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Compositional variations of nutrients and phytochemicals in two species of yams (*Dioscorea alata, Dioscorea esculenta*) and the tuber crop (*Xanthosoma sagittifolium*)

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A study was carried out to determine the levels of starch, protein, crude fat, crude fiber, ash and to compare the phytochemical content (saponins, flavanoids and alkaloids) and mineral elements (Calcium, Magnesium, Iron, Potassium and Zinc) in selected species of yams (*Dioscorea alata* (Rajala and Hingurala), *Dioscorea esculenta* (Kukulala)) and tubers (*Xanthosoma sagittifolium* (Kiriala)). Crude flour samples from each species were prepared by oven drying cut flakes at 40 °C for 30 hours followed by grinding. The chemical composition was analysed using the AOAC (1995) method while the starch content was analysed using the acid hydrolytic method. Three replicates from each sample were oven-dried and the dry ashing was followed by elemental analysis using an Atomic Absorption Spectrophotometer to determine the mineral elements. Phytochemicals were determined gravimetrically with slight modifications to the methods described by Okwu & Nadu (2006). The chemical composition, phytochemicals and mineral constituents were calculated on the dry weight basis and the results were analysed to compare the crude levels of nutrients and phytochemicals in the studied varieties using one way ANOVA of Minitab (version-14).

There was no significant difference in total starch ($P > 0.05$) between the studied varieties. The protein levels ranged from 2.66 ± 0.21 to 10.16 ± 0.64%, with *D. alata* having a higher protein level in comparison with the other species tested. The crude fat levels in tubers ranged from 1.5 ± 0.2 to 2.3 ± 0.1 %, with the highest level being observed in Kiriala. The crude fibre content in tubers was found to range from 1.8 ± 0.1 to 2.33 ± 0.15 % and the ash levels ranged from 1.66 ±0.21 to 2.33 ±0.21 %. Crude saponin levels were significantly higher ($P<0.05$) in yams while Rajala and Kiriala contained comparable levels ($P > 0.05$; 12.98 ± 0.61 and13.11± 0.52 mg 100 g^{-1}). Kukulala had the highest crude saponin content of 20.01± 0.46 mg 100g^{-1}. A high amount of crude flavonoids were observed in Kukulala and Kiriala (12.4 ± 0.46 and 11.26 ± 0.46 mg 100 g^{-1}). A considerable level of alkaloids was present in Hingurala and Kukulala (1.64 0.04± and 1.89 ±0.02 mg 100 g^{-1}). The yams were rich in Calcium and Iron while a high level of Magnesium was observed in Kiriala (45.27± 0.31 mg 100g^{-1}). High levels of Potassium were observed in all species. Results revealed a high nutritional significance and medicinal importance in the studied species due to the nutrients and phytochemicals present.

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