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Recognition of foods responsible for Hypercarotenemia from serum carotenoid metabolic profiles

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Hypercarotenemia is a condition now commonly seen among young infants in Sri Lanka mainly due to the excessive intake of carrot, pumpkin and papaw. Infants and children with Hypercarotenemia have yellow skin (palms and soles) mainly because of the deposition of carotenoids in the fatty tissue. The objective of this study was to determine the food types that the hypercarotenemic infants or children have ingested, from the serum carotenoid profile. A sample of venous blood was collected from the hypercarotenemic infants or children and serum was separated. The carotenoids were extracted into hexane and carotenoid profile determined using Reverse Phase High Performance Liquid Chromatography. (RP-HPLC) (Mobile phase – 58 Acetonitrile: 35 Methanol: 7 THF) The carotenoids in papaw, carrot and pumpkin were also extracted and carotenoid profiles determined as above.

The carotenoid profile of carrot has peaks at Retention Time (RT) 37 and 39 min, which are due to α and β carotene respectively. In pumpkin in addition to the α and β peaks, a luetin peak (RT= 5.5 min) is observed. Prominent peaks at 15 to 15.5 min (β- cryptoxanthin) and at 39 min (β carotene) are observed for papaw. The peaks which correspond to the α- carotene and β- carotene are indicated when carrot and pumpkin are high in the diet. Similarly when papaw consumption is high an additional peak at 15.5 min corresponding to β-cryptoxanthin is observed. This can be taken as a marker for papaw consumption. The polyhydroxy metabolites in the profile indicate that the excess carotenoids are hydroxylated to be removed. Out of the hypercarotenimics (n=15) studied, 67% had high amount of papaw in their diet. As a result of that the β-cryptoxanthin levels were high (mean = 30.9 µg/dL) compared to those who had not consumed papaw as their major carotenoid bearing food. For the other subjects, the major contribution was from the carrot and / or pumpkin as their α –carotene (mean = 36.3 µg/dL) and β-carotene (mean = 31.5 µg/dL) levels were high. If pumpkin contributes a high peak appears in the polyhydroxy region.

Results also indicate that more than in 80% of investigated infants and children α- carotene levels are higher than their β- carotene levels. This may be due to the high affinity of the β-carotene to bioconversion than α- carotene by physiological process.

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