

# **Concentration of Malondialdehyde, Retinol and Tocopherols ( $\alpha$ , $\beta$ , $\gamma$ , $\delta$ ) in Human Plasma after Supplementation of Different Oils - Fish, Echium, Linseed and Olive.**

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**Background:** Due to the supplementation of high PUFA containing plant and marine oils the oxidative stress could be increased in the study population. The aim was to investigate the concentration of lipophilic antioxidants (retinol & tocopherols) and of malondialdehyde (MDA) as marker of lipid peroxidation in plasma at baseline and during the supplementation of four test oils (fish oil mixed in olive oil [FO], echium [EO], linseed [LO], olive [OO]). **Design:** After a two week baseline period to receive baseline values (17 g baseline oil; Western diet) the different test oils (17 g/d) were supplemented during an eight weeks period. Subgroups with different mean age, BMI and blood lipids were included. All subjects were instructed to consume no further olive oil and no *n*-3-rich foods and oils, e.g., linseed oil.

**Results: I) Number of double bonds and tocopherols in test oils:** The daily consumed oils (17 g) have different portions of PUFA and varying amounts of double bonds (DB) [FO: **2 g** 5&6 DB, 6:1; EO: **10 g** 3&4; 4:1; LO: **5 g** 3 DB; OO **no** DB  $\geq$  3]. In addition, the oils showed different contents of tocopherol equivalents (FO 21.4 mg; EO 15.9 mg; LO 55.8 mg; OO 5.9 mg/100 g). **II) MDA and tocopherols in plasma:** The plasma MDA concentration at baseline did not differ between the four test groups. During the supplementation of FO and EO MDA increased significantly.  $\alpha$ -Tocopherol equivalents ( $\alpha$ -TE) and retinol decreased in plasma of FO and EO groups at day 7 which did rise again during the study (d 56). In contrast, in the LO and OO groups MDA,  $\alpha$ -TE and retinol remained unchanged compared to baseline. In general, plasma  $\gamma$ -tocopherol increased in association to its content in the test oils. Furthermore, higher age, metabolic syndrome and heavy smoking were associated with higher plasma MDA while younger subjects ( $\leq$  35 y) had lower tocopherol status at baseline.

**Conclusion:** The consumption of oils containing high amounts of highly unsaturated FA was associated with increased MDA in plasma. These oils have to be analysed for MDA content (ideally before supplementation) to account for oral MDA intake during oil supplementation and to distinguish between the endogenously synthesised MDA.