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**Research Article**

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# Physicochemical and Phytochemical Investigation on the Root of *Ceriscoides turgida* (Roxb.) Tirveng

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**ABSTRACT**

*The present attempt is to evaluate the physico-chemical and preliminary phytochemical studies on the root of Ceriscoides turgida (Roxb.) Tirveng. The root of this species is used by the local people in forest region of Chimur Tahsil, Chandrapur District, Maharashtra as a remedy against indigestion in children, jaundice and fever. The present study deals with the physico-chemical parameters like moisture content, total ash value, acid insoluble ash value and extractive value in different solvents. The preliminary phytochemical screening of Ceriscoides turgida (Roxb.). Tirveng root was done by preparing powdered drug extract in different solvent like petroleum ether, chloroform, ethyl acetate, acetone, methanol and water. The qualitative chemical examinations of the root revealed the presence of various phytoconstituents like carbohydrates, protein and amino acids, fixed oil and fats, saponins, sterols, alkaloids, phenols, tannins, flavonoids, anthocyanin, anthraquinones and cardiac glycosides in different solvent extracts.*

**Keyword:** *Ceriscoides turgida* (Roxb.); Tirveng; Physico-chemical; Phytochemicals

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## INTRODUCTION

In the recent years, research on medicinal important plants has attracted a lot of attentions globally. Most of the evidence has accumulated to demonstrate the promising potential of medicinal plants used in various traditional, complementary and alternate system of treatment of human diseases [1,2]. India is one of the world's 12 mega diversity centres with 47000 plant species. About 700 species are mostly used by the tribal and rural population. About 200 species are used medicinally and commercially on fairly large scale. Herbal medicines are promising choice over modern synthetic drug. They show no side effect and are considered to be safe. Generally herbal formulations involved the use of fresh or dried plant parts. Correct knowledge of such crude drugs is very important aspect in preparation, safety and efficacy of the herbal product. Pharmacognosy is a simple and reliable tool, by which complete information of the crude drug can be obtained [3-6]. There is a need for documentation of research work carried out on traditional medicines. It is extremely important to make an effort towards standardization of the plant material to be used as medicine. The process of standardization can be achieved by stepwise pharmacognostic study [7].

*Ceriscoides turgida* (Roxb.) Tirveng synonym *Gardenia turgida* (Roxb.) locally known as Pandhara Fetra belonging to the family Rubiaceae is a medicinally important tree found throughout the greater part of India. It is armed, deciduous tree up to 8 m tall with smooth yellowish-to-blackish-brown bark. Leaves of the plant have spines on the upper surface. The root of this plant species is used by the local people in forest region of Chimur Tahsil, Chandrapur District, Maharashtra as an herbal remedy for indigestion in children, jaundice and fever. The current article describes some physico-chemical and preliminary phytochemical characteristics of root of *Ceriscoides turgida* (Roxb.) Tirveng plant.

## MATERIALS AND METHODS

### Collection of Sample

The fresh plant material i.e. roots of *Ceriscoides turgida* (Roxb.) Tirveng was collected in December 2014 from forest region of Chimur Tahsil, in Chandrapur District, Maharashtra State, India. The plant was authenticated by taxonomist and voucher specimen was deposited in the herbarium of Department of Botany Brijlal Biyani Science College, Amravati with a voucher specimen sample no. B.B.S.C.H01. Collected materials (root) were chopped into small pieces, shade dried and then coarsely powdered using blender.

### Preparation of Root Extract

Crude plant extract was prepared by soxhlet extraction method. 30 gm of powdered plant material (root) was extracted with 250 ml different solvents like petroleum ether, chloroform, ethyl acetate, acetone, methanol and water separately. The concentrated extract was reduced to a semi solid mass by drying on water bath at 40 ± 50°C and stored in to air tight bottle. These extract were subjected to phytochemical screening for the identification of different phytoconstituents.

### Physicochemical Evaluation

Analysis of physico-chemical constants of root powder has been done to evaluate the quality and purity of the drug. Various physico-chemical parameters like moisture content, total ash value, acid insoluble ash value and extractive value in different solvents like petroleum ether, chloroform, ethyl acetate, acetone, methanol and water were calculated. The information collected from these test will be useful for standardization and to obtained the quality standards [8,9].

### Phytochemical Analysis

The qualitative chemical tests were carried out to identify the nature of different phyto-constituents present in the powdered crude drug. The test was carried out using standard protocols adopted by the various workers [10-18].

## RESULTS AND DISCUSSION

### Physicochemical Parameters

The result of physico-chemical parameters of *Ceriscoides turgida* (Roxb.) Tirveng root is shown in Table 1. The physico-chemical parameters indicate the quality and purity of crude drug was good enough. Insufficient drying favors spoilage by molds and bacteria and makes possible the enzymatic destruction of active principles. Not only the ultimate dryness of the drug is important, equally important is the rate at which the moisture is removed and the condition under which it is removed thus the determination of moisture content also provide the method of preparation of drug [19,20]. The moisture content of the drug was found to be 4.32 which show drug is properly dried and properly stored.

The ash values of the crude drugs signify its quality and purity and gives idea about the total inorganic content in the plant samples. The total ash value was found to be 11.398 which is an important in the evaluation of purity of drug, i.e., the presence or absence of foreign matter such as metallic salts or silica [9,21].

The acid-insoluble ash value was found to be 0.5475 is the part of total ash which is insoluble in dilute hydrochloric acid. Extractive value of methanol was found to be high as compared to extractive value of other solvents.

**Table 1: Physico-chemical parameters of *Ceriscoides turgida* (Root)**

| Sr.No. | Parameters | Value |
|---|---|---|
| 1 | Moisture content % | 4.32 |
| **Ash Value**% (w/w) | | |
| 2 | Total Ash Value | 11.398 |
| 3 | Acid insoluble ash value | 0.5475 |
| **Extractive value (% w/w)** | | |
| 4 | Petroleum ether | 0.405 |
| 5 | Chloroform | 0.353 |
| 6 | Ethyl acetate | 0.128 |
| 7 | Acetone | 0.425 |
| 8 | Methanol | 2.609 |
| 9 | Water | 1.754 |

**Preliminary phytochemical screening**

The preliminary phytochemical analysis of *Ceriscoides turgida* (Roxb.) Tirveng root are given in the Table 2. It revealed the presence of carbohydrates in petroleum ether, acetone, methanol and water extract. Protein and amino acids was found in the extract of petroleum ether, ethyl acetate, acetone and methanol. All extract shows the positive test for fixed oils and fats.

Saponins were extracted only in water. Saponins have hypotensive and cardio-depressant properties [22]. Saponins which are known to produce inhibitory effect on inflammation [23]. Saponins have the property of precipitating and coagulating red blood cells. Some of the characteristics of saponins include formation of foams in aqueous solutions, hemolytic activity, cholesterol binding properties and bitterness [24,25]. Saponins protect against hypercholesterolemia and antibiotic properties [26]. Saponins have the insecticidal, antibiotic, fungicidal properties [27]. In addition to industrial applications as foming and surface active agents, saponins have been extensively used as detergents, pesticides and molluscicides and also have beneficial health effects [28].

Sterol shows the positive test in petroleum ether, ethyl acetate and methanol extract. Steroids have been reported to have antibacterial properties [29] and they are very important compounds especially due to their relationship with compounds such as sex hormones [30].

**Table 2: Preliminary phytochemical screening of *Ceriscoides turgida* (Roxb.) Tirveng root**

| Sr. No | Chemical Constituents | Test | Petroleum ether (60-80°C) | Chloroform (61.2°C) | Ethyl Acetate (77.1°C) | Acetone (56°C) | Methanol (64.7°C) | Water (100°C) |
|---|---|---|---|---|---|---|---|---|
| 1 | Carbohydrates | Molisch's test | + | - | - | + | + | + |
| | | Fehling's test | + | - | - | + | + | + |
| | | Benedict's test | + | - | - | + | + | + |
| 2 | Protein and amino acids | Millon's test | + | - | + | + | + | - |
| | | Biuret test | + | - | - | - | - | - |
| | | Ninhydrin test | + | - | + | + | + | - |
| 3 | Fixed oils and fats | Stain test | + | - | + | + | + | - |
| | | Saponification test | - | - | - | - | - | - |
| | | Sudan test | + | + | + | + | + | + |
| | | Test for Glycerol | + | + | + | - | - | + |
| 4 | Saponins | Foam Test | - | - | - | - | - | + |
| | | Froth Test | - | - | - | - | - | + |
| 5 | Sterols | Salkowaski test | + | - | - | - | + | - |
| | | Libermann | - | - | + | - | - | - |
| | | Burchard test | | | | | | |
| 6 | Terpenoids | Test for Terpenoids | - | - | - | - | - | - |
| 7 | Alkaloids | Mayer's test | - | - | - | - | - | - |
| | | Hager's test | - | - | - | - | - | - |
| | | Wagner's test | - | - | - | - | + | - |
| | | Dragendorff's test | - | - | - | - | - | - |
| 8 | Phenols | Ferric chloride test | - | - | - | - | + | - |
| | | Libermanns test | - | - | - | - | - | - |
| 9 | Tannins | Lead Acetate test | - | - | - | + | - | - |
| | | Ferric chloride test | - | - | - | - | + | - |
| 10 | Flavonoids | Lead Acetate test | - | - | - | - | + | - |
| | | Shinoda test | - | - | - | - | + | - |
| | | Alkaline Reagent test | - | - | - | - | - | - |
| 11 | Anthocyanin | Dilute Hcl acid test | + | - | - | - | + | - |
| 12 | Anthraquinones | Borntragger's test | - | - | + | - | + | - |
| 13 | Cardiac Glycosides | Kellar-Killiani test | - | - | - | + | + | + |

Present- (+), Absent (-)

Alkaloids, phenol and flavonoids were extracted only in methanol. Alkaloids associated with medicinal uses for centuries and one of their common biological properties is their cytotoxicity [31]. Several workers have reported the analgesic [32,33], antispasmodic and antibacterial [34,35] properties of alkaloids. Alkaloids protect against chronic diseases. Alkaloids are common antibacterial, antimalarial, cytotoxic and anticancerous agents [36]. The phenolic compounds are one of the largest and most ubiquitous groups of plant metabolites [37]. They possess biological properties such as antiapoptosis, antiaging, anticarcinogen, antiinflammation, antiatherosclerosis, cardiovascular protection and improvement of endothelial function, as well as inhibition of angiogenesis and cell proliferation activities [38]. Several studies have described the antioxidant properties of medicinal plants which are rich in phenolic compounds [39,40].

Flavanoids are hydroxylated phenolic substances known to be synthesized by plants in response to microbial infection and they have been found to be antimicrobial substances against wide array of microorganisms. Flavanoids are also effective antioxidant and show strong anticancer activities [25,41,42]. Flavonoids have been

shown to have antibacterial, anti-inflamatory, antiallergic, antineoplastic, antiviral, anti-thrombotic, antioxidant and vasodilatory activities [43].

Tannins were observed in ethyl acetate and methanol extract. Tannins are secondary metabolites responsible for antimicrobial properties in various plants [44]. Tannins are attributed for analgesic and antiinflammatory activities. Apart from this tannin contribute property of astringency i.e., faster healing of wounds and inflamed mucous membrane [45]. Tannins have shown potential of antiviral [46] and antioxidant activity [47].

Anthocyanin was found in petroleum ether and methanol extract. Anthocyanins show the antioxidant and antiinflammatory activities [48,49].

Anthraquinones shows the positive test in ethyl acetate and methanol extract. Anthraquinones are antibacterial, antifungal and cytotoxic agents [50]. Natural or synthetic quinones show a biological or pharmacological activity and some of them show antitumoral activity [51].

Cardiac glycosides were extracted in acetone, methanol and water. Glycosides are known to lower the blood pressure [52]. Glycosides are naturally cardioactive drugs used in the treatment of congestive heart failure and cardiac arrhythmia [53]. Glycosides might play a role in the cardioprotective potential of pomegranate. New clinical studies of their anticancer potential as single or adjuvant treatments may provide insight into these potentially valuable therapeutic options [54].

## CONCLUSION

Standardization is essential measure for quality, purity and sample identification. Physico-chemical and phytochemical analysis of *Ceriscoides turgida* (Roxb.) Tirveng root confirm the quality and purity of plant and its identification. The plants studied here can be seen as a potential source of useful drugs. The information investigated will be useful for further pharmacological and therapeutical evaluation along with standardization of plant material.

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