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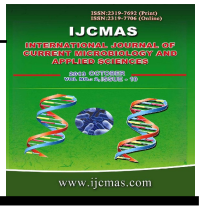

Original Research Article

DPPH Free Radical Scavenging Activity of the Extracts of the Aquatic Fern *Marsilea quadrifolia* Linn

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Keywords

Antioxidants; *M. quadrifolia*; DPPH activity; BHT

A B S T R A C T

Antioxidants are the substances which inhibit oxidation, which have the ability to remove the potentially damaging oxidizing agents in a living organism. Many phytochemicals present in the plants are able to reduce or prevent the oxidative damage to the human cells which can cause even cancer in humans. It is highly vital to know about the antioxidant activities of each plant and the phytocompounds responsible for that. In this study, the DPPH free radical scavenging activity of the extracts of *Marsilea quadrifolia* is analysed.

Introduction

The plant kingdom represents an enormous reservoir of biologically active compounds with various chemical structures and protective/disease preventive properties (phytochemicals). Plants are the natural sources of medicine. Herbal medicine is becoming popular as the medicines produced from medicinal plants are pure and they do not produce any side effects. Medicinal plants have been found useful in the cure of a number of diseases including bacterial diseases. Medicinal plants are a rich source of antimicrobial agents (Mahesh and Satish, 2008). The plant extracts have been developed and proposed for use as antimicrobial substances. Plants used in traditional medicine contain a vast array of substances that can be used to treat chronic and infectious diseases (Shrikant *et al*., 2012).

The term "phytochemical" is used to refer chemical compounds that occur naturally in plants (phyto means "plant" in Greek), chemicals that may have biological significance but are not established as essential nutrients. Scientists estimate that there may be as many as 10,000 different phytochemicals with the potential to affect diseases such as cancer, stroke, or metabolic syndrome. Plants need amino acids, sugars, organic acids, etc., for primary metabolism or their development. In addition, all higher plants produce one or several representatives, called as

secondary metabolites, which are not essential for a plant for its metabolism (Wink, 2003).

Phyto constituents are the natural bioactive compounds found in plants. These phyto constituents work with nutrients and fibers to form an integrated part of defense system against various diseases and stress conditions (Koche *et al*., 2010). These phytochemicals, often secondary metabolites present in smaller quantities in higher plants, include the alkaloids, steroids, flavonoids, terpenoids, tannins, and many others (Nonita *et al*., 2010).

Antimicrobial screening of plant extracts and phytochemicals, represents a starting point for antimicrobial drug discovery (Cseke *et al*., 2006). Many phytochemical compounds of the plants act as antioxidants, which are scavengers of particles known as *oxygen-free radicals* (also sometimes called *oxidants*). Many phytochemicals have been classified as phytoestrogens, with health-promoting effects resulting in the phytochemicals to be marketed as nutraceuticals (Moutsatsou, 2007).

An antioxidant, which can quench reactive free radicals, can prevent the oxidation of other molecules and may therefore have health-promoting effects in the prevention of degenerative diseases (Shahidi, 1997). It has been mentioned that antioxidant activity of plants might be due to their phenolic compounds (Cook and Samman, 1996). The antioxidant activity of the aerial part extract of *M. quadrifolia* was determined using the 1, 1-diphenyl-2-picrylhydrazyl (DPPH) free radical scavenging assay by the method of Blois (1958). The antioxidant activity of the MEMQ was evaluated by the phosphomolybdenum method according to the procedure of Prieto *et al*., (1999).

Materials and Methods

DPPH Free radical scavenging activity

Processing of Plants for Extract Preparation

About 60 gm of dry sample powder was weighed and macerated with 500 ml of each solvent (hexane, ethyl acetate and methanol) separately and kept overnight in shaker. The extract was collected after filtration using Whatman No.1 filter paper and was stored. Another 75 ml of solvent was added to the residual mixture and incubated in shaker for 24 hrs and the extract was collected again using a Whatman No.1 filter paper. This procedure was repeated once again and the extract was evaporated below 40 °C, which was used for further phytochemical analyses.

Procedure for free radical scavenging activity

The ability of the extracts to annihilate the DPPH radical (1,1-diphenil-2-picrylhydrazyl) was investigated by the method described by (Blois, 1958). Stock solution of the whole plant extracts was prepared to the concentration of 1 mg/ml. 100 µg of each extracts were added, at an equal volume, to methanolic solution of DPPH (0.1 mM). The reaction mixture is incubated for 30 min at room temperature; the absorbance was recorded at 517 nm. The experiment was repeated for three times. BHT was used as standard controls. The results are tabulated in Table 1.

Table.1 Scavenging potential of plant extracts from *Marsilea quadrifolia* Linn.

Sample	Concentration (µg)	% of inhibition
Ethyl acetate	50	39.9013
	100	48.391
	150	55.5934
Methanol	50	42.0132
	100	56.7214
	150	73.2215

The annihilation activity of free radicals was calculated in % inhibition according to the following formula

% of Inhibition = (A of control – A of Test)/A of control X 100

Results and discussion

The present study was carried out to analyse the antioxidant activity of the plant *M. quadrifolia*. The scavenging activity of the plant extract through the annihilation of the DPPH radicals was investigated. From this study, we can conclude that *M. quadrifolia* has a very good antioxidant activity. Comparatively, methanolic extract showed higher activity than ethanolic activity.

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