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Amelioration of oxidative damage by Methyl gallate in different *in vitro* models

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Abstract

The present study aims to evaluate the antioxidant potential of methyl gallate - an ester of gallic acid in different *in vitro* assays. The antioxidant capacity was assessed using Molybdate ion reduction, DPPH, ABTS radical cation scavenging, deoxyribose degradation (site specific and non-site specific), reducing power, lipid peroxidation, superoxide anion scavenging, chelating power and DNA nicking assays and the results were compared with known antioxidant i.e. gallic acid. From the results obtained, it was found that methyl gallate exhibited potent antioxidant activities in different *in vitro* models and the activity was related to its chemical structure. The reduction ability of methyl gallate was found to be 99.58mg AAE /100mg dry weight of pure compound. The IC_{50} value of methyl gallate in DPPH, $ABTS^{\cdot+}$ scavenging, deoxyribose degradation (site specific and non-site specific), reducing power, lipid peroxidation, superoxide anion scavenging, chelating power was found to be 21.679, 8.689, 19.884 and 20.086, 91.169, 15.825, 32.699 and 4990.2 µg/ml respectively. The methyl gallate also has tendency to conserve the supercoiled DNA (pBR 322) from the $^{\cdot}OH$ radicals mediated damage in DNA nicking assay. However, it has been found that hydrogen donation, free radical scavenging potential of methyl gallate was lower than standard antioxidant compound i.e. gallic acid and the lower effect was related to substitution of –OH group by $–CH_3$ group.

Keywords: Methyl gallate; gallic acid; antioxidant; hydrogen donation; free radical scavenging assay

Introduction

The overproduction of reactive oxygen species causes degradation of biomolecules including DNA, lipids and proteins and is furthermore linked to most prevalent degenerative diseases including aging, cancer and diabetes. Several environmental and life style factors act