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Anti-Inflammatory and Enzyme Inhibitory Activities of Polyphenols from Peanut (*Arachis hypogaea* L.) Hull

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[Abstract]

Peanut hull as by-product has been discarded during peanut processing. However, peanut hull contains plenty of polyphenols that shows various physiological activities. The objectives of this study were to investigate anti-inflammatory and enzyme inhibitory activities of polyphenols from 'Sinpalkwang' peanut (*Arachis hypogaea* L.) hull. Compounds were isolated from methanol extracts of peanut hull by preparative-high performance liquid chromatography after identifying and quantifying polyphenols using Ultra performance liquid chromatography (UPLC) and UPLC-Quadrupole time-of-flight-mass spectrometry profiling. The structures of compounds were elucidated by one-dimensional [^{1}H, ^{13}C] nuclear magnetic resonance (NMR) and two-dimensional NMR (correlated spectroscopy, heteronuclear single quantum coherence and heteronuclear multiple bond correlation). Three compounds were identified as 5,7-dihydroxy-4H-chromen-4-one (peak 2), luteolin (peak 4) and eriodictyol (peak 5). Significant differences in inflammatory mediator such as nitric oxide (NO), interleukin-6 (IL-6) and interleukin-1β (IL-1β) in lipopolysaccharide stimulated Raw 264.7 macrophages and in enzyme (xanthine oxidase [XO] and α-glucosidase [AG]) inhibitory activities were observed between three compounds ($p < 0.05$). Peak 5 treated Raw 264.7 macrophages showed lower content of NO (16.4 uM), IL-6 (7.0 ng/mL), and IL-1β (60.6 pg/mL) than peak 2 (NO: 28.3 uM, IL-6: 11.3 ng/mL, IL-1β: 66.9 pg/mL) and peak 4 (NO: 24.7 uM, IL-6: 9.3 ng/mL, IL-1β: 62.6 pg/mL). Peak 5 showed higher XO inhibitory activity (84.7%) and higher AG inhibitory activity (52.4%) than peak 2 (XO inhibitory activity: 45.4%, AG inhibitory activity: 21.6%) and peak 4 (XO inhibitory activity: 37.9%, AG inhibitory activity: 37.5%) at concentration of 0.5mg/mL. This study suggests that peanut hull could be a potential source of anti-inflammatory and physiological materials while creating new use of discarded peanut hull as by-products concomitantly.

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