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Evaluation of Potential and *In-Vitro* Antioxidant Activity of Mangrove Leaves *Avicennia marina* Ethanolic Extract

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ABSTRACT

Mangroves thrive under stressful and extreme tropical environmental conditions such as high solar radiation, temperature, salinity, and anaerobic conditions that may have unfavourable effects on the photosynthesis of these plants. Mangrove is used in traditional medicine for the treatment of skin disorders, boils and wounds. The conventional methods are poor, time-consuming as well as less systematic. The present study was carried out to *A. marina* and explores. This research may be useful for constituent (s)-based pharmacological activity. Plants are a rich wellspring of optional metabolites with intriguing organic exercises. The phytochemical analysis of *A. marina* reveals the presence of tannin, flavonoids, terpenoids, alkaloids, cardiac glycosides, and steroids. .*A. marina* is a traditional medicinal plant and the leaves have tremendous medicinal values. In the current examination, ethanolic leaf concentrate of A. *marina* was analyzed using *In-vitro* antioxidant activity of *Avicennia marina* DPPH and H_2O_2 scavenging activity different concentration signification amount of Ascorbic acid compare each concentration with (Positive control).

Keywords - *In-vitro* antioxidant, *Avicennia marina,* Phytochemical, pharmacological.

I. INTRODUCTION

Mangrove plant extracts have been used for centuries as a popular method for treating several health disorders. Medicinal compounds in the mangroves have long been used in folk medicine to treat diseases [1]. Nature has provided a complete storehouse of remedies to cure all ailments of mankind by providing our drugs in the form of herbs, plants and algae to cure incurable diseases without any toxic effects. Nowadays allopathic system usage was decreased due to side effects, adverse reactions, so now a day's herbal drugs usage was increased due to fewer side effects and patient acceptance in this way herbal drugs usage was increased [2-5]. Plant-derived medicines are a cheap source of novel compounds and

are in practice for the prevention and procurement of human, animal and plant diseases [6]. One function of these phytochemical contents can protect against free radicals. Free radicals found in the environment could be tackled by antioxidant compounds. Antioxidant compounds exist in many plants such as seagrass, seaweed and mangrove. Antioxidant also exists in mangrove (*Avicennia marina*) [7]. Extracts and chemicals from mangroves are used mainly as folkloric medicine, insecticides, pesticides, and these practices continue until today [8]. *Avicennia marina* has high nutritive value and had potential bioactive substances that may be used as pharmaceutical ingredients for the formulation of new or prospective potent drugs to cure a wide range of metabolic diseases [9-11]. Higher plants as sources of medicinal compounds have continued to play a dominant role in the maintenance of human health since ancient times. Over 50% of all modern clinical drugs are of natural product origin and natural products play an important role in drug development programs in the pharmaceutical industry.

II. METHODS AND MATERIAL

2.1 Plant Collection

Fresh and Healthy leaves of *the Avicennia marina* were collected from their natural habitat of Muthupet mangrove in Thiruvarur district, Tamil Nadu, India.

2.2 Extraction of mangrove plant leaves

After washing with distilled water, the leaves were shade dried, powdered and extracted separately in ethanol. Plant powder (20 gm) was taken and absorbed 100 ml of dissolvable and kept in a shaker for 24 hrs. After centrifugation at 5000 rpm, the solvent phase was separated and evaporated. The crude was stored at 40º C and used for further studies.

2.3 Phytochemical Qualitative Analysis

The ethanolic leaves extracts were assessed for the existence of the phytochemical analysis by using the standard methods [12-13].

2.4 In-vitro anti-oxidant assays

2.5 DPPH free radical scavenging assay

The DPPH radical-scavenging activity of the test extracts was examined using the modified method by Brand-Williams et al. [14]. Leaf extracts of different concentrations (50e200 mg/mL) were mixed with an equal volume of methanolic solution of DPPH (Sigma Aldrich). The mixture was allowed to react at room temperature in dark for 30 min. Ascorbic acid (1 mg/mL (50e200 mg/mL)) was used as positive control. After 30 min the absorbance was measured at 517 nm and converted into a percentage of antioxidant activity using the following equation.

% of inhibition = [A0-A1/A0] *100

Where A0 =Absorbance of control.

A1 = Absorbance of the test.

2.6 Hydrogen peroxide scavenging assay

The H_2O_2 scavenging activities for both the leaf extracts were assayed by the modified method [15]. Different concentrations of plant leaf extracts (50e200 mg/mL) and ascorbic acid at different concentrations (50e200 mg/mL) of (1 mg/mL) were added to 40 mM H2O2 solution prepared in phosphate buffer. The absorbance of H_2O_2 at 230 nm was determined after 10 min. The percentage of H2O2 scavenging by the extracts and standard (H_2O_2) was calculated as follows.

% of scavenged [H_2O_2] = [A0-A1/A0] *100

Where A0 =Absorbance of control.

A1 = Absorbance of test

Statistical analysis

All assays were performed in triplicate. Mean and standard deviation (SD) was examined for all assays. The results were expressed as mean ± SEM of three experiments. One way ANOVA with Dunnett's test was followed to compare each concentration with a positive control to analyze the level of statistical

significance. P < 0.05 were considered statistically significant using Graph pad PRISM v.8.0.

III. RESULTS AND DISCUSSION

Mangrove plants have long been represented as an accessible source of secondary metabolites with a spectrum of therapeutic and pharmacological potentials [16-21]. The conventional methods are poor, time-consuming as well as less systematic, so there is a need to use appears technological knowledge and sophisticated scientific methods to fulfil this knowledge gap [22]. The high rank of inhibitory action of the ethanolic extract might be due to the presence of a higher concentration of the antibiotic constituents. However, the antimicrobial activity observed in other solvent extracts was much inferior and therefore excluded in further studies [23]. As the potent inhibitory activity was detected in ethanolic extract, it can be inferred the antibiotic compounds present.

3.1. Preliminary phytochemical screening

.In the medication, it is utilized in hypercholesterolemia, hyperglycaemia, cell reinforcement, anticancer, calming, and weight reduction among others. It is similarly recognized to contain antimicrobial properties. India is in all probability the best maker of remedial flavours on the planet.

Table 1. Qualitative analysis of *A. marina leaves* extract

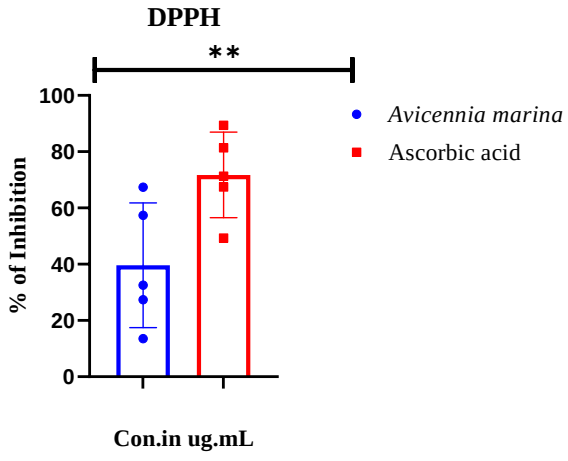
S. No	Analysed Phytochemicals factor	Ethanol	Methanol
1.	Tannin	++	+
2.	Saponin	-	+
3.	Flavonoids	++	-
4.	Steroids	+	-
5.	Polyphenol	++	+

Indications: "+" means positive activity, "-" means negative activity

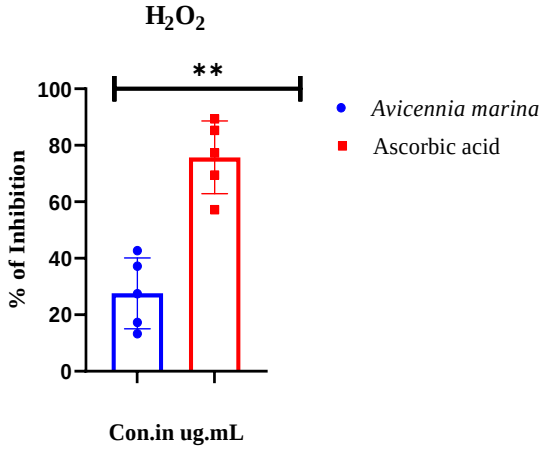
In concordance with our studies, it purported that ethanolic leaf extract of *A. marina* showed the highest antibacterial activity [24]. Each constituent assumes a significant part and lack of any one constituent may prompt unusual advancements in the body.

Antioxidant Activities

Conventional medication can be utilized in therapy as anticancer, antimicrobial, cell reinforcement, calming specialists. Recently, bioactive compounds are gaining much importance for their ability in enhancing resistance to various diseases and to improve the health of people both by traditional and modern ways of administrations [25-27]. In an organism, these exogenous antioxidants can manifest a good sort of actions, including inhibition of oxidizing enzymes, halation of transition metals, transfer of hydrogen or one electron to radicals, singlet oxygen deactivation, or enzymatic detoxification of reactive oxygen species, cellular membrane stability and involves inhibition of radical production alongside enhancement of the body defence system.



(a)



(b)

Fig 1. In-vitro antioxidant activity of extract Avicennia marina (A) DPPH scavenging activity (B) H2O2 scavenging activity. Values are expressed as Grouped entering replicate data Mean ± SD (n ¼ 3). One-way ANOVA followed by Dunnett's test was employed to compare each concentration with positive control. Graphpad prism software *Statistical significance at $p < 0.05$; ** statistical significance at $p < 0.01$. ASA-Ascorbic acid (Positive control); Ethanol.

All two tested extracts showed antioxidant capacity based on their phenolic contents. There was a positive correlation between the phenolic contents and the antioxidant activities. Ethanol extract of mangrove (48 hours maceration) showed higher antioxidant activity against DPPH scavenging assay [28]. Phenolic compounds could be a major determinant of antioxidant potentials of foods, and could therefore be a natural source of antioxidants. However, there are a couple of reports which stated that different solvent extract showed different potentiality in different assay [29-31]. That methanol extract of Avicennia marina has a higher antioxidant capacity than ethanol extract of the same plant based on the DPPH scavenging method while the antioxidant potential of acetone extract is higher than ethanol extract.

IV. SUMMARY AND CONCLUSION

Plants are an integral part of human civilization. Medicinal plants are also been relied upon by over 80% of the world population for their basic health care needs [32-34]. Drugs based on Plants are of prime importance for several remedies in conventional medicine throughout the world and serves as a substitute for drug supply in modern medicine. The presence of various bioactive compounds in the *A.marina* justifies the use of the whole plant for various ailments by traditional practitioners. However, the isolation of individual phytochemical compounds and analyzing their biological activity will yield productive results. This plant can be saved through biotechnological approaches and its quality can be worked on through optional metabolites creation and along these lines it very well may be utilized as a hotspot for growing new medications and commercialization. In the present study the phytochemical analysis. Secondary metabolites phytochemical analysis presence of absence *In vitro* antioxidant, anti-cancer and anticoagulant activities to scientifically validate their folklore use in the treatment of diseases. *A.marina* plants to decipher the exact mechanism involved in the anticancer and anticoagulant activity. There by suggesting *in vitro*, *in vivo* and secondary metabolite profiling studies to unravel and identify the bioactive compounds responsible and ultimately provide alternative treatment strategies. Clinical oncologist utilizes chemotherapeutic specialists that regularly effects affect organs regardless of their viability against malignancy cells. The adequacy of these medications is restricted bringing about administration of unfriendly medication responses, opposition and conceivable treatment-related demise.

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3. CONFLICT OF INTEREST

The authors stated that no conflicts of interest.

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