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Assessment of total phenolic, flavonoid content and Anti-oxidant potential of *Peltophorum pterocarpum* (DC.) Baker ex. K. Heyne flower extracts

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Abstract
The objective of the present study was to evaluate photochemical screening, and estimate total phenol, total flavonoid, and antioxidant potential of the flowers extract of *Peltophorum pterocarpum* by DPPH radical scavenging assay. Total phenolic and flavonoid contents were evaluated according to Folin-Ciocalteau procedure and a calorimetric method, respectively. It showed high content of total phenolic compounds and total flavonoids. *In vitro* antioxidant activity of petroleum ether, chloroform, acetone, aqueous and ethanol extracts was evaluated by studying 1, 1-diphenyl-2-picrylhydrazyl radical scavenging activity using the standard procedure. The result shows that acetone extract of *P. pterocarpum* flowers had highest antioxidant activity (93.5%) using DPPH method.

Keywords: *Peltophorum pterocarpum*, Antioxidant, DPPH.

Introduction

The medicinal properties of plants have been investigated in the recent scientific developments throughout the world, due to their potential antioxidant activities, no side effects and economic viability [1]. Recently there has been an upsurge of interest in the therapeutic potentials of medicinal plants as antioxidants in reducing such free radical induced tissue injury.

Antioxidants are play a very important key role in the body defense mechanism against reactive oxygen species (ROS), which are the harmful by products generated during normal cell aerobic respiration [2]. Many recent research have proved that antioxidants are radical scavengers, which protect the human body against free radicals that may cause pathological conditions such as ischemia, anaemia, asthma, arthritis, inflammation, neurodegeneration, and ageing process [3]. Many experimental datas suggests that free radical and reactive oxygen species can be involved in several number of diseases [4, 5]. As plants produces a lot of antioxidants to control the oxidative stress caused by sunbeams and oxygen, they can represent a source of compounds with antioxidant activity.

The phenolic compounds are considered as one of the largest and most ubiquitous groups of plant metabolites [6]. Plant phenolics are commonly found in both edible and non-edible plants, and have various biological effects, including antioxidant activity. The antioxidant activity of phenolics is mainly due to their redox properties, which allow to act as reducing agents, hydrogen donators, and singlet oxygen quenchers. In addition, they have a metal chelation potential. Recent studies have focused on the biological activities of phenolic compounds, which are antioxidants and free radical scavengers [7-9]. The extracts of more numbers of herbs, spices and other plant materials rich in phenolics and flavonoids are of increasing interest in the food industry because they retard oxidative degradation of lipids and there by improving nutritional value of food [10].

Materials and Methods

Fresh flowers of *P. pterocarpum* were collected from different places of Chennai. The leaves were washed thoroughly with normal tap water followed by sterile distilled water. Then the leaves were shade dried at room temperature. These were crushed to powder using grinding machine. The powdered sample was analysed for qualitative inorganic compounds.

Preparation of extracts

Preparation of the extracts was following the standard methods [11, 12]. About 15g of fine dried powdered flowers of *P. pterocarpum* were extracted with 150mL of ethanol (75%), acetone Chloroform, petroleum ether and aqueous extract for 1 min using an Ultra Turax mixer (13,000rpm) and soaked overnight at room temperature. The samples was then filtered through Whatman No.1 paper in Buchner funnel. The filtered solution was evaporated under vaccum in a rota-evator at 40 ˚C and then dissolved in respective solvents. The concentrated extracts were stored in airtight container in refrigerator below 10 ˚C.

Estimation of Total Phenol Content in Flowers Extracts of *P. pterocarpum*

Total phenolic content in the flowers extracts was determined by the Folin–Ciocalteau colorimetric method [13]. For the analysis, 0.5 mL of aliquot of sample was added to 0.5 mL of Folin–Ciocalteau reagent (0.5 N) and the contents of the flask were mixed thoroughly. Later 2.5 mL of sodium carbonate (2%) was added, and the mixture was allowed to stand for 30 minutes after mixing. The absorbance was measured at 760 nm in a UV-Visible Spectrophotometer. The total phenolics contents were expressed as mg gallic acid equivalents (GAE)/g extract.

Estimation of Total Flavanoid Content in Flowers Extracts of *P. pterocarpum*

Total flavonoids content of *P. pterocarpum* was determined by the aluminium chloride colorimetric method [14]. 0.5 mL of flower extracts of *P. pterocarpum* at a concentration of 1mg/ mL were taken and the volume was made up to 3mL with methanol. Then 0.1mL $AlCl_3$ (10%), 0.1mL of potassium acetate and 2.8 mL distilled water were added sequentially. The test solution was vigorously shaken. Absorbance was recorded at 415 nm after 30 minutes of incubation. A standard calibration plot was generated at 415nm using known concentrations of quercetin. The concentrations of flavonoid in the test samples were calculated from the calibration plot and expressed as mg quercetin equivalent /g of sample.

Qualitative Analysis of Antioxidant Activity of *P. pterocarpum* flowers

The antioxidant activity of flower extracts of *P. pterocarpum* was determined by standard method [15, 16]. 50 µL of flower extracts of *P. pterocarpum* were taken in the microtiter plate. 100 µL of 0.1% methanolic 1, 1-diphenyl-2-picrylhydrazyl (DPPH) was added over the samples and incubated for 30 minutes in dark condition. The samples were then observed for discoloration, from purple to yellow and pale pink were considered to be strong and weak positive respectively. The antioxidant positive samples were subjected for further quantitative analysis.

Quantitative Analysis of Free Radical Scavenging Activity of *P. Pterocarpum* flowers

The antioxidant activities were determined using DPPH, (Sigma-Aldrich) as a free radical. Flowers extract of 100 µL were mixed with 2.7 mL of methanol and then 200 µL of 0.1% methanolic DPPH was added. The suspension was incubated for 30 minutes in dark condition. Initially, absorption of blank containing the same amount of methanol and DPPH solution was prepared and measured as a control [17]. Subsequently, at every 5 minutes interval, the absorption maxima of the solution were measured using a UV double beam spectra scan (Chemito, India) at 517 nm. The antioxidant activity of the sample was compared with known synthetic standard of (0.16%) of butylated hydroxy toluene (BHT). The experiment was carried out in triplicates.

The capacity of scavenging free radicals activity was calculated by the formula

Scavenging activity (%) = (A of Control-A of Sample)/A of Control ×100

Result and Discussion

Table 1: Estimation of total phenol and flavanoid content of flowers extract of *Peltophorum pterocarpum*

Sample	Total phenol content (mg GAE/g)	Total flavanoid content (mg /g)
Peltophorum pterocarpum flowers extract	80	48.7

GAE: Gallic acid equivalents

Table2: DPPH scavenging activity of flowers extract of *Peltophorum pterocarpum*

Flower extracts of *P. pterocarpum*	% of inhibition for 100 µl
Petroleum ether	84
Chloroform	84.6
Acetone	93.5
Ethanol	91.3
Aqueous	92
BHT (Standard)	98.6

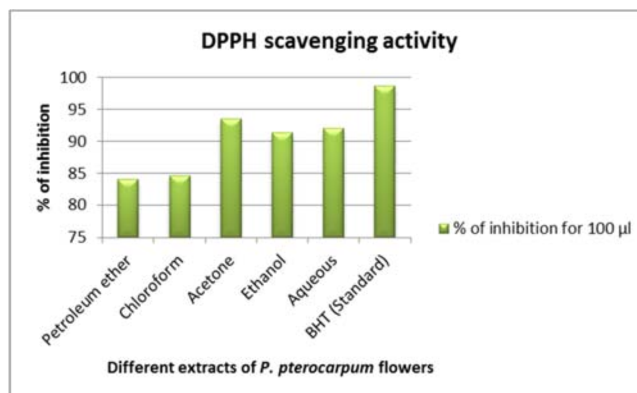

Fig 1: DPPH scavenging activity of flowers extract of *Peltophorum pterocarpum*

Discussion

The present study was to investigate the antioxidant activity and phenolic contents of *P. pterocarpum* flowers. In the present paper, we have evaluated the free radical scavenging activity of ethanol, acetone, pet. ether, chloroform and aqueous extracts of *P. pterocarpum* flowers. The antioxidant properties of *P. pterocarpum* have been evaluated by DPPH method. Scavenging activity for free radicals of 1.1-diphenyl-2- picrylhydrazyl (DPPH) has been widely used to evaluate the antioxidant activity of natural products from plant and microbial sources [18]. Among the five different solvents extracts tested, the acetone extract showed better DPPH scavenging activity. A maximum scavenging activity was offered by acetone extract of *P. pterocarpum* (93.5 %)

and followed by Aqueous (92%), ethanol (91.3%), chloroform (84.6%) and pet.ether (84%).
Polyphenolic compounds are commonly found in both edible and non-edible plants, they have multiple applications in food, cosmetic and pharmaceutical industries [19]. The concentration of phenols in the examined flowers extracts using the Folin-Ciocalteu reagent was expressed in terms of gallic acid equivalent.
Table 1 shows the estimation of total phenol and flavonoid content in the flowers extract of *P. pterocarpum.* The higher content of total phenol (80 mg GAE/g) and total flavonoid (48.7g) was found in flowers extract of *P. pterocarpum*. It has been recognized that flavonoids show antioxidant activity and their effects on human nutrition and health are considerable. The mechanisms of action of flavonoids are through scavenging or chelating process [20]. Phenolic compounds are a class of antioxidant agents which act as free radical terminators [21]. The value of phenolic content indicates that the plant has antioxidant activity. Obviously, to confirm the beneficial effects of these extracts, it is necessary to carry out further studies about their *in vivo* activity and bioavailability.

Conclusion
The present study revealed a marked antioxidant potential of flowers extracts. The flowers can be used as a remedy for treatment of oxidative damage caused by free radicals. The antioxidant activity of flowers extracts might be attributed to the presence of phenolic compounds and flavonoids. The strong antioxidant properties were confirmed in the acetone flowers extract. The result of the present study appear as interesting and promising in the search of potent antioxidant agent and may be effective as potential source novel antioxidant drugs.

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