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PHARMACOGNOSTIC PROFILE AND ANTIMICROBIAL POTENTIAL OF FRUITS OF *CRESSA CRETICA* L.

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ABSTRACT

The importance of medicinal plants in traditional health care practices, providing clues to new areas of drug research and biodiversity conservation is now well recognized. *Cressa cretica* Linn. belonging to family Convolvulaceae, commonly known as Rudravanti, is an erect, small, dwarf shrub, usually growing in sandy or muddy saline habitats. Though almost all its parts are used in traditional systems of medicine, fruits are the most important parts which are used medicinally. The present study gives an account on its pharmacognostical profile and its antimicrobial potential. This research paper presents microscopic characters, fluorescent analysis, physicochemical evaluation, element detection, moisture content, fiber detection and extractive values. The preliminary phytochemical screenings of various extracts was performed to establish the Pharmacognostical profile of the fruits. The antibacterial and antifungal effect of methanolic extract against various organism like *E.coli*, *S.aureus*, *S.typhi*, *B.subtilis*, and *C.albicans* by Cup plate method. It shows the very good antibacterial and antifungal activity which was comparable with standard antibiotic Ciprofloxacin.

Keywords: *Cressa cretica* L., Pharmacognostic profile, Antimicrobial activity.

INTRODUCTION

Cressa cretica L. belonging to the family Convolvulaceae, is perennial plant with a life cycle that continues in the summer period, when the salt marsh area drains. *C. cretica* usually grows in sandy or muddy saline habitats. Commonly the plant is known as 'Rudranti' in Hindi, 'Rudravanti' in Bengali and 'Dahna' in Oriya [1]. The entire plant is medicinally important to antitubercular, expectorant, Anthelmintic, stomachic, leprosy, asthma, urinary discharges, constipation, and as an appetizer [2-4]. The present investigation deals with studies on some important Pharmacognostical profiles of the fruits which can helpful in authenticating the plant material.

MATERIAL AND METHODS

Plant Material

Cressa cretica fruits collected from Mankarnika Aushadhalay, Pune. This plant was authenticated by Dr Mrs.A.S.Upadhyay, Botany Group, Plant Sciences Division, Agharkar Research Institute (No.3/187/2010/Adm. 367), Pune.

Morphology

C. cretica L. is an erect, small, dwarf shrub upto

38cm height. Roots are horizontal; germinate with lateral branches leading upward to produce above-ground parts. It is a perennial shrub or herb, usually branched. Stems are at first erect and then become decumbent, apparently short-lived, gray appressed pilose to sericeous. Leaves on main branches are often larger than that on branchlets and the blade is 1-12 mm long, lanceolate, ovate or elliptic- to scale like, sessile, Peduncle lengths, stamen lengths, filament pubescence and ranges distinguish.

Flowers are solitary, white or pink, auxiliary, 5-8 mm long, sessile or on short peduncles, bracteates, in spicate to head-like clusters at tips of branchlets, bracteoles unequal in length. Sepals are ovate to obovate and imbricate. Corolla is in salver form the limb is 5-lobed, the lobes mostly ovate imbricate, spreading to reflexes. Stamens exserted; filaments filiform; styles exserted. Ovary 2-locular, 4-ovulate; styles 2, distinct to the base; stigmas capitate [5]. Fruit is capsular, ovoid, unilocular, and usually one-seeded. Seeds are 3-4 mm long, glabrous and smooth [6,7].

Fluorescence analysis

The fresh fruits were dried under shade, powdered and pass through 40 mesh sieve and stored

in closed container for use. The colour change of the powdered fruits with respect to different chemical reagents on the basis of different chemical constituents was observed in day and ultraviolet light [8-10].

Physicochemical evaluation

Physico-chemical parameters such as the total ash, acid insoluble ash, water insoluble ash, Element detection, crude fiber and moisture content were determined as per reported methods.^{[11],[12]} considering the diversity of chemical nature and properties of contents of drugs, five different solvents were used for determination of extractive values as per reported methods [1,11,12].

Preparation of Extracts

The powder was extracted with different solvents ranging from non-polar to polar solvents. About 500 gm of the crude drug powder was subjected for Soxhlet extraction.

Phytochemical screening

The dried and powdered fruit was subjected to preliminary phytochemical screening for qualitative detection of phyto-constituents. The concentrated extracts were evaporated about to dryness and the extracts obtained with each solvent were subjected to various qualitative phytochemical tests for the identification of chemical constituents in the plant material [6,12,13].

Antimicrobial activity of *Cressa cretica* L.

The antibacterial and antifungal activity of methanolic extracts was studied by Cup plate method against various organisms like *E.coli*, *S.aureus*, *S.typhi*, *B.subtilis*, and *C.albicans*. was performed by reported method which is given in IP [11].

RESULT AND DISCUSSION

The fluorescence analysis represented the behavioral changes of the powder fruit with different chemical reagents in different wavelengths in UV, which can be the identifying character of the plant *C. cretica*. The fluorescence characteristics of the powder when treated with various chemical reagents have been extensively studied in different wavelengths (254nm & 366nm), which was set the standard parameters for authentication. The results are shown in Table: I (a) & I (b).

The physicochemical characters like ash values showed the inorganic Calcium, Magnesium, Potassium, sulphate, Iron, silicates, carbonates, phosphate & chloride present in fruits of *Cressa cretica* L. and acid insoluble ash values, water soluble ash shows the inorganic elements that were soluble in acid and water respectively. Sulphated ash was found out and this was useful to find out free metals present in the drug with sulphated form. The high percentage of Acid insoluble residue in the ash of *C.cretica* was evaluated and the results are depicted in Table II & III.

Table I(a). Fluorescent studies of powder of *C.cretica*

| Sr. No. | Reaction with chemical | UV-254 nm | UV-366 nm | Day light |
|---------|---|-----------------|-----------------|-----------------|
| 1 | Powder as such | Greenish | Blackish | Brown |
| 2 | Powder+1N NaoH in water | Greenish black | Black | Brown |
| 3 | Powder+1N Hcl | Faint green | Dark green | Brown |
| 4 | Powder+1N NaoH in methanol | Dark chocolate | Blackish | Brown |
| 5 | Powder+50% KoH | Greenish yellow | Blackish green | Dark brown |
| 6 | Powder+50% H ₂ SO ₄ | Dark purple | Blackish purple | Dark pink |
| 7 | Powder+50% Nitric acid | Faint green | Brownish black | Faint brown |
| 8 | Powder+ conc.nitric acid | Blackish | Yellowish green | Yellowish brown |
| 9 | Powder+ Acetic acid | Faint green | Blackish | Brown |
| 10 | Powder+ iodine water | Dark blue | Blackish | Blackish |

Table I(b). Behaviour of cressa cretica powder with different chemical reagent

| Sr. No | Chemical reagent | Observation |
|--------|-------------------------------|-----------------|
| 1 | Powder as such | Light brown |
| 2 | Powder + acetic acid | Yellowish |
| 3 | Powder + conc. Sulphuric acid | Violet/purple |
| 4 | Powder + conc.nitric acid | Dark brown |
| 5 | Powder + ferric chloride | Yellowish brown |
| 6 | Powder + aq.sodium hydroxide | Blackish brown |

Table II. Ash Values

| Sr. No | Test | Percentage (%w/w) |
|--------|-----------------|-------------------|
| 1. | Total ash value | 59.5 |
| 2. | Acid insoluble | 55 |
| 3. | Water soluble | 51 |
| 4. | Sulphated ash | 51.5 |

Table III. Element Detection

| Sr. No | Test | Observation | Inference |
|--------|---------------|------------------------|-----------|
| 1 | For calcium | White ppt | Present |
| 2 | For magnesium | White crystalline ppt | Present |
| 3 | For potassium | Yellow ppt | Present |
| 4 | For iron | Blue colour | Present |
| 5 | For sulphate | White ppt | Present |
| 6 | For phosphate | Yellow crystalline ppt | Present |
| 7 | For chloride | White ppt | Present |
| 8 | For carbonate | White ppt | Present |

The Crude fiber, moisture content and extractive values was assessed and represented in Table IV & Table V.

Table IV. Crude Fiber & Moisture Content

| Sr. No | Test | Content (gm) |
|--------|---------------------------|--------------|
| 1 | Crude fiber determination | 1.21 |
| 2 | Moisture content | 0.1 |

Table V. Extractive Value

| Sr. No | Solvent | Extractive value (%) |
|--------|---------------|----------------------|
| 1 | Pet.ether | 1.5 |
| 2 | Chloroform | 4.8 |
| 3 | Ethyl acetate | 7.6 |
| 4 | n-butanol | 3.2 |
| 5 | Methanol | 14.4 |
| 6 | Water | 27.2 |

Table VI. Phytochemical screening

| Sr. No | Test | Water | Chloroform | Ethyl acetate | N-butanol | Methanol |
|--------|--------------------------------|-------|------------|---------------|-----------|----------|
| 1 | For cardiac glycoside | + | - | - | - | - |
| 2 | For anthraquinone glycoside | + | + | + | + | - |
| 3 | For saponin glycoside | - | - | - | - | - |
| 4 | For alkaloids | - | - | - | - | + |
| 5 | For tannins and phenolic comp. | - | - | - | - | - |
| 6 | For hexose sugar | + | + | + | + | - |
| 7 | For carbohydrate | + | + | + | + | - |
| 8 | For hexose sugar | - | - | - | - | - |
| 9 | For non reducing sugar | - | - | - | - | - |
| 10 | For amino acid | - | - | - | - | - |
| 11 | For protein | - | - | - | - | - |

Table VII. Antimicrobial activity

| TEST ORGANISM | DIAMETER OF ZONE OF INHIBITION (MM) Methanolic extract of <i>Cressa cretica</i> L.fruit | | | | POSITIVE CONTROL CIPROFLOXACIN |
|-------------------|--|----------|-----------|----------|-----------------------------------|
| | 200µg/ml | 400µg/ml | 600 µg/ml | 800µg/ml | 200µg/ml |
| <i>E.coli</i> | 25 | 25 | 25 | 30 | 35 |
| <i>S.aureus</i> | 15 | 15 | 25 | 25 | 32 |
| <i>S.typhi</i> | 20 | 20 | 25 | 30 | 35 |
| <i>B.subtilis</i> | 20 | 20 | 20 | 25 | 30 |
| <i>C.albicans</i> | 20 | 25 | 25 | 25 | 34 |

The preliminary phytochemical screening shows the presence the phytoconstituents like Glycosides, Alkaloids, Carbohydrates, Tannins and Phenolic compounds, amino acid, protein. The results are shown in Table: VI.

Antimicrobial activity

Antibacterial and antifungal effect of methanolic extract against various organism like *E.Coli*, *S.aureus*, *S.typhi*, *B.subtilis*, and *C.albicans*. The zone of inhibition was found to be 200µg/ml, 400µg/ml, 600µg/ml, & 800µg/ml. The zone of the extract and standard

Ciprofloxacin 200µg/ml was comparable. The results shows that methanolic extract have potent antibacterial and antifungal activity which was shown in Table VII.

CONCLUSION

The present study on pharmacognostical characters of *Cressa cretica* L. may be useful to

supplement information in regard to its identification and can be an authenticate parameter of standardization. This study also concluded that fruit extract have great potential as antimicrobial compounds against microorganism and that they can be used in the treatment of various infectious diseases caused by resistant microorganisms.

REFERENCES

1. Chopra RN, Nayer SL, Chopra IC. Glossary of Indian medicinal plant. Council of scientific and industrial research, New Delhi, 1956; 56, 67.
2. Youngken HW. Pharmaceutical Botany. 7th Edition, The blakiston company, 1951.
3. Johansen DA. Plant micro technique. 1st edition, McGrew hill Book Company, 1940.
4. Jane FW. The structure of wood. 1st edition, Adam and Charles black. London, 1955.
5. Satakopan S, Karandikar GK. Studies in the American convolvulaceae. *Journal of scientific and industrial research*, 1961.
6. Evans WC. Pharmacognosy. 15th edition, W.B. Sounder publication. Edinberg, 2002, 43, 57.
7. Warriar PK, Nambier VP, Ramankutty C. Indian medicinal plant: a Compendium 500 species. CSIR publisher. New Delhi, 1990, 219.
8. Charles R, Chase JR, Robertson P. Fluorescence of powdered vegetable drugs with particular reference to development of a system of identification. *Journal of American Pharmaceutical association*, 1, 1948, 324-331.
9. Charles J, Kokoski R, Kokoski JS. Fluorescence of powdered vegetable drugs under Ultraviolet Radiation. *Journal of American Pharmaceutical association*, XI, 1958, 715-717.
10. Badami S, Gupta MK, Suresh B. Pharmacognostical evaluation of *Grewliatiliaefolia* bark. *Journal of Natural products*, 18, 2002, 6-10.
11. Anonymous. Indian pharmacopeia. Vol-II Government of India Ministry of Health and family welfare, Controller of Publications. New Delhi, 1996, A-54-57, 74-76.
12. Khandelwal KR. Practical Pharmacognosy: Techniques and experiments. 12th edition, Nirali prakashan, 2004, 139, 151.
13. Anonymous. Ayurvedic Pharmacopoeia. Government of India Ministry of Health and family welfare, Controller of Publications. Delhi, 2000, 151.