

Phytochemical Profile and in Vitro Bioactivity Studies on Two Underutilized Vegetables in Nigeria

Authors : Borokini Funmilayo Boede

Abstract : *B. alba* L., commonly called 'Amunututu' and *Solanecio biafrae* called 'Worowo' among the Yoruba tribe in the southwest part of Nigeria are reported to be of great ethnomedicinal importance but are among many underutilized green leafy vegetables in the country. Many studies have established the nutritional values of these vegetables, utilization are very poor and indepth information on their chemical profiles is scarce. The aqueous, methanolic and ethanolic extracts of these vegetables were subjected to phytochemical screening and phenolic profiles of the alcoholic extracts were characterized by using high-performance liquid chromatography coupled with diode array detector (HPLC-DAD). Total phenol and flavonoid contents were determined, antioxidant activities were evaluated using five in vitro assays to assess DPPH, nitric oxide and hydroxyl radical-scavenging abilities, as well as reducing power with ferric reducing antioxidant assay and phosphomolybdate method. The antibacterial activities of the extracts against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Salmonella typhi* were evaluated by using agar well diffusion method and the antifungal activity evaluated against food-associated filamentous fungi by using poisoned food technique with the aim of assessing their nutraceutical potentials to encourage their production and utilization. The results revealed the presence of saponnin, steroids, tannin, terpenoid and flavonoid as well as phenolic compounds: gallic acid, chlorogenic acid, caffeic acid, coumarin, rutin, quercitrin, quercetin and kaemferol. The vegetables showed varying concentration dependent reducing and radical scavenging abilities from weak to strong compared with gallic acid, rutin, trolox and ascorbic acid used as positive controls; the aqueous extracts which gave higher concentrations of total phenol displayed higher ability to reduce Fe (III) to Fe (II) and stronger inhibiting power against hydroxyl radical than the alcoholic extracts and in most cases exhibited more potency than the ascorbic acids used as positive controls, at the same concentrations, whereas, methanol and / or ethanol extracts were found to be more effective in scavenging 2, 2-diphenyl-1-picryl hydrazyl radical and showed higher ability to reduce Mo (VI) to Mo (V) in total antioxidant assay than the aqueous extracts. However, the inhibition abilities of all the extracts against nitric oxide were comparable with the ascorbic acid control at the same concentrations. There were strong positive correlations with total phenol (mg GAE/g) and total flavonoid (mg RE/g) contents in the range TFC ($r=0.857-0.999$ and $r=0.904-1.000$) and TPC ($r=0.844-0.992$ and $r=0.900-0.999$) for *Basella alba* and *Senecio biafrae* respectively. Inhibition concentration at 50 % (IC₅₀) for each extract to scavenge DPPH, OH and NO radicals ranged from 32.73 to 1.52 compared with control (0.846 - -6.42) mg/ml. At 0.05g/ml, the vegetables were found to exhibit mild antibacterial activities against *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Salmonella typhi* compared with streptomycin sulphate used as control but appreciable antifungi activities against (*Trichoderma rubrum* and *Aspergillus fumigates*) compared with bonlate antibiotic positive control. The vegetables possess appreciable antioxidant and antimicrobial properties for promoting good health, their cultivation and utilization should be encouraged especially in the face of increasing health and economic challenges and food insecurity in many parts of the world.

Keywords : antimicrobial, antioxidants, extracts, phytochemicals

Conference Title : ICGFS 2016 : International Conference on Global Food Security

Conference Location : Miami, United States

Conference Dates : March 24-25, 2016