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Docosahexaenoic and Eicosapentaenoic Acid as Functional Food Ingredients

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Combinations of DHA and EPA have been shown to effectively reduce cardiovascular death in patients with coronary heart disease. Occlusions of coronary arteries in dogs lead to ventricular fibrillation which could be avoided by concomitant infusion of free EPA and DHA. Obviously local lipases in the myocardium are not able to release n-3 fatty acids acutely from cell membranes. Further in vitro studies have shown that only free n-3 fatty acids are able to suppress fibrillation. Therefore it may be an option to maintain higher free n-3 fatty acid levels in serum to claim more efficacy in reduc-ing dangerous arrhythmias. To clarify whether a daily intake of 0.85 grams or a once weekly intake (5.95 grams) of ethyl esters of EPA and DHA (ratio 1.25 to 1.00) is superior in maintaining higher free serum levels 12 healthy probands (33 + 8 years old, 10 women, 2 men) were included in a cross-over study. During the whole study period they were not allowed to eat fish. After a run-in period of two weeks subjects were randomly allocated either to receive 1 capsule per day (0.85 g) or 7 capsules once a week for six weeks, followed by a four-week wash-out period. Then the probands received the other regime for six weeks followed by four weeks of wash-out. Blood samples were taken at weekly intervals - 24 hours after intake of one capsule and 7 days after intake of 7 capsules. Furthermore, blood samples were obtained on four consecutive days at week 5 to follow the increase and decrease after high dose supplementation. Free and total serum n-3 fatty acids were determined as methyl esters by gaschromatography. The determination of EPA and DHA serum concentration in weekly intervals (at trough levels) showed significantly higher levels on the daily regime for free EPA and DHA as well as for total EPA and DHA. The daily determinations at week five showed that the once-week high dose supplementation resulted in lower serum concentrations 48 - 72 hours after intake than the daily regime. Therefore a daily supplementation of a smaller amount of n-3 fatty acids seems to be superior to a once weekly intake of a high dose regarding free and total EPA and DHA concentrations in serum.