

Phytochemicals analysis, Phenolic & flavonoids content of *Cordia macleodii* Hook leaves & Bark

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Abstract

Cordia macleodii Hook (boraginaceae), a folklore medicinal plant, commonly known as "Shikari" in local language and found in Odisha and Madhya Pradesh. In this study, total phenolic content and concentration of flavonoids of two different extracts, from the ethanolic extract of *Cordia macleodii* (Boraginaceae) were determined using spectrophotometric methods. The total phenolic content ranged from 0.65 ± 0.05 & 1.65 ± 0.12 mg/g of dry weight of leaves & bark extract, expressed as gallic acid equivalents. The total flavonoids concentrations varied from 0.985 ± 0.09 & 1.89 ± 0.11 mg/g in bark & leaves extract, expressed as quercetin equivalents. Ethanolic extract of bark & leaves of *Cordia macleodii* showed the highest phenolic and flavonoids concentration respectively. The *Cordia macleodii* can be regarded as promising candidates for health management because of natural plant sources of phenolic and flavonoids with high value.

Keywords: Total phenolic content, Total flavonoids content, phytochemical screening, *Cordia macleodii*

Introduction

Cordia macleodii Hook (Boraginaceae) known Dahipalash (Hindi) or Dhaman (Marathi) or Panki/Shikari (Triabls), is a small tree (8-10 m) having white color flower and ovate leaves (5-10 cm), native to India (1-2). Various parts of the plant are used by tribal people and traditional medical practitioners of Odisha, Madhya Pradesh and Chattishgardh in the treatment of many diseased conditions. Leaves are used in wound healing, mouth sore; seeds as an aphrodisiac; stem in wound healing, while bark is used in the treatment of jaundice. Plant contains alkaloids, glycosides and tannins (3-4). Ethanomedicinal claims has not been evaluated pharmacologically except for hepatoprotective (leaf) (5), wound healing (leaf and bark) and antimicrobial and antifungal (leaf and bark) (6). Present study was an attempted to determine various phytoconstituents present (qualitative and quantitative) to prove it trial/traditional claim ethanopharmacologically.

Material and Method

Chemicals

All the solvents and chemicals used were purchased from Merck chemical (LR grade), India. Double distilled water was used throughout the experiment.

Extraction of Plant Material

Dried powder of bark and leaves of *Cordia macleodii* Hook were extracted successively with petroleum ether, chloroform, ethyl acetate and ethanol using Soxhlet's apparatus. The remaining marc was suspended in water, macerated for 48 hrs, filtered and dried under vacuum using rotary evaporator at 40°C (7).

Qualitative phytochemicals screening

Successively prepared extracts of barks and leaves were tested for the presence of carbohydrate, glycoside, saponin, tannins, alkaloid, flavonoids, steroids, and protein by using reported methods (8-10).

Quantitative phytochemicals estimation

Estimation of total flavonoids content (TFC)

TFC was determined by the method of Krishnamoorthy M. *et al*, 2011(11). $AlCl_3$ solution (1ml, 2%, w/v in methanol) was mixed with 1 ml of extract (10gm powder in 50 ml methanol) or standard quercetin solution (25-150 μ g/ml) and the volume was made to 10 ml in a volumetric flask, allowed to stand for 1 hr at room temperature and absorbance was measured at 420 nm against the blank. TFC was compared to quercetin equivalent (QE) of dried powder using the regression equation $Y = 0.004 X + 0.001$, $R^2 = 0.998$, where x is the absorbance and y is the quercetin equivalent (QE).

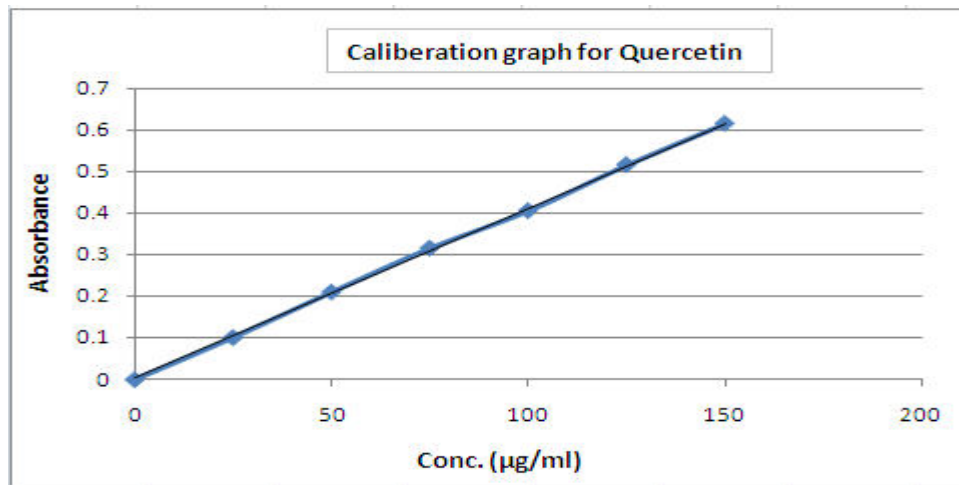


Figure No. 1: Determination of flavonoids content by quercetin method

Estimation of total phenolic content (TPC)

The total phenolic content was determined by the modified Folin-Ciocalteu method as per Singh S.K. and Chouhan H.S., 2011(12). Briefly, 1 ml extract (10gm powder in 50 ml methanol) and 1 ml Folin-Ciocalteu Reagent (FCR) were added to 9 ml of water in to a 25 ml volumetric flask. Mixtures were vortexed and set

aside for 5 min. Sodium carbonate solution (7%, w/v, 10 ml) was added to the mixtures, diluted with water to 25 ml and were incubated for 1.5 h at room temperature. Absorbance of mixtures was then measured at 760 nm against the blank. TPC was compared to gallic acid equivalent (GAE) of dried powder using the regression equation $Y = 0.009 X + 0.008$, $R^2 = 0.998$, where x is the absorbance and y is the quercetin equivalent (QE).

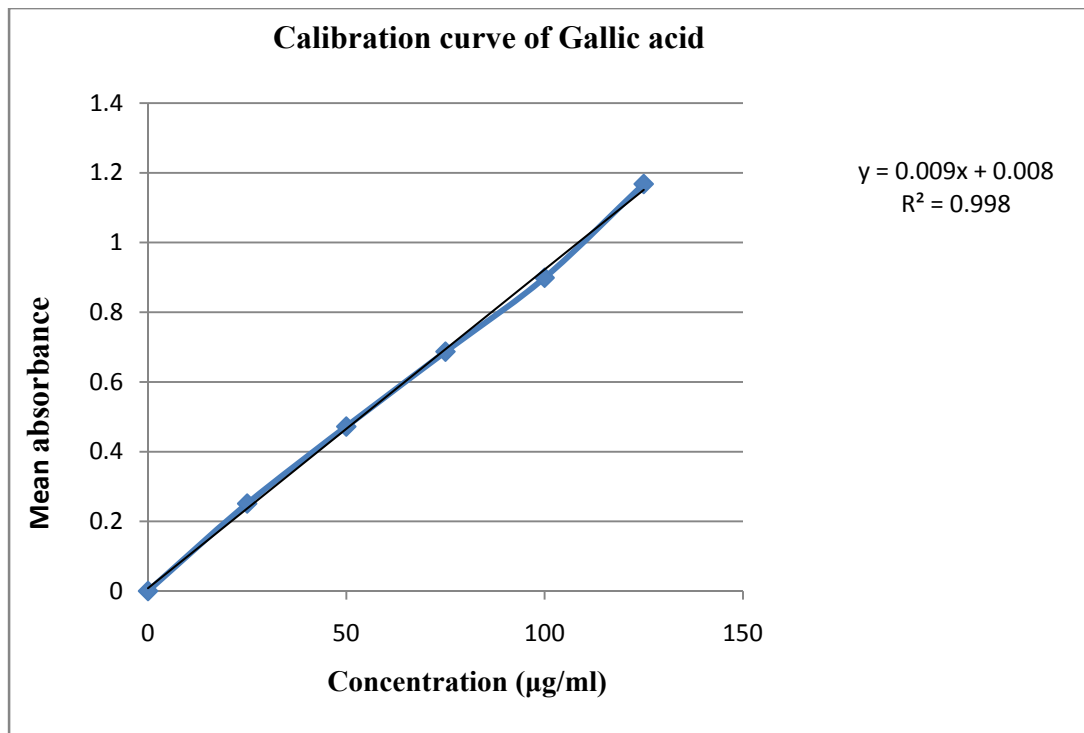


Figure No. 2: Determination of phenolic content by Gallic acid method

Results and Discussion

Table No. 1 show the result of successive extracts in different solvents of plant materials (leaf and bark) of *Cordia macleodii* Hook. *Cordia macleodii* Hook leaf extract shows the presence of alkaloids, phenols and absence of glycosides, saponins, flavonoids and Phytosterol in pet ether extract while chloroform leaf extract shows the presence of saponins and phenols only and absence of alkaloids, flavonoids, Phytosterol and glycosides. Ethanolic leaf extract shows the presence of alkaloids, glycosides, phenolic and flavonoids. In both extract i.e. ethanolic and aqueous extract of leaf

and bark, show maximum Phyto constituents as compared to other solvents.

Table No. 2 show the content of flavonoids and phenolic in ethanolic extract of *Cordia macleodii* Hook leaf and bark. The total phenolic content was estimated by Gallic acid (Figure. No. 2) while flavonoids content estimation was done by Quercetin (Figure. No. 1) and it was found to be total phenolic 1.65 ± 0.12 & 0.65 ± 0.05 and total flavonoids 0.98 ± 0.09 & 1.89 ± 0.11 in bark and leaves ethanolic extract respectively.

Table No.1 phytochemical screening of dried bark and leaves extracts

Extracts	<i>Cordia macleodii</i> Hook(Bark)					
	Alkaloids	Glycoside	Saponins	Phytosterol	Phenols	Flavonoids
Pet. ether	+ve	-ve	-ve	-ve	-ve	-ve
Chloroform	-ve	-ve	+ve	-ve	+ve	-ve
Ethylacetate	-ve	-ve	-ve	-ve	+ve	+ve
Ethanol	-ve	+ve	-ve	+ve	+ve	+ve
Water	+ve	-ve	+ve	+ve	+ve	+ve
<i>Cordia macleodii</i> Hook (leaf)						
Pet. ether	+ve	-ve	-ve	-ve	+ve	-ve
Chloroform	-ve	-ve	+ve	-ve	+ve	-ve
Ethylacetate	+ve	-ve	-ve	-ve	+ve	+ve
Ethanol	+ve	+ve	-ve	-ve	+ve	+ve
Water	+ve	-ve	-ve	+ve	+ve	+ve

-ve - absent, +ve - present

Table No.2 Estimation of total flavonoids and phenolic Content

S.No.	Ethanolic Extract	Total Phenol (mg/g)	Total Flavonoid (mg/g)
1.	Bark	1.65 ± 0.12	0.98 ± 0.09
2.	Leaves	0.65 ± 0.05	1.98 ± 0.11

Conclusion

The result indicates that qualitative and Quantitative chemical analysis was useful preliminary phytochemicals characterization of the *Cordia macleodii* Hook plants which have the more bioactive compound. The result of *Cordia macleodii* Hook extracts are known

to have curative activity against diseases producing pathogen. Therefore it could be used pharmacologically to develop new compounds for health benefit.

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