638/E2

A novel water-soluble carotenoid derivative from palmyrah (*Borassus flabellifer* L) fruit pulp

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

Natural yellow water-soluble compounds are not available for use in the food industry. A possible solution can be based on these findings as for the first time, a water-soluble carotenoid is reported from a plant source, palmyrah fruit pulp (*Borassus flabellifer* L). The substance was extracted into acetone. On partition, a yellow colour was removed into the water layer and found out to be unextractable even into the 100% diethyl ether. The spectrum of the compound showed the characteristic three peaks of carotenoids. A freeze-dried water extract was reacted with naringinase at pH 4 (for rhamnosidase action) and 5.25 (for β-glucosidase action). Hydrolysis resulted in the release of glucose and rhamnose. As detected by thin layer chromatography (Tlc) rhamnose content was much smaller. Enzymic hydrolysis resulted in the ability to extract the product into petroleum ether. After hydrolysis parameters measured changed as follows; λ_{max} from 413, 443, 479 to 401, 426, 462; R_f on Tlc on 5% methanol in toluene from 0 to 0.89; retention time in high performance liquid chromatography (HPLC) (solvent system used was acetonitrile: methanol: tetrahydrofuran 58: 35: 7) from 4 to 28 min; response to epoxide tests (HCl vapor test and epoxy-furanoid rearrangement test) while the water-soluble carotenoid had no epoxy groups, after hydrolysis gave two epoxy groups which was compatible with the results of Tlc and HPLC data. The product was in *trans* configuration. Theoretically the parent carotenoid is likely to have had two hydroxy groups for the glycosylation, which during deglycosylation resulted in the formation of two epoxy groups. This is probably due to mechanism of glycosidic enzymic hydrolysis which proceeds through charged centers favoured the formation of epoxides. Palmyrah is a distinctive fruit as it contains substances for the glycosylation i.e.: substrates; glucose and rhamnose as well as enzymes; glycosyl and rhamnosyl transferases, which normally act on β-sitosterol to form glycosides. It is hypothesized as palmyrah fruit contains several underivatised carotenoids, one of which acts as a substrate analog of β-sitosterol. The water-soluble derivative or synthetic analogs could have commercial implications in the food industry as a food colourent.

Acknowledgement: Grant No: IPICS SRI:07

*erjansz@sjp.ac.lk Tel: 011-2803578