

Isolation of Bioactive Compounds from Low Grade Coffee and Selected Spices/Herbs for Use in Food Application

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ABSTRACT

Bioactive compounds from various plants, animals and microbial sources are gaining importance in recent years. Antioxidant molecules from plants are reported to show a protective effect on many chronic degenerative diseases such as DNA oxidation, cancer, oxidative stress, ageing, inflammation etc. In the present study, coffee by-products such as low grade green coffee beans (LCB), spent coffee along with selected spices and herbs from India and Japan were selected for the evaluation of bio activity studies. Extracts were prepared and analyzed for polyphenol content (Folin-Ciocalteu Reagent) and radical scavenging activity (α - α -diphenyl- β -picrylhydrazyl radical) and oxygen radical absorbance capacity (ORAC). The extracts were also evaluated for anti-tumor (P388 cell assay), anti-inflammatory (J774A.1 cell assay) and anti allergy (RBL- 2H3) *in vitro*. Extract of LCB were evaluated for oxidative stress (*in vivo*) in BALB/c mice.

Methanol extract of LCB showed maximum radical scavenging activity (92.0%) and ORAC value ($4416 \pm 215 \mu\text{M}$ Trolox/g) next to oregano extract. The radical scavenging activity of the other spices was found to be in the order of oregano > ginger > long pepper > garlic. Among the herbs, it is observed that lemon balm, oregano and sage showed maximum activity (>60%). All the extracts, except garlic, showed anti-tumor activity on P388 cell assay. However, these extracts did not show much anti-inflammatory activity on J774A.1 cell assay. Garlic, oregano, lemon grass and mustard greens showed better anti-allergic activity in RBL-2H3 cell line at the concentration of 10 $\mu\text{g/ml}$ compared to other spices and herbs. LCB extract, at the concentration of 1%, reduces the urine oxidative stress in terms of the biomarker as 8-OHdG and increases the serum HDL cholesterol significantly ($p < 0.05$) in BALB/c mice at the end of 14 days of experimental period. There is not significant difference in the reactive oxidative metabolites between control and coffee fed mice. Further studies are needed to confirm the results and to find out the compounds responsible for the beneficial effect. Isolation and structure elucidation of compounds to use in food applications needs further investigation.