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Nutraceutical properties of a *Tisochrysis lutea* enriched diet: a 1-month study in rats

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Abstract:

Tisochrysis lutea is a marine microalga, which contains bioactive compounds such as polyunsaturated fatty acids and fucoxanthin. In this 1-month study, the effects of a diet containing 20% *T. lutea* F&M-M36 were investigated in rats. No adverse effects regarding food consumption, growth or animal behavior were observed, nevertheless rats fed *T. lutea* showed a tendency to a reduction in body weight gain and a significantly higher water intake compared to controls fed a standard diet (AIN-76). The high Na⁺ content of the algal biomass induced a huge increase in urinary Na⁺ and urine production, but blood pressure, creatinine and urea blood levels as well as kidney histopathology were not suggestive of renal impairment. In rats fed the *T. lutea* diet a significant increase in HDL and decreased plasma triglycerides, with an increased excretion of fecal lipids were observed. These animals showed also a significant increase of PPAR γ and UCP-1 and a significant reduction of APOA-1 and LPL hepatic gene expression, compared to controls. These data indicate that a diet supplemented with 20% of *T. lutea* biomass modulates the expression of genes involved in lipid metabolism, suggesting that this microalga might represent a promising source of functional foods for the prevention of dyslipidemias and associated diseases. However, the high Na⁺ content of the algal biomass may represent a safety issue, which must be solved before this microalga can be used in humans.