, glabrous and smooth and shining to reticulate, dark brown in color, characteristic in taste and having pleasant odor.

Microscopic Characters

Fruit

Transverse section of the fruit passing through collenchyma generally appears oval or polygonal. Lignified parenchymatous cells of mesocarp found associated with the fibrous tissue. The remaining vittae comprise yellowish-brown fragments with fine cracks and look like broken glass. Moreover, a single ridge of vascular bundle raphe appears in the middle of commissural surface clearly seen in the section [Figure 1].

In longitudinal section, a longitudinally elongated, 120–190 μ long and 14–17 μ wide, thick walled, pitted, and very small lumen structure founded as sclerenchyma [Figure 2b].

Powder Microscopy

Powder microscopy showed colorless oil globules, polyhedral structure endosperm [Figure 3a]. A thin walled, few colorless, and few colored with reddish-brown matter and wavy cells are cork cells [Figure 3a]. Starch grains were also seen in the powder microscopy. These are simple oval or rounded in shape and about 2–4 to 10–20 μ long [Figure 3a]. A sieve tube-shaped structure of companion cells was seen in preparation [Figure 3b]. Annular

xylem vessel also seen in this section which is in the form of rings placed more or less at equal distance from each other [Figure 3b]. The preparation also showed lignified, thickened yellow walls with crystal sheath of parenchymatous cells are fibers [Figure 3c].

Physicochemical Analysis

Ash value showed the inorganic calcium, iron, carbonates, and phosphates present in fruit of *C. cretica* Linn. On the basis of the different ash values of the plant, it was concluded that acid-insoluble ash value was found to be the highest (18%), while water-soluble ash was lowest (7%) [Table 1]. About 80 g of the crude drug powder was subjected for Soxhlet extraction. Ethanol and ethyl acetate were shown high extractive value [Table 2].

The foreign organic matter value of the plant drug lied within the limits and it was free from dust, molds, and extraneous matter [Table 3]. The moisture content was calculated through loss on drying method and was found to be 2.25% [Table 4]. The swelling

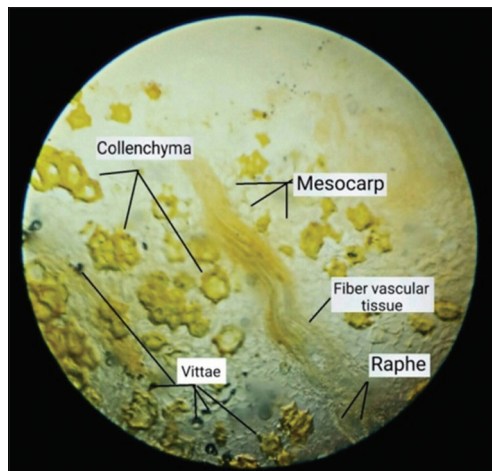


Figure 1: Transverse section of fruit. Collenchyma, mesocarp, fiber vascular tissue, vittae, raphe

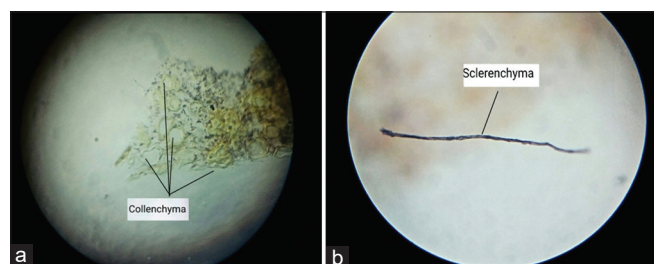


Figure 2: Longitudinal section of fruit. (a) Collenchyma (b) Sclerenchyma

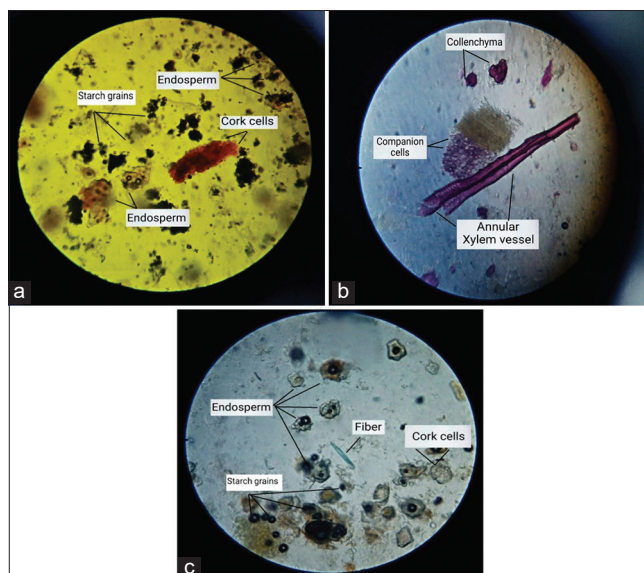


Figure 3: Powder microscopy of fruit. (a) Endosperm, starch grains, cork cells. (b) Collenchyma, companion cells, annular xylem vessel. (c) Fibers collenchyma

Table 1: Ash values of *Cressa cretica* Linn.

Test	Percentage (%w/w)
Total ash	18
Acid-insoluble ash	13
Water-soluble ash	7

C. cretica: *Cressa cretica*

Table 2: Extractive values of *Cressa cretica* Linn. in different solvents

Solvent	% value (w/w)	Consistency
Pet. ether	1.25	Brown
Chloroform	0.05	Brown
Ethyl acetate	5.25	Brown
Ethanol	29	Brown
Aqueous	22.80	Brown

C. cretica: *Cressa cretica*

and foaming index values were recorded to be 0.8 cm and <100, respectively [Tables 5 and 6].

Preliminary Phytochemical Screening

The phytochemical profiling of the plant revealed the presence of alkaloids and flavonoids. This serves as an important tool for the quality assurance of plant for future studies. The fluorescence analysis is a tool for the determination of constituents in the plant that gives a definite idea of the chemical nature. The fluorescence characteristics of the powder when treated with various chemical reagents have been extensively studied in different wavelengths

Table 3: Foreign organic matter of plant *Cressa cretica*

Parameter	% yield (w/w)
Foreign organic matter	0.20

C. cretica: *Cressa cretica*

Table 4: Moisture content of *Cressa cretica*

Parameter	% value (w/w)
Moisture content	2.25

C. cretica: *Cressa cretica*

Table 5: Swelling index of *Cressa cretica*

Parameter	Value (cm)
Swelling index	0.8

C. cretica: *Cressa cretica*

Table 6: Foaming index of *Cressa cretica*

Parameter	Value
Foaming index	<100

C. cretica: *Cressa cretica*

Table 7: Fluorescence analysis fruit powder of *Cressa cretica* Linn.

Treatment	Short UV light	Long UV light	Daylight
Drug powder	Green	Black	Brown
Drug powder+1N HCl	Faint green	Dark green	Brown
Drug powder+1N H ₂ SO ₄	Dark Purple	Blackish purple	Dark pink
Drug powder+1N HNO ₃	Blackish	Yellowish green	Brown
Drug powder+Picric acid	Black	Black	Reddish brown
Drug powder+5% FeCl ₃	Black	Dark green	Dark brown
Drug powder+Iodine	Green	Brown	Brown
Drug powder+GAA	Dark blue	Blackish	Blackish

C. cretica: *Cressa cretica*. UV: Ultraviolet

(254 nm and 366 nm). This analysis of the drug powder was carried out and data are presented in Table 7.

CONCLUSION

C. cretica Linn., a halophyte plant commonly known as *Rudravanti*, however, is a controversial name, and hence, a well-established quality control and identification parameters are highly essential for the plant. In this paper, the macroscopical and microscopical findings will lay down the standards which will be useful for the detection of its identity and authenticity.

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