Free radical Scavenging Activity and Phenolic content of decoctions of some medicinal plants

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Abstract

Free radicals are normally generated in substantial amounts in the body; excessive amounts cause oxidative damage through chain reactions forming disorders like diabetes mellitus, cardiovascular and pulmonary diseases. In diabetic conditions, a non enzymatic reaction occurs with proteins and reducing sugars forming glycated protein named Amadori products. Further rearrangement, oxidation and reduction of Amadori products leads to form Advanced Glycated End products which causing spontaneous damage to proteins in physiological system leading various complications like Nephropathy, Neuropathy ,Retinopathy and this process accompanying the formation of free radicals. In this process oxidation plays an important role to form Advanced Glycated End Products. Therefore antioxidants are highly important in prevention or slowing the glycation reaction. Humans have evolved a complex antioxidant system, but this may not be sufficient to maintain optimal cellular functions in diabetic conditions. Medicinal plants usually contain different phenolic compounds having antioxidant properties. Therefore, a study was carried out to examine the *in vitro* free radical scavenging activity and total phenolic content of the decoctions of plants, *Cassia auriculata* (Ranawara, flower) *Phyllanthus emblica* (Nelli, fruit) and *Scoparia dulcis* (Walkottamalli, whole plant) which are used in the treatment for diabetics. Three fresh samples from each plant collected from different areas where they are grown and commercial dried sample from the traditional market was selected to prepare the decoctions and compared phenolic contents and antioxidant activity. The total phenolic content of each extract was determined using Folin-Ciocalteu reagent and evaluation of free radical scavenging activity was assessed using DPPH assay and ABTS assay. Decoctions of the commercial samples of *P. emblica* showed the highest total phenolic content as 625 mgGAE/g and *C auriculata* and *S dulcis* showed 459 and 131 mgGAE/g respectively. Samples dried under laboratory conditions of *C.auriculata* had total phenolic content from 226 – 287 mgGAE/g, *P.emblica* from 479 -517 mgGAE/g and *S dulcis* from 167 – 186 mgGAE/g. The highest DPPH antioxidant activity showed the commercial sample of *P. emblica* as 27 µg/ml and other samples dried under laboratory conditions were in the range of 41 – 49 µg/ml. No significant difference between the DPPH activity of *C. auriculata* commercial sample and other samples dried in the dehydrator and were in the range of 248 -309 µg/ml while *S. dulcis* all the samples showed DPPH antioxidant activity from 437 – 540 µg/ml. The reference standard, Butylated Hydroxy Toluene showed 20 µg/ml. ABTS antioxidant activity was high in all commercial samples of *C.auriculata, P.emblica* and *S. dulcis* and were as 648,625 and 615 mmol/g while other samples dried using the dehydrator showed 313 – 536 mmol/g,479 -517 mmol/g and 549-550 mmol/g respectively.

Key words: Antioxidant properties, Glycation, Diabetes, DPPH assay, ABTS assay