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Research Article

EVALUATION OF *IN-VITRO* ANTIOXIDANT EFFECT OF *SCHREBERA SWIETENIOIDES* LEAF AQUEOUS EXTRACT

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ABSTRACT

This study was carried out with an objective to investigate the antioxidant potential of extract from leaves of *Schrebera swietenioides* using DPPH (1,1, Diphenyl 2 picryl hydrazyl) radical scavenging method. *Schrebera swietenioides* leaf extract was prepared by crushing leaves into a fine powder and extracted with water by cold extraction method. Its antioxidant activity was compared with the standard ascorbic acid. EC_{50} for standard ascorbic acid was found to be 16.71 µg/ml whereas for test (*Schrebera swietenioides* leaves extract) it was 26.62 µg/ml. This study confirms the antioxidant activity of leaves of *Schrebera swietenioides* using DPPH radical scavenging method.

Keywords: *Schrebera swietenioides*; Antioxidant; DPPH

INTRODUCTION

Free radicals have led to serious diseases including liver cirrhosis, atherosclerosis, cancer, diabetes mellitus and other neurodegenerative disorders. Agents that are able to scavenge these free radicals have great role in nullifying these pathological conditions. Antioxidants play key role to protect the human body against the damage caused by free radicals[1-4]. Many plant species have been utilized as traditional medicines for their antioxidant potential. *Schrebera swietenioides* Roxb (Oleaceae) is a medium range deciduous tree up to 20 m in length having thick bark and is grey in color. Leaves of the plant are imparipinnate, opposite leaflets are 3-4 in pairs, flowers are yellowish brown in color, fruits are pear shaped, pendulous and have 2 - valve capsules; seeds are 8 in number, ending in long wings[5]. The root, bark and leaves are appetizing, digestive, anthelmintic and are traditionally use in folk medicine in rural India. Gastrointestinal colic, flatulence, skin diseases, leprosy, diarrhea, anemia and rectal disorders are being treated by *Schrebera swietenioides*[6]. However, there is lack of scientific evidence for the pharmacological basis for its action in various ailments. Thus, we evaluated antioxidant activity of *Schrebera swietenioides* leaves extract using DPPH method. Pharmacological and phytochemical screening of this plant may provide beneficial approach for management and prevention of free radical induced diseases.

MATERIALS AND METHODS

Chemicals and reagents

All the chemicals and reagents used for study were of analytical grade. Required solutions for study were prepared freshly.

Collection of Plant material

Fresh and fully-grown plants of *Schrebera swietenioides* were collected from Tapi District from South Gujarat in the month of May 2018. It was authenticated by Department of Pharmacognosy (DDU/FOP/18-19/S-1), Faculty of pharmacy, D. D. University, Nadiad, Gujarat, India.

Preparation of plant extract

The collected plant material was washed thoroughly in water, leaves were shade dried at room temperature, reduced to a coarse powder in a mechanical grinder and passed through a 40 # sieve for desired particle size. The powder obtained was subjected for the extraction with water by cold extraction process. Sample (50 g powder) was soaked into 250 ml water inside a conical flask with frequent shaking at regular intervals for 24 hours. The resulting extracts were filtered and collected. The remaining residue was again extracted with water and same process was repeated. The obtained extracts were left to dry under sunshade and sealed with aluminum foils and stored in the refrigerator at 4 ºC until required for antioxidant activity[7].

Antioxidant activity by DPPH radical scavenging assay

Different dilution of extract and standard (200,400 and 800 µg/mL) were prepared. DPPH solution was prepared by dissolving 3 mg of DPPH in 50 mL ethanol. Then 2 mL extract of each concentration and standard from each dilution was added ethanol into 2 mL of DPPH solution. Ascorbic acid was used as standard. The mixture was shaken vigorously and was kept standing in the dark for 30 minutes. The absorbance of the above solution was measured at its maximum wavelength 517 nm. The free radical scavenging activity of samples was calculated using the mathematical formula: % free radical scavenging activity = 100 × (1– AE/AD), Where AE is absorbance of the solution of different concentration whereas; AD represents the absorbance of only DPPH solution[8]. EC_{50} value was calculated from triplicate results of samples using Prism 5 Statistical Software.

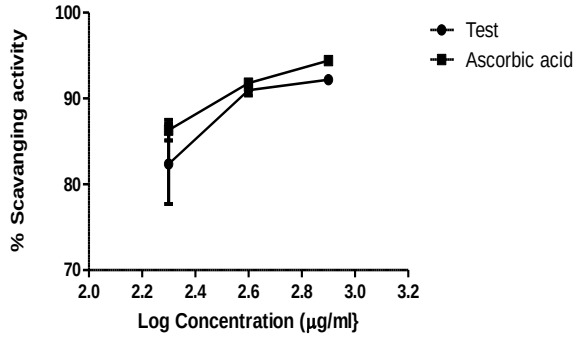

Figure 1: % DPPH radical scavenging activity

RESULTS AND DISCUSSION

In our study, it was observed that as the concentration of DPPH increases, antioxidant activity of *Schrebera swietenioides* extract also increased. EC_{50} value for standard ascorbic acid and test extract were found to be 16.71 µg/ml and 26.62 µg/ml respectively (Figure 1). Hence, aqueous extract of plant *Schrebera swietenioides* showed effective antioxidant activity by DPPH free radical scavenging assay method.

The aim of this study was to evaluate antioxidant effect of *Schrebera swietenioides* leaf aqueous extract. Aqueous extract of leaves of *Schrebera swietenioides* showed antioxidant activity. DPPH (2, 2 Di phenyl picryl hydrazyl) is a stable free radical at room temperature and is reduced in presence of an antioxidant molecule. Hence, it is said that antioxidant effect is directly related to extinction of DPPH (measured at 517 nm) free radical in the sample solution[9]. Oxidation refers to a chemical reaction where movement of electrons takes place. In oxidation process the substance itself gets reduced and oxidizes other substance, hence acting as a proton donor. This oxidation process leads to a lot of free radicals which in human body has serious effects. In view to stop the formation of free radicals in human body or eliminate the free radicals already present in human body antioxidants are used. Antioxidant is a substance that's inhibits the process of oxidation, it can be used to preserve the stored food. Standard example of an ant-oxidant is vitamin C or E that removes potentially damaging oxidizing agents in a living organism. Other chemical examples of an antioxidant are thiols or ascorbic acid (vitamin C) which terminates their chain reactions[10].

Antioxidant class of agents including plant phenolic compounds which act nearly as good proton donors leading to radical terminators thus contributing to the antioxidant activities of plant. Flavonoids are group of poly-phenolic compounds, which exhibit several biological effects such as antioxidant, anti-inflammatory, anti-hepatotoxic, antiulcer, anti-allergic, antiviral and anticancer activities. They also act as inhibitors enzymes such as reductase and xanthine oxidase and are capable of effectively scavenging the reactive oxygen species because of their phenolic hydroxyl groups[11]. Lipid peroxidation is the oxidative degradation of lipids. It is the process in which free radicals "steal" electron from the lipids in cell membrane, resulting in cell damage. This process proceeds by a radical chain reaction mechanism. Trace number of primary antioxidants affect the rate of initiation step due to the presence of lipid radical or they may also lead to inhibition of propagation step due to the presence of peroxyl or alkoxyl radicals. Secondary antioxidants which are also known as preventative antioxidants as they retard the rate of oxidation either by removal of substrate or singlet oxygen quenching[12].

Based on scientific evidence, number of plants namely *Phyllanthus emblica* (amla*), Psidium guajava* (guava), *Vitis vinifera* (grapes), *Cocculus hirsutus* (broom creeper), *Withania somnifera* (ashwagandha), *Zingiber officinale* (ginger), *Azadirachta indica* (neem), *Benincasa hispida* (wax gourd), *Sonchus asper* (spiny sow thistle), *Moringa oleifera* (drumstick tree), *Asparagus racemosus* (shatavari), *Glycyrrhiza glabra* (licorice 'yastimadhu'), *Annona squamosal* (custard apple or sitaphal) showed antioxidant activity due to presence of flavonoids, anthocyanins and vitamins[13]. It has been documented that *Schrebera swietenioides* aqueous and methanolic extracts contains flavonoids[14, 15]. Thus we proposed that DPPH radical scavenging activity of plant leaves extract might be obtained due to presence of flavonoids and other chemical constituents. The plant leaves extract showed its antioxidant effect effective when compared with standard antioxidant ascorbic acid.

CONCLUSION

Schrebera swietenioides plant leaves showed antioxidant activity by DPPH radical scavenging assay method and the activity was comparable to standard ascorbic acid. However detailed investigation is required for microscopical evaluation, isolation and identification of phytochemical constituent and pharmacological activity at cellular level.

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