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Metabolic fate of palm tocotrienols in human postprandial plasma model

S Fairus[1], MN Rosnah[1], HM Cheng[2] K Sundram[1]
[1]*Food Technology & Nutrition Unit, Malaysian Palm Oil Board, Kuala Lumpur, Malaysia*
[2]*Faculty of Medicine, University of Malaya, Malaysia*

Background – Detection of tocotrienols in human plasma has proven difficult even after long periods of supplementation. The rapid disappearance of tocotrienols has raised questions about their physiological effects in humans.
Objectives – To elucidate the metabolic fate of palm tocotrienols in humans using a postprandial model system.
Design – Seven healthy volunteers (four males & three females) were conditioned on a tocotrienol-free diet for seven consecutive days. On the eighth day, all volunteers were administered a single dose of vitamin E supplement, either 1010 mg palm vitamin E (318 mg α-tocopherol + 692 mg tocotrienols) or 1098 mg α-tocopherol in the form of capsules. Blood was sampled at baseline (fasted), 2, 4, 6, 8 & 24 h after supplementation. Tocopherols & tocotrienols concentration in total plasma, triglyceride rich particles (TRP), LDL & HDL fractions for each bleeding interval was determined.
Outcomes – Following the intervention with palm vitamin E, tocotrienols were detected in total plasma, TRP, LDL and HDL. However, the concentrations of the tocotrienols detected were minimal, while α-tocopherol remained the major circulating plasma vitamin E isomer. Findings showed that tocotrienols appeared in the blood stream at 2 h interval & disappeared within 24 h. Tocotrienols concentration in total plasma plasma, TRP & LDL peaked between 4 to 6 h; in HDL, tocotrienol concentrations peaked at 8 h after supplementation. α-tocopherol was the major vitamin E detected in plasma despite supplementation with either α-tocopherol or the tocotrienol-rich palm vitamin E preparations.
Conclusions – Rapid disappearance of tocotrienols in plasma and all lipoprotein fractions suggest that tocotrienols have a very short duration of absorption & distribution in circulating blood.

Influence of dietary omega-3 polyunsaturated fatty acid (PUFA) supply on brain gene expression

AP Jayasooriya[1,2] , RS Weisinger[2], HS Weisinger[3], M Mathai[2], L Puskas[5], K Kitajka[5], N Chen[2], ML Ackland[4], AJ Sinclair[1]
[1]*Department of Food Science, RMIT University, VIC 3001*
[2]*Howard Florey Institute, University of Melbourne VIC 3010*
[3]*Department of Optometry, University of Melbourne, VIC 3010*
[4]*School of Biological and Chemical Sciences, Deakin University, VIC 3125*
[5]*Laboratory for Functional Genomics, Hungarian Academy of Sciences, Szeged, H-6701, Hungary*

Background - The functional roles of omega-3 polyunsaturated fatty acids (PUFA) are thought be mediated by the modulation of physico-chemical properties of the cell membrane and eicosanoid metabolism. Recent evidence suggests that omega-3 PUFA might also play a pivotal role in regulation of body functions through the modulation of its genetic apparatus
Objective - To determine the influence of dietary omega-3 PUFA supply on brain gene expression.
Design - Female rats were fed with a α-linolenic acid (ALA) sufficient (CON) or deficient (DEF) diet throughout gestation and lactation. Three groups of male offspring were studied: (1) pups maintained on CON diet, from mothers on CON diet, CON (n= 4); (2) pups maintained on DEF diet, from mothers on DEF diet, DEF (n=4) (3) pups maintained on CON diet from weaning ((3 weeks of age), from mothers on DEF diet, DEF-CON (n=4). Brain gene expression of weanlings and adult offspring were analysed by microarray technique. Confirmation of prominent microarray results was done by RT-PCR.
Outcomes - Compared to CON weanlings, a total of 24 known genes and expressed sequence tags (ESTs) were differentially expressed in DEF weanlings. Compared to CON adults, a total of 129 genes and ESTs were differentially expressed in adult DEF offspring; a total of 12 genes and ESTs were differentially expressed in adult DEF-CON animals. Over-expression of the zinc transporter 3 gene was identified as the most prominent change in gene expression due to omega-3 PUFA deficiency.
Conclusions - Dietary omega-3 PUFA supply influences the gene expression apparatus of the brain and it may be one of the mechanisms responsible for the physiological actions of the omega-3 PUFA.