Inhibition of Nitric Oxide Production and Proinflammatory Cytokines by Several Medicinal Plants

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ABSTRACT

Background: A number of medicinal plants have been used to treat various immunological diseases. Nitric oxide (NO) has an important regulatory role in the various types of inflammatory processes. Objective: To investigate the NO modulatory activity of the extracts of several medicinal plants native to Iran including Dracocephalum kotschyi, Linum persicum, Dionysia termeana, Salvia mirzayanii, Ferulago angulata and Euphorbia cheiradenia. Methods: The methanic extracts of the plants were prepared and examined for their effects on the NO production by lipopolysaccharide-stimulated mouse macrophages. The level of TNF-α and IL-1β pro-inflammatory cytokines in the macrophage culture were detected using enzyme-linked immunosorbent assay. Results: All the extracts at concentration of 50 μg/ml demonstrated a significant decrease in NO production (p<0.001) after a 24-hour treatment. This inhibitory effect was also seen after 48 hours. Among the extracts, L. persicum was the strongest extract in reducing the NO production at 1 μg/ml after both 24 and 48-hours (nearly 100% inhibition, p<0.001). S. mirzayanii extract with 66.2 ± 8% inhibition at 50 μg/ml, showed the mildest effects in 48 hour culture. In cytokine release determination, the extract of L. persicum significantly inhibited both TNF-α and IL-1β cytokines production by stimulated macrophages (p<0.001). D. kotschyi, D. termeana and F. angulata decreased secretion of IL-1β from the cells. Conclusion: These results indicate the presence of anti-inflammatory and macrophage inhibitory substances in these plants.

Keywords: Cytokines, Medicinal Plants, Nitric Oxide

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