

Radical Scavenging and Radiomodulatory Effects of *Psoralea corylifolia* Linn. Substantiated by *in vitro* Assays and EPR Spectroscopy

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The present study is the first report of the radiomodulatory effects of *Psoralea corylifolia* Linn. The extract (IBG-RA-26) prepared from *P. corylifolia* was chemically analysed by HPLC, LC-MS/MS and NMR. The total polyphenolic content of IBG-RA-26 was 0.287 mg/ml of quercetin equivalents. IBG-RA-26 exhibited a dose-dependent increase in 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity. It exhibited comparable (> 50%) site-specific and non-site-specific hydroxyl radical scavenging activity in higher concentration ranges (500–1000 µg/ml), while at lower concentrations (5–50 µg/ml) it exhibited significantly ($p < 0.05$) higher non-site-specific scavenging ability compared to site-specific activity. Nitric oxide scavenging activity of IBG-RA-26 (5–1000 µg/ml) increased in a concentration-dependent manner, while maximum superoxide ion scavenging ability (79%) was observed at 50 µg/ml. The electron donation potential of IBG-RA-26 was found to be higher than that of ascorbic acid at lower concentrations (up to 5 µg/ml). Analysis of the ability of IBG-RA-26 to protect membranes against γ -radiation, utilizing an artificial membrane system (liposome), revealed a significant ($p < 0.05$) decrease in the formation of malondialdehyde (MDA) as a function of the concentration of IBG-RA-26. Radiation-induced lysis of human erythrocytes was monitored and efficacy of IBG-RA-26 was tested in the concentration range 25–1000 µg/ml, with significant protective efficacy observed in the range 25–50 µg/ml. IBG-RA-26 rendered significant ($p < 0.05$) protection against radiation (0.25 kGy)-induced DNA damage. EPR spectroscopy was used to investigate the DPPH radical scavenging capacity of IBG-RA-26. IBG-RA-26 exhibited a good DPPH radical scavenging capacity in a concentration-dependent manner. By direct EPR spectroscopy we have also demonstrated the possible formation of free radical species in a solution of IBG-RA-26. The wide spectrum of radioprotective and antioxidant properties exhibited by IBG-RA-26 indicate that *P. corylifolia* has potential as a radiomodulatory agent.

Key words: *Psoralea corylifolia*, Radiomodulation, Antioxidant Properties, DNA Protection