SECTION E2

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Studies on the carotenoids and the *in-vitro* bioaccessibility of β-carotene of jakfruit (*Artocarpus heterophyllus*) kernel from the major cultivations of Sri Lanka

A M B Priyadarshani*, E R Jansz and H Peiris
Department of Biochemistry, University of Sri Jayewardenepura, Gangodawila, Nugegoda

Ripe jakfruit (*Sinhala: waraka*) is widely available in Sri Lanka. In present study the specimens (n=6) collected from the major cultivations in the Kurunegala and Matale districts, the major jakfruit producing districts in Sri Lanka showed a marked variations from specimen to specimen not only in total carotenoid content but also in components. Carotenoids were extracted with acetone and separation was done by open column chromatography (OCC). Identification was carried out by position/order of elution in OCC, uv/visible spectrophotometry, thin layer chromatography (TLC), chemical tests; HCl vapour test, epoxide-furanoid rearrangement test, iodine catalyzed *cis-trans* isomerisation test and peak enrichment in reverse phase high performance liquid chromatography (RP-HPLC). Quantification was done by HPLC. The following carotenoids were detected from ripe jakfruit; β-carotene (traces to 50), α-carotene (traces to 20.5), lutein (2.7 to 221.5), unidentified I (traces to 33.7), unidentified II - *trans* isomer (8.3 to 45.5), unidentified II - *cis* isomer (11.1 to 59.9), unidentified III (non-detectable amount to 32.2) and unidentified IV (traces to 32.8), all in units of µg/100g of dry weight (DW). The major carotenoids common to all specimens were lutein and unidentified II. Theoretically calculated retinol equivalent (RE) and retinol activity equivalent (RAE) varied from traces to 10 and 5/100g DW, respectively. This made prediction of percentage contribution from this fruit to the recommended daily allowance (RDA) of pro-vitamin A per portion impossible. *In-vitro* bioaccessibility was performed by simulating the gut physiology. Results showed a low bioaccessible β-carotene (~ 8%) probably due to the nature of the rubbery texture of the kernel. *In-vivo* mastication and re-gurgitation prior to *in-vitro* digestion showed a higher accessibility (12-18%) of β-carotene. Crocetin; a carboxylic acid carotenoid was extracted into the methanolic KOH water extract after saponification and it was tentatively identified by its chemical characteristics and spectrum. The kernel subjected to autoclaving (121 °C). This resulted in a new carotenoid released into the water layer with marked changes in carotenoid profile. In addition, there was isomerisation in the case of β-carotene with the reduction in total carotenoid concentration indicating that canned products will be even less significant contributor to the recommended daily allowance (RDA) of vitamin A.

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*buddhiathapaththu@yahoo.com Tel: 011-2758558