

Comparative Study of the Anti-inflammatory Effects of Sub-extracts of the *Capparis ovata* Water Extract (COWE) Used as an Alternative and Complementary Treatment for Multiple Sclerosis

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Aim of the study: Multiple sclerosis (MS) is a chronic inflammatory, ademyelinating and neurodegenerative disorder of the central nervous system. There is still no complete cure for MS, and it remains entirely non-treatable disease with no effective treatment. In the present study ethyl acetate, butanolic and dichloromethane sub-extracts of the COWE (*Capparis ovata* water extract) were tested for its anti-inflammatory effects on selected proinflammatory and inflammatory genes believed to be important in MS pathophysiology using SH-SY5Y cells.

Material and Methods: The human neuroblastoma cell line SH-SY5Y was purchased American Tissue Culture Collection. SH-SY5Y cells were grown in monolayer culture in DMEM:F12 medium containing 10% FBS, 0.5% penicillin/streptomycin at 37°C in a humidified atmosphere comprised of 95% air and 5% CO₂. Cell viability was assessed using lactate dehydrogenase (LDH) activity in the media conditioned by the crystal violet cell staining. In these cells, levels of the chemokine (C-C motif) ligand 5 (CCL5), C-X-C motif chemokine 9 (CXCL9), C-X-C motif chemokine 10 (CXCL10), glial fibrillary acidic protein (GFAP), interleukin 6 (IL6), matrix metalloproteinase 9 (MMP9), nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB1), tyrosine-protein phosphatase non-receptor type 11 (PTPN11) and tumor necrosis factor-α (TNFα) were determined by quantitative reverse transcriptase-PCR assay (qRT-PCR).

Results: We have found that the butanolic, dichloromethane and ethyl acetate sub-extracts significantly inhibited the expression of NF-κB1, CXCL10, CCL5, CXCL9, IL6 and MMP9 genes in SH-SY5Y cells. The butanolic and dichloromethane sub-extracts treated SH-SY5Y cells decreased TNFα, GFAP, and PTPN11 mRNA activity while ethyl acetate fraction was increased. Results support that the butanolic and dichloromethane sub-extracts of the COWE extract have more powerful potential to serve as an alternative or complementary therapeutic agent in MS treatments.

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Keywords: *Capparis ovata*, ethyl acetate sub-extract, butanolic sub-extract, dichloromethane sub-extract, multiple sclerosis, anti-inflammatory.