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emphasis on Control of Vector-Borne Diseases***

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BOOK OF ABSTRACTS

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***in association with
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&
The Absolute Human Care Foundation,
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PROTECTIVE EFFECTS OF BORNYL ACETATE AND *OCIMUM* *SANCTUM* LEAF EXTRACT AGAINST LPS-INDUCED ENDOTOXEMIA IN SWISS ALBINO MICE

S. Beulaja¹, R. Sangeetha², M. Livya Catherene², K. Manikandan², M. Jayasuriya² and R. Manikandan²

¹Department of Biochemistry, School of Life Sciences, Vels Institute of Science, Technology & Advanced Studies (VISTAS), Pallavaram, Chennai (TN)

²Department of Zoology, University of Madras, Guindy campus, Chennai (TN)

The present investigation was aimed to explore phytochemical composition and possible protective mechanisms of the ethyl acetate leaf extract of *Ocimum sanctum* (holy basil) and the monoterpene bornyl acetate against lipopolysaccharide (LPS)-induced liver endotoxemia in mice. Phytochemical screening of ethyl acetate extract revealed the presence of carbohydrates, flavonoids, terpenoids and tannins, suggesting a rich reservoir of bioactive compounds with potential pharmacological relevance. *In vivo* administration of LPS produced pronounced pathological alterations in the liver, including massive inflammatory cell infiltration, sinusoidal congestion and disruption of normal hepatic architecture. However, co-treatment with *O. sanctum* extract or bornyl acetate markedly alleviated these histopathological changes, indicating their hepatoprotective role. Further, biochemical analysis revealed that LPS exposure significantly elevated malondialdehyde (MDA) levels, reflecting enhanced lipid peroxidation and oxidative tissue damage. These effects were counteracted in the co-treated groups, wherein MDA levels were substantially reduced. In parallel, the endogenous antioxidant defense system was restored, as evidenced by a marked increase in activities of SOD, GPx, GST, GSH and catalase in treated animals. Molecular studies further demonstrated modulation of key inflammatory mediators. The expression of IL-1 β , IL-6 and iNOS were strongly downregulated in bornyl acetate group, while *O. sanctum* extract also exhibited significant but comparatively lesser modulatory effects. Notably, SOCS3 expression, which was upregulated in the LPS group, was downregulated following bornyl acetate co-treatment, further supporting its role in immune regulation. Collectively, the findings suggest that *O. sanctum* ethyl acetate extract and bornyl acetate exert potent protective effects against LPS-induced hepatic injury by attenuating oxidative stress, enhancing antioxidant defense and modulating inflammatory cytokine signaling. These results highlight their therapeutic potential, warranting further mechanistic studies and long-term evaluations for clinical applicability.

Keywords: Bornyl acetate, *Ocimum sanctum*, lipopolysaccharide, antioxidants, hepatoprotective

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BORNYL ACETATE AS A POTENTIAL THERAPEUTIC MODULATOR OF JAK/STAT-KLF4 DEPENDENT MACROPHAGE POLARIZATION IN ATHEROSCLEROSIS

Jaya Suriya Mani¹, Manikandan Kumerasen¹, Ramar Manikandan^{1*}, Thyagarajan Raman¹, Beulaja Manikandan²

¹Department of Zoology, University of Madras, Guindy campus, Chennai - 600 025

²Department of Biochemistry, School of Life Sciences, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai, Tamil - Nadu 600117

Atherosclerosis is a chronic inflammatory disorder driven by lipid accumulation and macrophage dysfunction within arterial walls. Macrophage polarization between M1 (pro-inflammatory) and M2 (anti-inflammatory) phenotypes is a crucial determinant of plaque progression. Excess 7-ketocholesterol (7KCh), an oxidized cholesterol derivative, triggers abnormal M2 to M1 repolarization via dysregulated JAK/STAT-KLF4 signalling, enhancing foam cell formation and inflammation. In this study, the potential therapeutic role of bornyl acetate, a natural monoterpene ester with known anti-inflammatory and antioxidant properties, was investigated. Using IC-21 macrophage cell lines, cytotoxicity and viability were assessed through Alamar Blue assay, while Griess assay measured nitric oxide production. DPPH assay evaluated the antioxidant capacity, and Oil Red O staining confirmed lipid accumulation and foam cell formation. Phagocyte and phenocyte analyses were conducted to determine functional polarization states. The findings indicate that bornyl acetate effectively mitigates 7KCh-induced inflammatory and oxidative alterations, suggesting its promise as a therapeutic modulator of macrophage polarization in atherosclerosis.

Keywords: Atherosclerosis, Macrophage polarization, Inflammation, Natural Compounds.