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Antioxidative and anticholinesterase compounds from two closely related *Croton* species

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Abstract

A comparative antioxidant and acetylcholinesterase inhibitory evaluation of the extracts and isolated compounds from the leaves of *Croton gratissimus* and *Croton zambesicus* was carried out to determine their potential and suitability as substitutes for each other in the management of oxidative and neurodegenerative conditions. Four different antioxidant assays and the microplate assay for acetylcholinesterase inhibition were carried out to study the activities of the extracts and compounds. Bioassay guided fractionation was used to target antioxidant constituents of the crude extracts and ethyl acetate fractions of 20% aqueous methanol extract of *C. gratissimus* on silica gel and Sephadex LH-20 columns resulted in the isolation of kaempferol-3-O-β-6"(p-coumaroyl) glucopyranoside (tiliroside), apigenin-6-C-glucoside (isovitexin) and kampferol. The extract of *C. zambesicus* yielded quercetin-3-O-β-6"(p-coumaroyl), glucopyranoside-3'-methyl ether (helichrysoside-3'-methyl ether), kaempferol-3-O-β-6"(p-coumaroyl) glucopyranoside (tiliroside) and apigenin-6-C-glucoside (isovitexin). Three of the isolated compounds and their different combinations were also included in the bioassays. In all the assays performed, the antioxidant capacity and AChE inhibitory effects of *C. zambesicus* extracts were weaker than that of *C. gratissimus*. This suggests that *C. zambesicus* is not an acceptable substitute for *C. gratissimus*, despite the similarity in some of their constituents. Generally, the combinations of the isolated compounds showed better activities in most of the assays compared to the individual isolated compounds. This suggests mechanisms such as synergism and/or additive effects to be taking place. This means some of the extracts, isolated compounds and compound combinations could be useful in the management of neurodegenerative conditions and may serve as sources of natural neurodegenerative agents.

Biography

Dr Ashwell R. Ndhlala received his BSc Honours degree in Biochemistry from the University of Zimbabwe in 2001, first doctorate (DPhil in Biochemistry) from the same institute in 2008 and second doctorate (PhD in Ethnopharmacology) from the University of KwaZulu-Natal, South Africa in 2010. He is a Researcher at The Research Centre for Plant Growth and Development in KwaZulu-Natal South Africa. His research interests are on African Traditional Medicine. With long term goals of documenting the safety, efficacy and sustainable utilisation of African Traditional Medicine. With vast experience in toxicology, bioanalysis, microbiology, conservation methods and indigenous knowledge systems, he has contributed immensely to the knowledge of ethnopharmacology of African Traditional Medicine. He serves as a member of the Editorial Board for the South African Journal of Botany and the Journal of Bioequivalence & Bioavailability.