

Characterization of Proanthocyanidins and Phenolic Compounds in Peanut Skin Using UPLC/Orbitrap-MS Techniques

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[Introduction]

Peanut (*Arachis hypogaea* L.) is an important crop world-wide because of its high efficiency in lipid and protein production. There is no doubt that the kernels is the most important product of peanut. In comparison with the kernels, the peanut skin is almost completely neglected in nutraceutical terms, although it has potentially health promoting phenolics and dietary fiber and there is considerable potential for its exploitation.

[Materials and Methods]

Hand-peeled peanut skin (PS) of the five peanut cultivars (Daan, Sinpalkwang, K-ol, Sewon, Heukseang) were extracted with 80% ethanol. The PS extracts were filtered through a 0.2 μ m filter unit prior to for ultra-high-performance liquid chromatography coupled to Orbitrap high-resolution mass spectrometry (UPLC/Orbitrap-MS). A single-stage Orbitrap mass spectrometer was equipped with Heated Electrospray Ionization Source (HESI). The HESI parameters in positive polarity were as follows: sheath gas flow rate: 50; aux gas flow rate: 15; spray voltage: 2.5 kV; capillary temp.: 270 °C; heat temp.: 40 °C. Mass range in full scan mode was set at m/z 150-1,000 and MS² scan of the two precursor-ion in the first scan.

[Results and Discussions]

The aim of this study was to identify the proanthocyanidin and phenolic compounds in the PS using UPLC/Orbitrap-MS analysis. Twenty three proanthocyanidins (PACs) were identified in ethanolic extracts of peanut skin. A-type PACs m/z 577, 863 and 864 display a 2 Da difference in $[M+H]^+$ from B-type polymers (m/z 579 and 865). PS contain significantly more PACs (dimer and trimer) compared to free phenolic compounds (e.g., catechin and epicatechin). Especially, quercetin-3- sambubioside-7-glucoside (m/z 759), quercetin-sambubioside (m/z 597), isorhamnetin-3-glucoside (m/z 479) and isorhamnetin-3-(malonoyl)-glucoside (m/z 565) were detected at a significant difference only in Sewon cultivar. And cyanidin-3-sophoroside (m/z 611), cyanidin-3-sambubioside (m/z 581), quercetin-feruloyl-glucoside (m/z 641), quercetin-3-diglucoside (m/z 627), quercetin-3-glucuronide (m/z 479) and quercetin-3-glucoside (m/z 465) were detected only in black peanut cultivar Heukseang.

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