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Determination of Phenol and flavonoid content from *Vateria indica* (Linn)

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ABSTRACT

The present study aim to evaluate phenol and flavonoid content of Ethanolic and aqueous extract of the stem bark of the plant *Vateria indica* (L.), Dipterocarpaceae, is a woody plant was distributed in India and Sri Lanka. The resin has been used as a traditional medicine for sore throat, chronic bronchitis, rheumatism, and diarrhea. The stem of the genus *Vateria* is known to produce biological active compounds such as oligostilbenoids and monoterpenes. In the present study the phenol and flavonoid content of Ethanolic and aqueous stem bark extract of *Vateria indica* was evaluated by "Folin Ciocalteu's method" and "Aluminium chloride colorimetric method". Total phenolic content for Ethanolic and aqueous extract were found to be 670 mg/g and 310 mg/g and total flavonoid content were found to be 74mg/g and 62mg/g respectively.

Keywords: *Vateria indica*; Dipterocarpaceae; Stem bark, flavonoid, Polyphenols, Phenol content.

INTRODUCTION

Traditional knowledge about plants has become treasure trove and cultural heritage of many nations. Therefore it is very important to preserve and protect the traditional knowledge and also establish a data base of traditional medicine, this will help to conserve and retrieve the information to benefit of mankind [1]. Phenols are one of the chief secondary metabolites present in the plant kingdom. They are generally found in both edible and non-edible plants, and has been reported to have multiple biological effects including anti-oxidant activity [2]. Flavonoids are a class of phytochemical that possesses a wide range of biological activities. Flavonoids present an important class of antimutagens and anticarcinogens with high potential [3]. Phenolic compounds are a widely studied group of compounds from natural source and are also implicated in various biological activities. Certain phenolic compounds such as ellagic acid found in strawberries, raspberries, grapes, walnuts, etc. have been found to be antimutagenic [4].

Flavonoids are the most common group of polyphenolic compounds that are found ubiquitously in plants. Flavonoids and other plant phenolics are especially common in leaves, flowering tissue and woody parts such as stem and bark [2]. *Vateria indica* (Linn). Dipterocarpaceae is a perennial woody plant. A slow-growing species, Endemic and found primarily in the South west coast evergreen forests, upto an altitude of 750 m, and also occasionally in secondary evergreen dipterocarp forest in the states of Karnataka, Kerala & Tamil Nadu [5]. Dipterocarpaceaeous plants have been known to have an abundance of stilbene oligomers that have a blocking unit of resveratrol. The woody plant *Vateria indica* (Linn). is distributed in India and Sri Lanka, and the resin has been used as a traditional medicine for sore throat, chronic bronchitis, rheumatism, and diarrhea [6]. The present study describes the Phenolic and flavonoid content of Ethanolic and aqueous stem bark extract of *Vateria indica* (Linn).

MATERIALS AND METHODS

Chemical and reagents

All chemicals and solvents used were of analytical grade, Rutin was obtained from sigma chemicals, USA and Gallic acid from nice chemicals, Mumbai. The other chemicals were used procured from Ranbaxy fine Ltd. for whole study.

Plant material and preparation of the extracts plant material

The stem bark of *Vateria indica* was collected from in and around Manipal, Karnataka, India during the month of September. The plant was authenticated by Dr. Richard lobo, Department of Pharmacognosy, Manipal College of Pharmaceutical Sciences (Manipal, India).

The stem barks were shade dried, coarsely powered and about 100g of crude powder drug was extracted with ethanol by hot extraction process (Soxhlet). After completion of the extraction the solvent was recovered by distillation *in vacuo*. The aqueous extraction was prepared by maceration process with 100g of the stem bark power using chloroform: water (1:99) for seven days, after completion of the extraction the solvent was recovered by distillation and concentrate.

Total Phenolic Content

Total soluble phenolics in the extracts were determined with “Folin-Ciocalteu reagent” using Gallic acid (50-250 µg) as a standard phenolic compound. 1.0 mL of extract solution containing 1.0 mg extract was diluted with 46 mL of distilled water in a volumetric flask. 1.0 mL of Folin-Ciocalteu reagent was added and the content of the flask mixed thoroughly. 3 min later 3.0 mL of 20% sodium carbonate was added and the mixture was allowed to stand for 2 h with intermittent shaking. The absorbance of the blue color that developed was read at 765 nm. The concentration of total phenols was expressed as Gallic acid equivalents in mg/g of dry extract [7].

Total flavonoid content

Aluminum chloride colourimetric method was used for determination of flavonoids. To the 10mL volumetric flask 2 mL of water and 1 mL of plant extract (1 mg/mL) were added. After 5min 3 mL of 5 % sodium nitrite and 0.3 mL of 10 % aluminum chloride were added. After 6min, 2 mL of 1 M sodium hydroxide was added and the volume made up to 10 mL with water. Absorbance was measured at 415 nm. The percentage of total flavonoids were calculated from

Calibration curve of rutin (10-250 µg) plotted by using the same procedure and total flavonoids was expressed as rutin equivalents in milligrams per gram sample [8].

RESULTS

Total Phenolic content for Ethanolic and aqueous extracts of *Vateria indica* were found to be 670 mg/g and 310 mg/g respectively when compared with Gallic acid (R^2 value – 0.996) (fig. 1) and total flavonoid content for methanolic and aqueous extract of *Vateria indica* were found to be 74 mg/g and 62 mg/g respectively when compared with Rutin (R^2 value – 0.999) (fig. 2)

Total phenol content

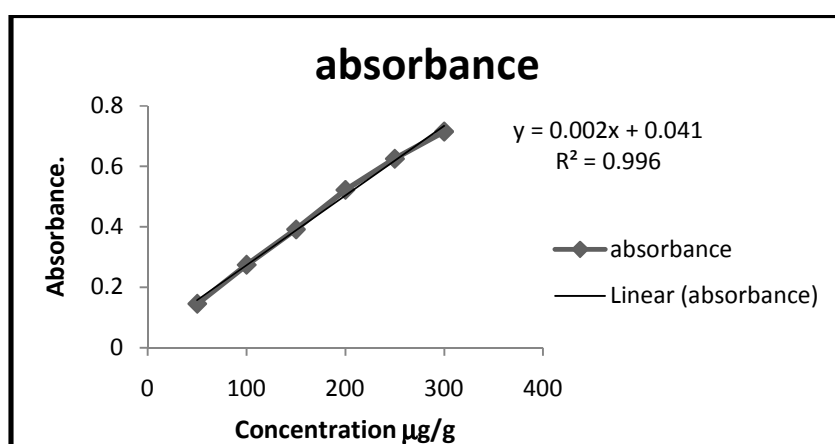


Fig. 1: standard plot of Gallic acid

Total flavonoid content

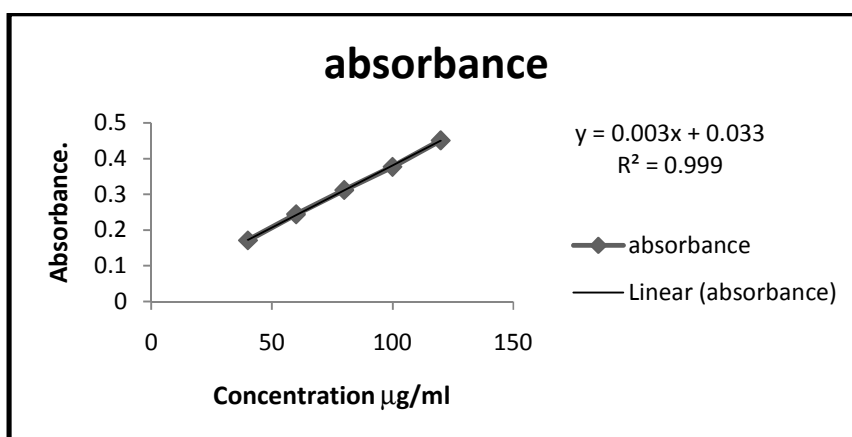


Fig. 2: standard plot of Rutin

Table 1: Total Phenolic and flavonoid content of Ethanolic and aqueous extract of *Vateria indica*(Linn).

Fraction	Phenolic content (mg/g)	Flavonoid content (mg/g)
Ethanolic extract	670	74
Aqueous extract	310	62

RESULTS AND DISCUSSION

Total Phenolic content

The total phenolic contents in the stem bark of *Vateria indica* were determined by using Folin Ciocalteu's method. The sample extract dilution was oxidized with Folin Ciocalteu reagent and the absorbance of the resulting blue colour was measured at 765 nm after 30 min [9]. The results obtained revealed the presence of total phenolic contents in Ethanolic and aqueous extract of *Vateria indica* bark 670mg/g and 310mg/g respectively. Phenolic compounds are very important plant constituents because of their scavenging ability due to their hydroxyl groups, they are also powerful chain breaking antioxidants and has been associated with antioxidant activity and play a crucial role in stabilizing lipid peroxidation [10].

Total flavonoids content

The Aluminium chloride colorimetric method uses wavelength scan of the complexes of the sample and standard with aluminum chloride showed that the complexes formed by flavonoids (Rutin) with C-3 or C-5 hydroxyl group [11] revealing total flavonoids content in Ethanolic and aqueous extract of stem bark of *Vateria indica* 72mg/g and 62mg/g respectively.

CONCLUSION

The results obtained in the present study indicate that *Vateria indica* stem bark extracts contain good amount of phenolic and flavonoid content and can be used as a natural source antioxidant and antimutagenic agents that could have great importance as therapeutic agents in preventing or slowing the progress of aging and age associated oxidative stress related degenerative diseases.

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