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The effect of seaweed derived polyphenols on inflammation and oxidative stress *in vivo* - The SWAFAX study

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Cardiovascular disease (CVD) is currently the leading cause of death worldwide(1). Epidemiological evidence has shown a positive effect of polyphenol intake on CVD risk(2). Seaweed is a rich source of polyphenolic compounds, which can comprise 5 to 15% of the dried weight(3). Some studies suggest that the potential antioxidant and anti-inflammatory benefits of seaweed-derived polyphenols may yield highly bioactive components with commercial potential for food and pharma applications(4). The aim of this randomised, double-blind, placebo controlled, crossover design study was to investigate the biological activity of a food grade seaweed polyphenol extract (CEVA, France) in terms of reducing oxidative damage to DNA, modulation of inflammatory responses and reduction on chronic, low level inflammation *in vivo*.

Volunteers were randomised to receive either a capsule containing 100 mg seaweed extract or a matched placebo daily for an 8 week period, with an 8 week washout period between each treatment. Fasting blood and urine samples were taken from each volunteer at 4 time-points during the study, at baseline and completion of the 2 treatment phases.

80 apparently healthy volunteers (42·7 (SD 7·1) years, BMI 30·2(SD 3·9) kg/m^2) were recruited onto the study for 24 weeks; $n = 78$ completed both treatment periods. Blood and urine samples were analysed for an array of outcome measures including DNA damage to lymphocytes (Comet assay), intracellular cytokine activity (flow cytometer) (in preparation), C-reactive protein (CRP), triglycerides and isoprostane levels.

Parameter ($n = 78$)	Average baseline value (both)	Placebo treatment effect (change from pre)	Seaweedtreatment effect (change from pre)	Sig.
CRP(mg/l)[1]	2·67 (3·90)[3]	0·01 (3·30)	−0·83 (4·9) (31%↓)	NS
Cholesterol (mmol/l)	5·20 (0·77)	−0·06 (0·57)	−0·10(0·57)	NS
Triglycerides (mmol/l)	1·51 (0·94)	0·01 (0·82)	0·04(0·96)	NS
HDL (mmol/l)	1·37 (0·32)	−0·01 (0·15)	−0·03 (0·15)	NS
LDL (mmol/l)	3·16 (0·10)	−0·08 (0·50)	−0·06 (0·50)	NS
DNA damage (basal) %	6·72 (2·48)	0·74 (2·86)	−0·41(3·13)	NS
DNA damage (+H_2O_2) %	34·20 (7·00)	−1·56 (6·60)	−2·03 (6·40)	NS
F_2Isoprostanes (pg/ml)[2]	392 (219)	−10 (182)	−6 (138)	NS

[1]Outliers removed s51, s16; [2]Analysis performed on n = 40 only; [3]Values are mean (SD); NS = not significant.

There were no significant changes in either the placebo or seaweed treatment group for any of the parameters measured. However, there was a 31% decrease in CRP, although this did not reach statistical significance. The inflammatory markers are yet to be analysed but may provide additional information on the anti-inflammatory potential of a range of novel seaweed extracts that could be further exploited.

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