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Nutraceutical potential of antidiabetic metabolites from herbal tea for improving African rural livelihoods

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Plants constitute an important source of functional products for human health and nutrition in most African cultures. Albeit no safety and efficacy studies, tea processed from *Fadogia ancylantha* leaves has been traditionally used for management of diabetes and hypertension. As part of the ongoing work to add value to indigenous knowledge and natural resources, this paper presents the natural products isolated from *F. ancylantha* that have shown antidiabetic activities in C2C12 and Chang myocytes. Plants were identified by the National Herbarium and Botanical Gardens of Malawi, leaves were harvested and processed. Using bioassay-guided fractionation, bioactive compounds were isolated and characterized by various spectroscopic methods including MS, 1D and 2D NMR. The organic extract exhibited the highest relative glucose uptake in Chang cells (181.24±0.29%) and C2C12 (172.29±0.32%) while the hot and cold aqueous extracts gave lower uptakes, 145.94±0.37 and 138.70±0.52% in liver cells respectively. The polar active component provided four compounds and their chemical structures were unequivocally identified by both NMR and MS techniques as acetylchalcone, glucosidic chalcone, hydrocoumarin and glucosidic coumarin. Equimolar of pure compounds in C2C12 cells gave relative glucose uptakes of 151.06±0.11, 143.88±0.11, 170.47±0.08 and 153.76±0.09%, respectively; which were statistically higher ($p<0.05$) than 130.36±0.06 and 137.47±0.06% obtained for insulin and metformin, respectively. These results provide scientific justification for the development of effective nutraceuticals from *F. ancylantha* for management of type 2 diabetes and degenerative diseases prevalent among the African population.

Biography

Kumbukani K Nyirenda MSc, a lecturer in pharmaceutical and medicinal chemistry at the College of Medicine, University of Malawi, is presently finalizing his doctoral thesis; studying the properties of bioactive compounds from Malawian plants. As a young scientist, he was among six African recipients of the World Bank's prestigious McNamara Fellowship that culminated in a national research initiative in traditional medicines. He has contributed to a chapter in a book and published in reputable journals including Journal of Ethnopharmacology and Food Chemistry. His aspirations are to add value to his Ph.D. work through sustainable partnerships.

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