

EFFECT OF *Desmodium heterophyllum* AQUEOUS EXTRACT COMBINED WITH PHOTOBIMODULATION THERAPY IN A MODEL OF ACUTE INFLAMMATION

Tássio Malber de Oliveira^{1*}, Roberta Maria Abrão², Luiz Gustavo Vilela Filho², Brendha Sena Costa², Gracimério José Guarneire², Nerilson Marques Lima², Sandra Bertelli Ribeiro de Castro², Caio César de Souza Alves³, Murilo Xavier Oliveira³, Alessandra de Paula Carli³

tassio.malber@ufvjm.edu.br

1-LAP, Departamento de Medicina, Fammuc, UFVJM, Rua. Do Cruzeiro, 01, Teófilo Otoni, Minas Gerais, Brazil. Universidade dos Vales do Jequitinhonha e Mucuri, Campus Mucuri, 39803-371.

Species of the genus *Desmodium* have bioactive compounds with anti-inflammatory and immunomodulatory properties. Photobiomodulation therapy (PBMT) has been attracting attention as a non-invasive alternative for modulating inflammatory processes. However, there are no studies evaluating the combination of these approaches. Therefore, we investigated the immunomodulatory potential of *Desmodium heterophyllum* aqueous extract combined with PBMT in an experimental model of acute inflammation. The study aimed to evaluate the immunomodulatory effects of *D. heterophyllum* aqueous extract, alone and in combination with PBMT, in a model of carrageenan-induced paw edema in mice, analyzing cell viability, nitric oxide production, and inflammatory cytokine profile. To this end, the species was collected, identified, and processed to obtain the aqueous extract, which was subsequently characterized by high-performance liquid chromatography (HPLC) and mass spectrometry. *In vitro* assays were conducted with J774A.1 and RAW 264.7 macrophages, evaluating cytotoxicity (MTT) and NO production (Griess). For *in vivo* assays, BALB/c mice were divided into groups and treated with the extract at different concentrations (50, 125, and 250 mg/kg), TFBM (780 nm), or a combination. Edema was induced with carrageenan (2.5%) and monitored for 4 hours. Cytokines (IL-1 β , TNF- α , IL-6, IFN- γ) were quantified by ELISA from tissue macerates. The extract presented a phytochemical profile rich in flavonoids, isoflavonoids, simple phenols, and saponins. *In vitro* cell assays demonstrated low cytotoxicity (>90% viability) and significant inhibition of NO production. In an animal model, a dose of 50 mg/kg reduced edema comparably to dexamethasone. TFBM alone also significantly reduced inflammation. The combination of the extract (250 mg/kg) with TFBM promoted edema reduction from the first hour, similar to dexamethasone. There was a significant decrease in TNF- α and IL-6 in treated groups, indicating modulation of the inflammatory response. This is the first time a study has evaluated the aqueous extract of *D. heterophyllum* combined with TFBM, demonstrating a promising and safe immunomodulatory effect. The combination showed innovative therapeutic potential, reinforcing the integration of phytotherapy and photobiomodulation as a relevant alternative for the control of acute inflammatory processes.

Keywords: *Desmodium heterophyllum*; photobiomodulation therapy; acute inflammation; phytotherapy.

