

**PHYTOCHEMICAL ANALYSIS OF THE LEAF, FLOWER, AND BARK OF A MEDICINAL PLANT,  
*CRATAEVA MAGNA* (LOUR.) DC****SHASHIKANTA BEHERA, BISWARANJAN BEHERA, DURGA PRASAD BARIK, SOUMENDRA KUMAR NAIK\***

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**ABSTRACT**

**Objective:** The aim of this work was to perform preliminary screening of the phytoconstituents present in the leaf, flower, and bark of a valuable medicinal plant, *Crataeva magna* (Lour.) DC.

**Methods:** Phytochemical analysis of the leaf, flower, and bark extracts was done using various solvent by standard methods as described by Harborne (1973).

**Results:** Six different extracts each for leaf, flower, and bark were screened. Saponins were present in all the extracts of leaf, flower, and bark, whereas not a single extract showed the presence of steroids. Five extracts of flower and four extracts of leaf and bark indicated the prevalence of flavonoids. Similarly, four extracts of bark and three extracts of leaf and flower showed the incidence of tannins. Terpenoids occurred only in the aqueous extracts of leaf and flower, whereas alkaloids were found only in two and one extract(s) of leaf and bark, respectively. Phenolic compounds were not found in any of the bark extracts, but three and two extracts of leaf and flower showed their presence.

**Conclusion:** The preliminary phytochemical analysis of this medicinal plant indicated that these plant parts can be exploited by scientists in general and the pharmaceutical industries in particular for the designing of new drugs.

**Keywords:** Bark, *Crataeva magna*, Flower, Leaf, Medicinal plant, Phytochemical analysis.

**INTRODUCTION**

*Crataeva magna* (Lour.) DC., commonly known as Baruna, is an evergreen medicinal plant with religious value belonging to the family Cappariaceae. The plant is found usually in the semi-arid regions of the tropical and subtropical countries of the world including India [1]. The plant is widely used in the treatment of various diseases in the traditional system of medicine including Ayurveda and Unani [1,2]. Its various parts, including the root, stem, flower, and leaf, are used for the treatment of fever [1]. The leaf paste of the plant is applied externally on piles, and the juice is taken orally to get relief from bleeding piles [3,4]. An ethnobotanical survey reported that, in some region of India, the paste prepared from the bark is useful to cure infantile diarrhea [5]. The bark is also used by tribals for the treatment of inflammation, kidney stones, and also as an analgesic agent [6].

At present, there is only one report on the preliminary phytochemicals analysis of the pericarp of *C. magna* [1]. Thus, the present experiment was conducted to analyze the presence of phytochemical constituents in different parts of the plant (the leaf, flower, and bark) other than pericarp which are mainly used in the traditional system of medicine.

**METHODS**

The leaf, flower, and bark of *C. magna* were collected from the campus of Ravenshaw University, Cuttack, Odisha, India, in March 2014. The collected leaf, flower, and bark were washed with distilled water and dried in shade for 4-6 days. They were then coarsely powdered and stored in air tight container for the experiments at room temperature. A 5 g of powdered leaf, flower, and bark samples were individually dispensed in 60 ml screw capped tube (Borosil, India) containing 30 ml each of aqueous (distilled water), acetone, chloroform, ethanol, n-hexane, and methanol. All these were kept at room temperature for 24 hrs. Then, the extracts were filtered through Whatman No. 1 filter paper. The collected filtrates were used for the preliminary phytochemical analysis by methods reported by Harborne, 1973 [7].

**RESULTS**

The preliminary phytochemical analysis of leaf, flower, and bark of *C. magna* in this study revealed the presence of saponins, flavonoids, tannins, alkaloids, phenolic compounds, and terpenoids (Table 1). This study revealed the presence of saponins in all solvent extracts of leaf sample of *C. magna*, whereas tannins were found in aqueous, acetone, and methanol extracts. Besides, flavonoids were found in all extracts except chloroform and n-hexane, and alkaloids were present only in two extracts (acetone and chloroform) of leaf sample. While steroids were totally absence in all the extracts, and terpenoids were present only in aqueous extract of leaf sample (Table 1).

The phytochemical analysis of flower extracts of *C. magna* revealed the presence of saponins in all solvents tested. The flavonoids were present in all the extracts of flower except n-hexane. Alkaloids and steroids were absent in all six extracts while terpenoids showed their presence only in aqueous extract. Only three crude extracts of flowers (aqueous, acetone, and ethanol) showed the presence of tannins, whereas phenolic compounds were recorded in aqueous and ethanol extracts of flower sample (Table 1).

The phytochemical study gave negative results for the presence of phenolic compounds, steroids, and terpenoids in all the extracts tested for bark, whereas all the extracts of bark sample showed the presence of saponins. The tannins and flavonoids were recorded in all the extracts except chloroform and n-hexane. Interestingly, only aqueous extract of bark showed the presence of alkaloids (Table 1).

**DISCUSSION**

*C. magna* has been used for the treatment of a variety of disorders in the traditional system of medicine. The therapeutic properties of medicinal plants such as *C. magna* [1-6] are possibly due to the presence of different secondary metabolites such as alkaloids, flavonoids, saponins, and phenols. Sufficient work has yet to be done on *C. magna* to know

Table 1: Preliminary phytochemical analysis of the leaf, flower, and bark of *C. magna*

Solvents	Tannins			Saponins			Alkaloids			Flavonoids			Phenolic compounds			Steroids			Terpenoids		
	L	F	B	L	F	B	L	F	B	L	F	B	L	F	B	L	F	B	L	F	B
Aqueous	+	+	+	+	+	+	-	-	+	+	+	+	+	+	-	-	-	-	+	+	-
Acetone	+	+	+	+	+	+	+	-	-	+	+	+	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	+	+	+	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Ethanol	-	+	+	+	+	+	-	-	-	+	+	+	+	+	-	-	-	-	-	-	-
n-hexane	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methanol	+	-	+	+	+	+	-	-	-	+	+	+	+	-	-	-	-	-	-	-	-

+: Presence, -: Absence, L: Leaf, F: Flower, B: Bark, *C. magna*: *Crataeva magna*

the presence of secondary metabolites in different parts of the plant as well as active principles behind these therapeutic properties. The phytochemical analysis of leaf, flower, and bark of *C. magna* in this study showed the presence of secondary metabolites including saponins, flavonoids, tannins, alkaloids, phenolic compounds, and terpenoids which have immense therapeutic properties. In this study, only saponins were found to be present in all the six extracts tested for leaf, flower, and bark. The saponins content was also reported to be high in the phytochemical analysis of pericarp of *C. magna* [2]. Saponins are known for their anti-inflammatory and antimicrobial effects [8,9]. Besides, flavonoids have been reported to possess many useful properties, including anti-inflammatory activity, estrogenic activity, and antimicrobial activity [10]. Tannins have also a curative role in piles and inflammation [8]. Thus, the medicinal properties of *C. magna* may be attributed to saponins, tannins, flavonoids, and other phytochemicals present therein. However, more in-depth research is necessary to know the bioactive principles of this plant for different diseases which will lead to the production of plant-based medicine without side effects.

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