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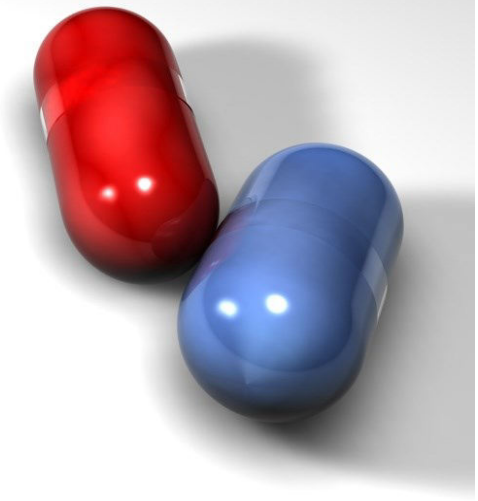

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Letter to the Editor

Comparative antioxidant scavenging and lipid peroxidation activity of rutin and gallic acid

Sir,

Reactive oxygen species (ROS) are generated in the normal metabolism of living organisms, and beside of their beneficial role in signal transduction, they are involved in dispersion of several degenerative diseases like malignant tumors, rheumatic joint inflammation, cataract, Parkinson's disease, Alzheimer's disease, hypertension, diabetes, oxidative stress, tissue damages and atherosclerosis (Halliwell and Gutteridge, 1984). Natural products and secondary plant metabolites play a key role in the prevention of various chronic diseases and improvement of health. Rutin is used as a chemotherapeutic agent in addition to food supplement. The present study was designed to evaluate the antioxidant of free radical and lipid peroxidation activities of various concentrations of rutin and gallic acid.

To evaluate the antioxidant efficacy of both natural compounds various free radical scavenging assays are used.

During these characterizations 1, 1-diphenyl-2-picrylhydrazyl (DPPH), ABTS (2, 20-azinobis-(3-ethylbenzothiazoneline-6-sulphonic acid, 7.4 mM), ammonium molybdate, β-carotene, nitroblue tetrazolium, 2-deoxyribose, hydrogen peroxide and $FeCl_2.4H_2O$ solution are free radicals providers. DPPH assay was performed according to the procedure as reported by Gyamfi et al. (1999). ABTS radical cation (Re et al., 1999), phosphomolybdenum method (Prieto et al., 1999), β-carotene-linoleate (Sun and Ho, 2005), superoxide radical scavenging activity (Nishikimi et al., 1972), hydroxyl radicals (Nagai et al., 2005), hydrogen peroxide (Ruch et al., 1989) and the chelating ability of ferrous ions by various fractions were estimated by the method of Dinis et al. (1994). After % activity of free radical inhibition, IC_{50} of various assays was determined using Graph pad software.

The scavenging activities of various concentrations of rutin and gallic acid were determined using free radicals of 1, 1-diphenyl 1-2-picrylhydrazyl (DPPH). Results showed that rutin (IC_{50} 6.7 ± 0.1 µg/mL) possessed highest antioxidant activity as compared to gallic acid (19.0 ± 0.0 µg/mL) (Table I; Figure 1).

The ABTS radical scavenging activity order of bioactive constituents are: rutin>gallic acid with IC_{50} values of 52.7 ± 3.2 µg/mL and 122.1 ± 5.2 µg/mL, respectively (Table I). The results showed that rutin possessed significantly higher ABTS radical scavenging activity ($p<0.01$) as compared to gallic acid.

Table I
Extracts of rutin and gallic acid for various antioxidant system

	IC_{50}	
	Rutin	Gallic acid
DPPH activity	6.7 (0.1)[a]	19.0 (0.0)[b]
ABTS radical inhibition	52.7 (3.2)[a]	122.1 (5.2)[b]
Phosphomolybdenum assay	58.3 (1.8)[a]	123.0 (3.1)[b]
β-Carotene bleaching	61.6 (2.4)[a]	190.2 (2.8)[b]
Chelating activity	75.3 (3.2)[a]	92.5 (3.3)[b]
Superoxide scavenging	68.6 (2.3)[a]	220.7 (7.8)[b]
Nitric oxide scavenging	68.5 (4.2)[a]	145.0 (3.2)[b]
Lipid peroxidation	57.4 (3.1)[a]	112.2 (2.4)[b]
Hydrogen peroxide scavenging	86.3 (4.0)[a]	100.7 (3.8)[b]
Hydroxyl radical	93.2 (2.6)[a]	98.5 (0.6)[b]

Each value is represented as mean (SD); n=3; Means not sharing the same letter are significantly different (LSD) at $p<0.01$ probability level in each column

Table I showed the reduction of Mo (VI) to Mo (V) by administration of rutin (IC_{50} 58.3 ± 1.8 µg/mL) and gallic acid (IC_{50} 123.0 ± 3.1 µg/mL).

The absorbance of β-carotene was found to be decreased in the presence of 50–250 µg/mL of the various ascorbic acid, gallic acid and rutin. Various concentrations of these compounds effectively inhibited the oxidation of linoleic acid and subsequent bleaching of β-carotene. Rutin (IC_{50} 61.6 ± 2.4 µg/mL) was more potent then that of gallic acid (IC_{50} 190.2 ± 2.8 µg/mL).

Scavenging activity for superoxide radicals exhibited by rutin (IC_{50} 68.6 ± 2.3 µg/mL) and gallic acid (IC_{50} 220.7 ± 7.8 µg/mL).

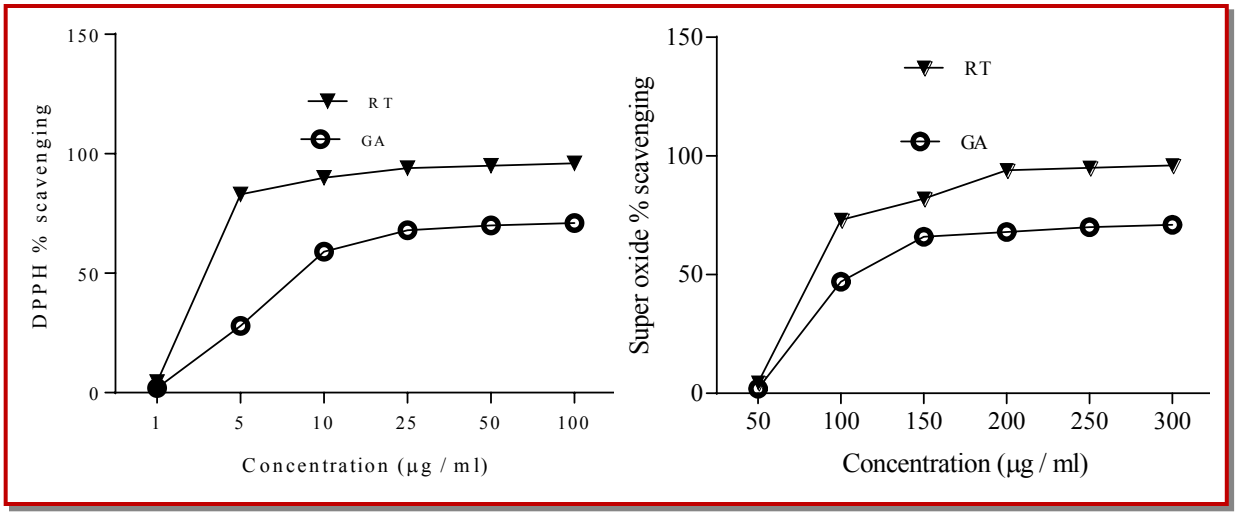

Figure 1: DPPH and superoxide scavenging activity rutin (RT) and gallic acid (GA)

Table I shows the hydroxyl radical scavenging activities of rutin (IC_{50} 93.2 ± 2.6 µg/mL) and gallic acid (IC_{50} 98.5 ± 0.6 µg/mL).

Scavenging effect of rutin and gallic acid indicated that rutin possessed ($p<0.01$) highest hydroxyl radical scavenging effect and was most potent.

Various concentrations of compounds showed an ability to chelate iron (II) ions in a dose-dependent manner. Among these rutin had potent iron chelating activity. The highest activity was observed for rutin ($p<0.01$) and was more potent in inhibition of lipid peroxidation than gallic acid. Overall, the rutin showed the highest nitric oxide scavenging ($p<0.01$) capability compared to other compound.

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