

Red Mexican Grapefruit: A Novel Source for Bioactive Limonoids and their Antioxidant Activity

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Citrus limonoids have shown to inhibit the growth of cancer in colon, lung, mouth, stomach and breast in animal and cell culture studies. For the first time in the present study, an attempt has been made to isolate antioxidant fractions and five limonoids from red Mexican grapefruit seeds. Defatted seed powder was successively extracted with hexane, ethyl acetate (EtOAc), acetone, methanol (MeOH) and MeOH/water and the extracts were concentrated under vacuum. Radical scavenging activity of 1,1-diphenyl-2-picrylhydrazyl (DPPH) and total phenolic content were also measured for comparison with the antioxidant capacity in the phosphomolybdenum method for the above extracts. Acetone and MeOH extracts, respectively, showed the highest (85.7%) and lowest (53.3%) radical scavenging activity, at 500 ppm. The total phenolic contents were found to be highest in the acetone extract (15.94%) followed by the MeOH extract (5.92%), ethyl acetate extract (5.54%) and water extract (5.26%). Antioxidant capacity of the extracts as equivalents to ascorbic acid ($\mu\text{mol/g}$ of the extract) was in the order, EtOAc extract > acetone extract > water extract > methanol extract. Furthermore, the EtOAc and acetone extracts were loaded onto silica gel columns to obtain four limonoid aglycons. MeOH fraction was loaded onto a dowex-50 and sepabeads resin column to obtain a limonoid glucoside. The purity of the isolated five compounds was analyzed by HPLC using a C_{18} column and UV detection at 210 nm. Finally, the structures of the compounds were identified as obacunone, nomilin, limonin, deacetylnomilin (DAN) and limonin-17- β -D-glucopyranoside (LG) using ^1H and ^{13}C NMR studies.

Key words: Grapefruit, Limonoids, Antioxidant Activity, Phosphomolybdenum Method