

Omega-3 and soy may protect against pollution harm: Study

23-Sep-2008 - **Supplements of omega-3 or soy may protect the heart against certain damaging effects of air pollution, according to a new study from an international team of researchers.**

Exposure to high levels of particulates from vehicle exhaust and industrial emissions is known to detrimentally affect the heart, possibly by inducing oxidative stress. Particulate matter smaller than 2.5 micrometres (PM2.5) may also inhibit the action of protective antioxidant enzymes in the body, such as copper/zinc (Cu/Zn) superoxide dismutase (SOD), manganese SOD, and glutathione peroxidase (GSH-Px).

Supplementation with omega-3 or soy may cause an increase in Cu/Zn SOD activity and reduced glutathione (GSH) levels, according to findings of a study published in the journal *Environmental Health Perspectives*.

The greater protective effects were observed following omega-3 supplementation, which the researchers said could be due to the different types and amounts of polyunsaturated fatty acids (PUFAs) in the two supplements: fish oil contains EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid), while soy oil contains ALA (alpha-linolenic acid).

"This is the first study to evaluate the impact of supplementation with omega-3 polyunsaturated fatty acids on biomarkers of response to oxidative stimuli related to air pollution exposure among individuals in a non-controlled environment," wrote researchers.

Study details

Researchers recruited 52 elderly nursing home residents (average age 76.5, average BMI 26.1 kg/m²) and observed them for seven months. An initial three-month stage with no supplementation was followed by four months of receiving either fish oil or soy oil supplements. There was no placebo group, and the subjects acted as their own controls.

The randomised controlled trial used two gram doses of the oils. The fish oil capsules contained 52.4 per cent DHA, 25 per cent EPA and 5.8 per cent DPA (docosapentaenoic acid). The soy oil capsules contained 6.78 per cent ALA, 16.3 per cent saturated fat, 52.7 per cent linoleic acid (omega-6), and 22.5 per cent oleic acid (omega-9).

The levels of PM2.5 were the same as the smoggy surroundings outside, which meant that the participants had chronic exposure to particulate matter.

Analysis of blood samples taken before and during supplementation showed that consumption of the omega-3 supplements was associated with lower levels of oxidative damage in blood cells, with the greater effect observed in the fish oil group.

Moreover, Cu/Zn SOD activity increased by 49 and 23 per cent in the fish and soy oil groups respectively. GSH levels increased by 62 and 55 per cent in the fish and soy oil groups respectively, report the researchers.

While no effect on levels of lipoperoxidation (LPO) products – a marker for oxidative stress – was observed in the soy oil group, a 72.5 per cent decrease in LPO products was recorded in the fish oil group.

"A major concern with dietary supplementation is the effective dose," stated the researchers. *"The fact that fish oil appears to be more effective against oxidative stress related to PM2.5 exposure than soy oil suggests that the small amount of ALA - further elongated in EPA and DHA - in soy oil might be insufficient to protect against the adverse effects of PM2.5 exposure."*

"We based our results on a limited sample size but suggest that essential fatty acids might play an important role in modulating the impact of PM on health, which warrants further investigation in larger populations," they concluded.