Bioavailability of long chain n-3 fatty acids from ready-to-eat meals enriched with omega-3 oil and from microencapsulated omega-3 oil powder

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Background: Intake of LC n-3 PUFA is often low due to low consumption of oily sea food. As an alternative, fish liver oil in powder form has been suggested for fortification of foods. In the present study we investigated the bioavailability of n-3 fatty acid from microencapsulated powder compared to n-3 fatty acid from meals enriched with cod liver oil.

Methods: Participants (N=99, age ≥ 50 years) of this 4-week double-blinded dietary intervention study were randomized into three groups. Group 1 (n=38) received ready-to-eat meals enriched with cod liver oil and placebo powder, group 2 (n=30) received microencapsulated cod liver oil powder and regular meals; and group 3 (n=31) was the control group which received placebo powder and regular meals. Blood samples from fingertip where collected at baseline and endpoint and analysed for fatty acids.

Results: Seventy seven subjects finished the study (79.7%). EPA and DHA increased significantly in both intervention groups ($P < 0.05$) but did not change in the control group. Comparable results were for omega-3 index and the n-3/n-6 ratio ($P<0.05$) neither changed in the control group.

Table 5 : Whole blood FA measurements from fingertip test

	Enriched meal group (n=27)	n-3 powder group (n=25)	Control group (n=25)
EPA C:20:5			
t_0	1.15 ± 1.1	0.83 ± 0.3	1.06 ± 0.4
t_1	1.91 ± 0.7*	2.02 ± 0.7*	1.13 ± 0.4
DHA C:20:6			
t_0	3.04 ± 1.0	3.12 ± 0.7	3.40 ± 0.8
t_1	3.62 ± 0.8*	3.69 ± 0.7*	3.42 ± 0.6
n-6/n-3 ratio			
t_0	8.52 ± 3.8	10.25 ± 3.9	7.64 ± 2.6
t_1	4.23 ± 1.6*	4.77 ± 3.1*	7.58 ± 2.3
Omega-3 index[1]			
t_0	5.66 ± 1.7	5.51 ± 1.0	5.99 ± 1.2
t_1	7.08 ± 1.5*	7.38 ± 1.5*	6.03 ± 1.0

Data are shown as means ± SD

t_0 = baseline t_1 = endpoint

* Significant difference between baseline and endpoint

[1]Omega-3 index calculated from whole blood using formula:

EPA + DPA + DHA (%) X 0.95 + 0.35

Conclusions: The results show that after four weeks of regular consumption of n-3 powder or meals enriched with cod liver oil EPA, DHA, n-3/n-6 ratio and omega-3 index change in agreement with the intake of n-3 fatty acids. The study also shows that the bioavailability of n-3 fatty acids in encapsulated powder form is very similar to bioavailability of n3- fatty acids from meals enriched with liquid cod liver oil.

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