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Scavenging Capacities of DPPH and ABTS Free Radicals and Anti-inflammatory Activities of Ethanol Extracts and their Fractions from *Sophora tonkinensis*

Eun Sun Moon, Ji Yoon Lee, Seongdae Kim and Chang Won Choi*

[1]Student and [2]Professor, Department of Biology & Medicinal Science, Pai Chai University, Daejeon 35345, Korea

The first purpose of this study was to evaluate the scavenging capacity (SC) of DPPH and ABTS free radicals for ethanol extract (STR-E) and its active fractions from Sophora tonkinensis root (STR). Four different fractions from STR-E were prepared by using different types of solvents such as chloroform (STR-E-C), ethyl acetate (STR-E-EA), n-butanol (STR-E-B), and water (STR-E-W). STR-E-C showed the highest value of total phenolic content, while STR-E showed the highest value of total flavonoid and terpenoid content. In STR-E and its four fractions, STR-E-EA showed the strongest SC with the lowest SC50 values of the DPPH radicals and ABTS radicals. The second purpose of this study was to evaluate anti-inflammatory activity in the lipopolysaccharide (LPS)-induced RAW 264.7 macrophages treated with STR-E, STR-E-C, and STR-E-EA, respectively. No cytotoxic effect to RAW 264.7 cells was observed at 20 ~ 25 μg/ml of STR-E, 10 μg/ml of STR-E-C, and 5 μg/ml of the STR-E-EA, presenting cell viability values close to that of the untreated control (100%). STR-E, STR-E-C, and STR-E-EA significantly suppressed the LPS-induced nitric oxide (NO) in a dose-dependent manner. Results of reverse-transcription (RT)-qPCR analysis showed that the peak mRNA levels of IL-1β, TNF-α, iNOS, IL-6, and IL-10 were observed in the LPS-stimulated macrophages at 4 h, 2 h, 12 h, 12 h, and 12 h, respectively. The peak mRNA levels of IL-1β, TNF-α, iNOS, and IL-6 were significantly reduced in the LPS-stimulated macrophages co-treated with 20 μg/ml and 25 μg/ml of STR-E, respectively. In the case of IL-10, its peak mRNA level slightly increased without statistical significance. Compared with the LPS-stimulated macrophages, the peak mRNA levels of IL-1β, TNF-α, iNOS, and IL-6 reduced in the LPS-stimulated macrophages co-treated with 10 μg/ml and 20 μg/ml of STR-E-C, respectively. In contrast, the peak mRNA level of IL-10 significantly increased at 8 h. Compared with the LPS-stimulated macrophages, the peak mRNA levels of IL-1β, TNF-α, iNOS, and IL-6 reduced in the LPS-stimulated macrophages co-treated with 5 μg/ml and 10 μg/ml of STR-E-EA, respectively. In contrast, the peak mRNA level of IL-10 increased at 4 h. Taken together, our data indicated that STR-E, STR-E-C, and STR-E-EA activate macrophages to secrete both pro-inflammatory and anti-inflammatory cytokines.

*(Corresponding author) choicw@pcu.ac.kr