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Enhancing the biosynthesis of essential oil and bioactive compounds in *Agathosma betulina* using *in vitro* micropropagation technique

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The global demand for medicinal plant products has increased in the last two decades leading to overexploitation and sometimes extinction. Plant biotechnology is one of the efficient approaches used to engineer the biosynthesis of essential and/or bioactive compounds in plants. This study was aimed to develop a micropropagation protocol for *Agathosma betulina*, one of the most highly utilized medicinal plants in South Africa as well as to enhance the biosynthesis of some bioactive compounds by manipulating media compositions. Seeds and leaf tissues from explant of *A. betulina* were decontaminated thereafter, subcultured on MS media adjusted with different concentration of BA, NAA, IBA and DAA. Regenerants with well-developed root system were acclimatized for five months. Dried samples from *in vitro* cultures and acclimatized plants were extracted using dichloromethane and analyzed for phytochemical compositions using GC-MS. An efficient decontamination protocol was developed for micropropagation of *A. betulina*. Over 80% seed germination was recorded using scarification technique. Leave tissue from explant grown on ½ MS media had significantly high shoot proliferation, shoot length and number of leaves compared to the other treatments. Phytochemical analysis revealed significantly higher amounts of various phytochemicals accumulated in the leaf compared to stem and callus/roots. The most abundant phytochemicals were recorded in media containing NAA 0.5 mL^{-1} in the following order; limonene>pulegone>isomenthone (68, 39 and 33% respectively). *In vitro* cultures of *A. betulina* accumulated more phytochemicals compared to the acclimatized plant. Perhaps this could be that the phytohormones induced synthesis of certain compounds in *in vitro* culture. *A. betulina* possess a number of pharmacological properties including anticancer, antimicrobial and antioxidant. These activities are linked to inherent phytochemical contents. Hence, engineering the biosynthesis of bioactive compounds in *A. betulina* is an efficient means to meet the high demands for this plant.

Biography

Ambrose Okem has completed his PhD from University of KwaZulu-Natal and currently pursuing Post-doctoral fellowship at Cape Peninsula University of Technology in Medicinal Plant Research. He has published more than 10 papers in reputed journals and has been serving as a Reviewer of reputed journals.

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