ISSN 0975-6299 Vol.1/Issue-3/Jul-Sep.2010

International Journal of Pharma and Bio Sciences

ANTIRADICAL ACTIVITY OF MEDICINALLY IMPORTANT *MORINDA PUBESCENS* FRUITS

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ABSTRACT

The methanolic extracts of fruits of a promising medicinal plant *Morinda pubescens* J.E.Smith were screened for their antiradical properties using ascorbic acid as standard antioxidant. Free radical scavenging activity of methanolic and aqueous fruit extract was evaluated using 1,1-diphenyl-2-picrylhydrazyl (DPPH), nitric oxide (NOX) and ferric reducing antioxidant power (FRAP) assay. The overall antioxidant activity of methanolic extract of mature fruits was the stronger, than the aqueous extract. It reveals that the consumption of these fruits would exert several beneficial effects by virtue of their antioxidant activity.

KEY WORDS

Antiradical activity, *Morinda pubescens,* Fruits.

INTRODUCTION

In an aerobic environment, all animals and plants require oxygen and hence reactive oxygen species (ROS) are omnipresent. It is well known that excess generation of ROS is involved in structural alterations of cellular molecules leading to cytotoxicity and cell death (1). Rcently fruits and vegetables have play an important role in the chemoprevention of diseases and aging and are recognized as natural antioxidants. Many higher plants are major sources of natural products used as pharmaceuticals, agrochemicals, flavor and fragrance ingredients, food additives, and pesticides (2). According to Block et al., (3) fruits and vegetables are major source of dietary antioxidants and their precursors. Many plants are known to have beneficial therapeutic effects as noted in the traditional Indian system of medicine, Ayurveda. Recent studies on medicinal plants and herbal constituents have shows their beneficial therapeutic potentials. However, little attention has been made on their radioprotective as well as antioxidant activities (4). Desai et al., (5) evaluated free radical scavenging activity of young and mature leaves of nine coastal medicinal plants.

M. pubescens J.E. Smith is a member of family Rubiaceae and extensively used in ancient Indian medicinal system like Unani and siddha of south India. Mathivanan *et al.,* (6) reported the

wound healing activity of fruits of *M. pubescens*. Hence, present study was aimed to evaluate antiradical potential of the methanolic and aqueous extract of fruits of *M. pubescens*.

MATERIAL AND METHODS

The mature fruits of *Morinda pubescens* were collected from the drought prone area of Osmanabad and dried in shade. Oven dried, ground plant material (50 grams) was extracted with 500 ml of methanol and distilled water separately for 24 h below 50℃ using soxhlet apparatus. The final extracts were passed through Whatman filter paper No.1. The filtrates obtained were concentrated on water bath up to 50 ml and stored at 4^{o}C for further use.

The total antioxidant capacity of fruit samples was determined by FRAP assay, which depends upon the reduction of ferric tripyridyltriazine (Fe (III)- TPTZ) complex to the ferrous tripyridyltriazine (Fe (II)- TPTZ) by a reductant at low pH. Fe (II)- TPTZ has an intense blue colour which can be monitored at 593 nm (7) . Free radical scavenging activity was determined according to the method of Koleva *et al.,* (8) with slight modifications. The scavenging effect was calculated in % using formula % discoloration = (1-Abs sample /Abs control) × 100. Ascorbic acid was used as reference standard. The interaction of methanolic and aqueous extract of *M. pubescens* with nitric oxide (NO) was assessed by the nitrite detection method (9).

Statistical analysis

All data were reported as mean ± standard deviation of three replicates. The results were compared by one-way analysis of variance (ANOVA) and Tukey's test were carried out to test any significant differences among the means using Graph pad instat software . Differences among means ($P < 0.001$) were considered statistically significant.

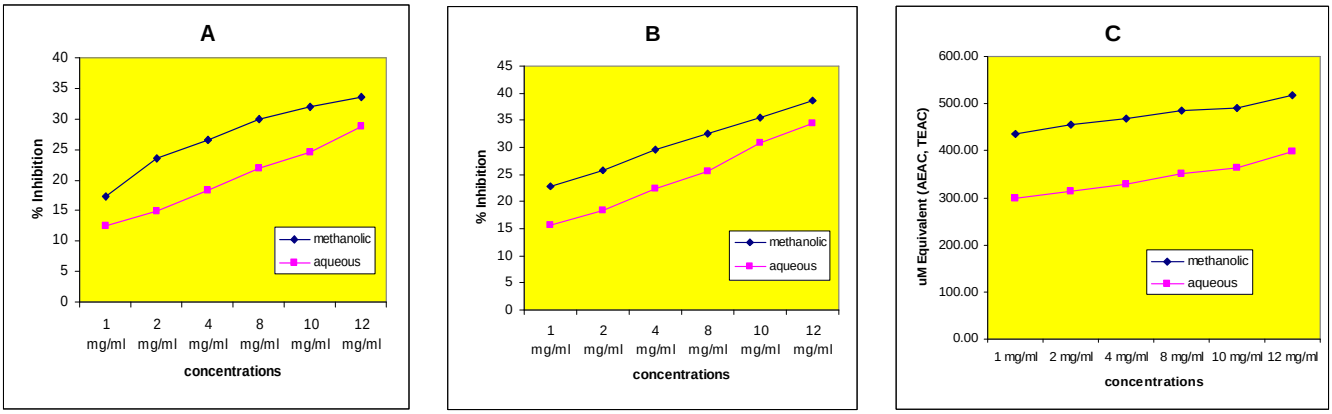

Figure1.
Antiradical activity of methanolic and aqueous fruit extracts *M. pubescens* with A) DPPH, B) Nitric oxide and C) FRAP

RESULTS AND DISCUSSION

The free radical scavenging properties of *M. pubescens* fruit extracts were presented in Fig.(1) Different concentrations of *M. pubescens* fruits 1mg/ ml to 12 mg/ml were used and concentration dependent effect of the extracts in terms of their antiradical potential was observed. Fig.(1a) shows the data on free radical scavenging activities as assessed by DPPH assay. The results of Nitric oxide scavenging ability were presented in Fig. (1b), it shows that methanolic extract to be the most potent scavenger than aqueous. Fig.(1c) shows the data on FRAP assay, which indicates that the methanolic extract is highly significant for the ferric reducing capacities than the aqueous extract. Both the extracts shows concentration dependent increase in their ferric reducing capacities. The aqueous extracts were compared to water-soluble antioxidant, ascorbic acid (AEAC), while the solvent extracts were expressed in terms of Trolox (TEAC), an ethanol soluble standard antioxidant, equivalent.

Antioxidants are the compounds which helps to delay or inhibit the oxidation of lipids and other molecules through the inhibition of either initiation or propagation of oxidative chain reactions (10). According to Chanwitheesuk et al., (11), antioxidants can act as either reducing agents, or by free radical scavengers or singlet oxygen quenchers. Free radicals contribute to more than one hundred disorders in humans including atherosclerosis, arthritis, ischemia and reperfusion injury of many tissues, central nervous system injury, gastritis, cancer and AIDS (12,13). Free radicals are often generated as by products of biological reactions or from exogenous factors. The involvements of free radicals in the pathogenesis of a large number of diseases are well documented by Pourmorad and coworkers (14). Medicinal plants can protect against harmful effects of ionizing radiation. Natural plant extracts or pure compounds are safe ingredients, which do not have any toxic effects. According to Kulkarni, (15), plant extracts can be characterized by polyvalent formulations and interpreted as additive, or, in some cases, potentiating. First, the therapeutic benefit of medicinal plants is usually attributed to their antioxidant properties and oxidative stress is a prominent feature of these diseases (16,17).

According to Moncada and Parmer, (18) Nitric oxide plays various physiological roles and it also occupies several pathological states. It is an important second messenger, acts as a neurotransmitter and plays an important role in the defense against pathogens as well as in the control of blood pressure. The interaction of NO with other radicals leads to the formation of more hazardous radicals such as peroxynitrite anion and hydroxyl radical (19). In present investigation methanolic extract shows significant increase in % inhibition by increasing concentration in a dose-dependent fashion, while increased concentration of nitrite after spontaneous decomposition of sodium nitroprusside, which indicates that methanolic extract may contain compounds able to scavenging NO [Fig – 1 b].

FRAP assay measures the reducing ability of antioxidants against oxidative effects of reactive oxygen species. Electron donating anti-oxidants can be described as reductants and inactivation of oxidants by reductants can be described as redox reactions (20). Total antioxidant power may be referred analogously to total reducing power. In the current study methanol extracts of *M. pubescens* exhibited greater antioxidant power with increasing concentrations. [Fig – 1 c].

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