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In Vitro evaluation of antioxidant and free radical scavenging activities of Mosinone-A

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KEYWORDS

Mosinone-A, DPPH, Nitric oxide, hydroxyl radical, reducing power

A B S T R A C T

Plant origin antioxidants are plays a key role in the suppress the progression of free radical mediated disorders. In this study, the antioxidative potential of a phenolic compound Mosinone-A against superoxide anions, DPPH+, ABTS+ (2,2'-azinobis[3-ethylbenzothiazoline-6-sulphonate), H_2O_2, NO- and reducing power. In all the methods the Mosinone-A exhibited good scavenging activity, which was compared to that of standard ascorbic acid. The activity of phenolic compound Mosinone-A on DPPH radical, reducing power, ferrous ion chelation, ABTS radical, FRAP and hydroxyl radical were found to be 0.44, 0.48, 32.51, 10.03, 1.51 and 0.23 mg/ml, respectively. The results obtained in the present study provides an evidence that the anti-oxidative potency of Mosinone-A, which may support its use in various ailments account and protect cells against oxidative stress.

Introduction

Free radicals are chemical species that possess unpaired electrons, which are highly reactive. The ROS includes superoxide anions (O_2^-), hydrogen peroxide (H_2O_2) and hydroxyl radicals (OH^-) which are essential and natural byproducts of body's digestion system (McCord, 2010). Nonetheless, they are perilous, when present in abundance, brings about oxidative stress that cause the structure and functions of biological molecules such as lipids, proteins, enzymes, DNA, and RNA (Leeuwenburgh and Heinecke, 2001). Medicinal plants contains a wide variety of free radical scavenging molecules, such as phenolic derivatives, flavonoids, anthocyanins, carotenoids, dietary glutathione, vitamins, furan derivatives and endogenous metabolites are rich in antioxidant activities (Yi-Zhong *et al.*, 2006). These beneficial effects were promoting health is believed to be achieved through several possible mechanisms, for example, direct response with and extinguishing free radicals, chelation of

move metals, decrease of peroxides, and incitement of the antioxidative enzyme defense system (Cao *et al.,* 1998).

Free radical scavenging capacity and antioxidant activities of phytocompound have been developed to measure by *In vitro* studies which are major subject in chemopreventive studies (Khanam *et al.,* 2004). Particularly, antioxidant activity of phenolics is mainly due to their redox properties, which permit them to go about as diminishing operators or hydrogen-atom donor, which was citing by frequent articles (Pulido *et al.,* 2000). To our knowledge there is no reports on the in vitro antioxidant activities of Mosinone-A in the available literature. Thus in the present study, therefore investigated the invitro antioxidant and free radical scavenging potential of Mosinone-A. The scavenging activities of Mosinone-A on superoxide anions, $DPPH^+$, $ABTS^+$ (2,2'-azinobis[3-ethylbenzothia zoline-6-sulphonate), H_2O_2, NO^- and reducing power were determined.

Results

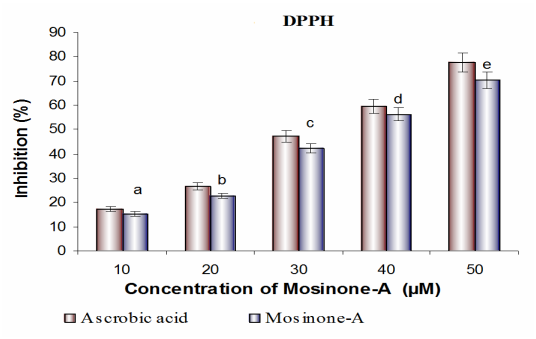
Several concentrations ranging from 10-50μM of Mosinone-A were tested for their antioxidant activity using different *In vitro* models. It was observed that free radicals were scavenged by the test compound in a dose dependent manner in the various methods. From the results given in figure 1 it is inferred that, to maximum percentage inhibition in all models viz., $DPPH^+$, OH^-, superoxide, reducing power, $ABTS^+$ and NO^-. The different concentrations of Mosinone-A showed 88, 83, 65, 60, 65 and 70% inhibitions respectively. At 50μM (maximum concentration), the % inhibition was highest with $DPPH^+$ and OH^- followed by superoxide anion, reducing power, $ABTS^+$ and finally nitric oxide.

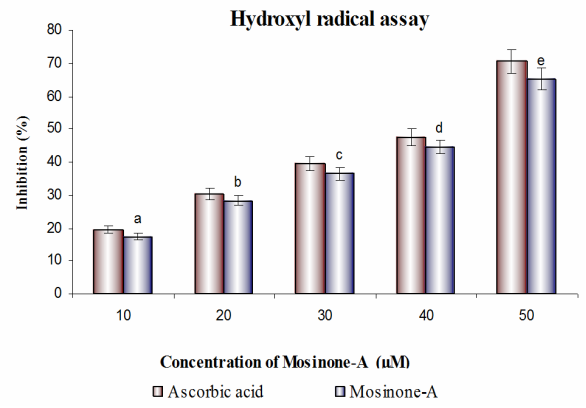
Discussion

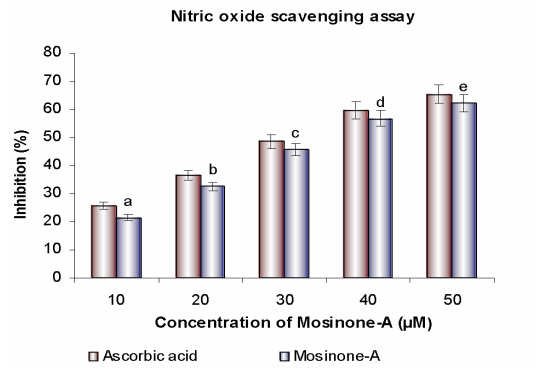
Many scientific investigations have been reported on the use of medicinal plants and its phytochemicals as radical scavengers (Pham *et al.,* 2011). In the present study, the free radical scavenging and antioxidant potential of Mosinone-A was assessed by various assays such as $DPPH^+$, $ABTS^+$, $H_2O_2^-$, $OH^\bullet$ and Fe^{2+}. From the above study Mosinone-A have strong reducing power and free radical scavenging effect on hydroxyl, superoxide and hydrogen peroxide radicals when compared to standard antioxidant ascorbic acid.

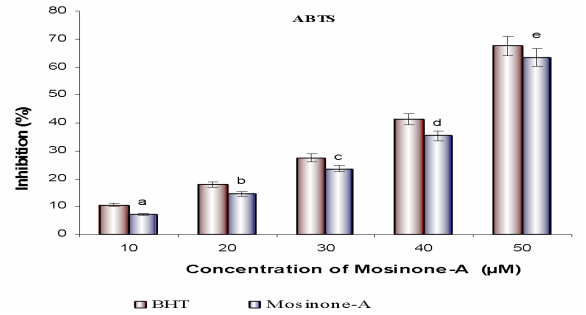
The ability of Mosinone-A to reduce DPPH and $ABTS^+$ radicals to the corresponding hydrazine by converting the unpaired electrons to paired ones. The maximum concentration (50μM) of Mosinone-A exhibited the highest percentage of inhibition which indicates that Mosinone-A causes reduction of DPPH and $ABTS^+$ radicals in a strohometric manner. Superoxide anion is produced from molecular oxygen due to oxidative enzymes of body by non enzymatic reaction such as autooxidation by catecholamines (Hemmani and Parihar, 1998). The probable mechanism of scavenging the superoxide anions may be due to inhibitory effect of the Mosinone-A towards generation of superoxides in the *in vitro* reaction mixture. The hydroxyl radical (OH^-) thus produced may attack the sugar of DNA bases causing sugar fragmentation, base misfortune and DNA strand breakage (Halliwell, 1994). This radical has the capacity to induce carcinogenesis, mutagenesis and which rapidly initiates lipid peroxidation (Rajesh *et al.,* 2008). From the present results, it is inferred that the Mosinone-A have better hydroxyl radical scavenging activity as reflected in terms of percentage inhibition.

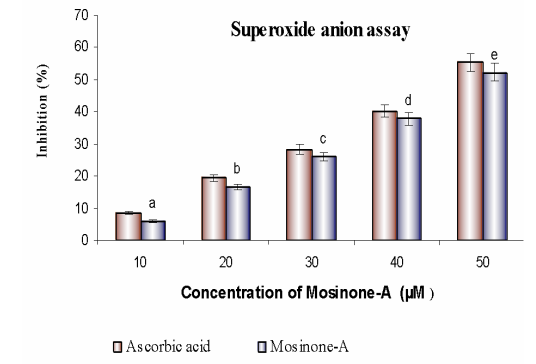
Figure.1 The effect of Mosinone-A on DPPH, superoxide, hydroxyl, iron reducing power and nitric oxide radical scavenging assays

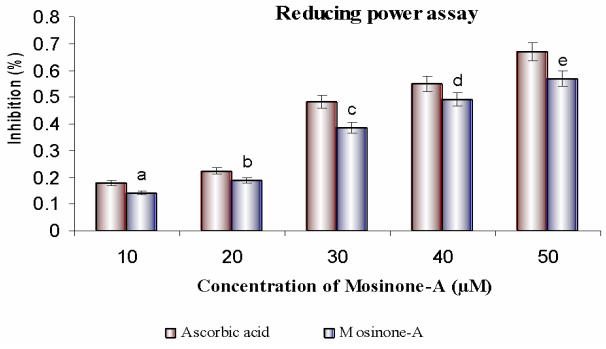












Values are given as represented as mean ±

SD of six experiments in each group. a, b,c,d,e significantly different from ascorbic acid $p<0.05$.

Excess concentration of NO is associated with several diseases (Ialenti *et al.,* 1993). Oxygen reacts with the excess nitric oxide to generate nitrite and peroxynitrite anions which acts as free radicals. The levels of nitric oxide was significantly reduced in this study by the effect of Mosinone-A indicating the free radicals scavenging properties in a concentration dependent manner. In the reducing power assay, the presence of antioxidants in the sample results in the reduction of Fe^{3+} to Fe^{2+} by donating an electron.

The amount of Fe^{2+} can then be monitored by measuring the formation of perl's blue at 700 nm. Increasing absorbance indicates an increase in reductive ability by the Mosinone-A. From the above results, it can be concluded that Mosinone-A showed the most potent in vitro antioxidant activity with high percentage inhibition. This may be attributed to the presence of acetogenein and tetra hydro furan portion in the molecules which probably play a role as an effective free radical scavenger and have an effective anticancer agent.

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