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Antinociceptive Activity of Methanolic Extract of *Melastoma malabathricum L.* Leaves and Mechanisms of Action in Experimental Animals

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ABSTRACT

Objectives/Research Problem: Melastoma malabathricum L., (Melastomaceae) is a medicinally important plant known as "Senduduk". Traditionally, the leaves are used to relieve diverse pain-related ailments. Present study aims to examine the antinociceptive activity of methanolic extract of M. malabathricum (MEMM) leaves and its fractions via in vivo models of nociception.

Materials and Method: Extracts (100, 250, 500 mg/kg) were administered orally 60 minutes prior to subjection to the respective test, n=6/group. Evaluation of MEMM antinociceptive activity; chemically (acetic acid-induced abdominal constriction; ACT, formalin-induced paw licking test; FT) and thermally (hot plate test; HT) models of nociception and elucidation of mechanisms of action involved; role of opioid, vanilloid receptors, glutamatergic system and NO/cGMP pathway were determined. Continuously, MEMM, partitioned into three fractions: petroleum ether (PEMM), ethyl acetate (EAMM), and aqueous (AQMM) extracts and determine the most potent fraction. Therefore, experiment ED50 and its 95% confidence intervals (CI) values were conducted, and ACT was used to screen. Calculation, obtained, PEMM, the most effective was further used to assess the antinociceptive properties. Phytochemical screening, HPLC and GC-MS analysis were performed.

Results and Discussion: First stage, MEMM exhibited significant ($P<0.05$) antinociceptive activity, respectively. Naloxone, a non-selective opioid antagonist, failed to significantly affect the MEMM-antinociception. MEMM, significantly ($P<0.05$) reversed in the capsaicin- and glutamate-induced test. L-arginine (NO precursor), L-NAME (NO synthase's inhibitor), methylene blue; MB (cGMP's inhibitor), combination significantly ($P<0.05$) failed to change the intensity of MEMM antinociception. Second stage, PEMM exhibited significant ($P<0.05$) antinociceptive activity, respectively. Naloxone, significantly failed to reverse the PEMM-antinociception. PEMM, significantly ($P<0.05$) reversed the capsaicin- and glutamate-induced test. L-arginine, L-NAME, MB, combination significantly ($P<0.05$), failed interfering the PEMM-antinociception. Result for phytochemical screening, presence: flavonoids, tannins, saponins, triterpenes and steroids (no alkaloids). Result for HPLC analysis, MEMM, presence: flavonoids (major constituents), and GC-MS analysis, majority: palmitic acid, terpene, diterpene, □-Linolenic acid and fatty acid ester.

Conclusion: MEMM and PEMM-induced antinociceptive in this present study, supported, at least in part of the ethno-medicinal uses of M.malabathricum L. as potential candidate that exhibit antinociceptive activity with the indication of extracts contains several phytochemical compounds to be the possible evidences of the remarkable antinociceptive properties.

KEYWORDS: Melastomaceae, Herbal, Pain-killing, Natural products, Drug discovery.

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