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Investigation of the anti-nociceptive and sedative hypnotic effects of leaf methanol extract of *Ballota africana* (L.) Benth. (Lamiaceae) in mice

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Purpose: The use of medicinal plants in South Africa is an old age practice. *Ballota africana* is a commonly used medicinal plant in the country by traditional medicine practitioners to treat headaches and insomnia amongst other ailments. However, there is no information in literature to verify the effectiveness of *B. africana* in the treatment of headaches and insomnia. The study, therefore, investigated the anti-nociceptive and central nervous system depressant activities of the leaf methanol extract of this plant species in mice.

Materials & Method: Fresh leaves of *Ballota africana* were collected from Kirstenbosch Botanical Gardens, South Africa, verified by the curator of the Gardens and a taxonomist in the Department of Biodiversity and Conservation Biology, University of the Western Cape, South Africa and a voucher specimen (UWC 102 Amabeoku) deposited in the University Herbarium. Leaf methanol extract of the plant species was prepared using standard extraction methods. The acetic acid writhing and the hot plate tests were used to determine the anti-nociceptive effects while pentobarbitone induced sleep and locomotor activity tests were used to evaluate the sedative-hypnotic effect of the plant species. Phytochemical qualitative analysis, acute toxicity and HPLC studies of the plant species were also carried out using standard methods.

Results: The phytochemical qualitative analysis carried out on the dried powdered leaves of *Ballota Africana* showed the presence of triterpene steroids, saponins, tannins, flavonoids and reducing sugars. Leaf methanol extract of *B. africana* (25-400 mg/kg, i.p.), paracetamol (500 mg/kg, i.p.) or indomethacin (20 mg/kg, p.o.) significantly reduced 3% acetic acid (0.25 ml, i.p.)-induced writhes. Combined therapy of the lowest and sub effective doses of leaf methanol extract of *B. africana* (12.5 mg/kg, i.p.) and indomethacin (10 mg/kg, p.o.) which are in themselves ineffective against 3% acetic acid (0.25 ml, i.p.)-induced writhes, significantly reduced 3% acetic acid (0.25 ml, i.p.)-induced writhes. Leaf methanol extract of *B. africana* (25-400 mg/kg, i.p.) and morphine significantly delayed the reaction time of mice to thermal stimulation 15, 30, 45, and 60 min after treatment. Dimethylsulfoxide (0.25 ml, i.p.) did not significantly affect 3% acetic acid (0.25 ml, i.p.)-induced writhes or thermal stimulation. Leaf methanol extract of *B. africana* (25-400 mg/kg, i.p.) significantly and dose dependently prolonged pentobarbitone (40 mg/kg, i.p.)-induced sleep in mice. Diazepam (0.5 mg/kg, i.p.) significantly prolonged pentobarbitone (40 mg/kg, i.p.)-induced sleep in mice. Leaf methanol extract of *B. africana* (25-400 mg/kg, i.p.) significantly and dose dependently reduced the locomotor activity of mice. Diazepam (0.5 mg/kg, i.p.) significantly reduced the locomotor activity of mice. Dimethylsulfoxide (0.25 ml, i.p.) did not significantly affect pentobarbitone (40 mg/kg, i.p.)-induced sleep in mice or locomotor activity of mice. The LD50 value obtained for the leaf methanol extract of *B. africana* following oral administration was probably over 4000 mg/kg. The HPLC finger-print of the methanol extract showed characteristic peaks at the following retention times: 3.556, 9.127, 10.062, 13.499, 26.613, 29.519 and 30.166 min. In conclusion, the data obtained show that leaf methanol extract of *B. Africana* has both anti-nociceptive and sedative-hypnotics effects.

Biography

George J Amabeoku has a qualification in Pharmacology. He has lectured at Universities in Nigeria, Zimbabwe and now in South Africa. His research interest and expertise are in the field of neuro-psycho-pharmacology which he now applies to traditional medicine where he focuses on the evaluation of the neuro-psycho-pharmacological activities of medicinal plants used in South Africa with a view to validating their efficacy.

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