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Nutraceutical properties of *Arthrospira platensis* and *Isochrysis T. lutea* rich diets in rats

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Microalgae are recognized as potential sources of food due to their balanced biochemical composition and high nutritional value, and possess several, promising health promoting activities. Male Sprague-Dowley rats were fed a diet containing 20% *A. platensis* F&M-C256, *Isochrysis T. lutea* (clone T-iso) F & M-M36 or a control diet (AIN-76), for 1 month. The microalgae-rich diets were both well-tolerated; food consumption, clinical parameters, body weights were not affected, and palatability and digestibility were comparable to that of the control diet. Clinical biochemistry parameters did not indicate any renal or hepatic impairment, total cholesterol and LDL were unchanged, but a significant increase in HDL and a decreased plasma triglycerides were found in both microalgae-fed groups, with an increased excretion of fecal lipids. In *A. platensis* group, we observed a significantly increased expression of hepatic PPAR- α ; in *Isochrysis T. lutea*-fed rats the hepatic expression of PPAR γ and UCP-1 genes were significantly increased while a reduction of the expression of APOA-1 and LPL genes was observed, compared to controls. *A. platensis* (Spirulina) contains compounds such as C-phycoerythrin and γ -linolenic acid and *Isochrysis T. lutea* has high level of docosahexaenoic acid (DHA) and fucoxanthin, all known for their nutraceutical properties. The ability to modulate the expression of PPAR- α in the liver, suggests a fibrate-like effect of *A. platensis* whereas, the effect of *Isochrysis T. lutea*-rich diet seems to be related to PPAR γ signaling, without adverse effects such as hepatic steatosis and fluid retention, commonly observed with PPAR γ agonists. These data showed that a balanced diet, supplemented with 20% of *A. platensis* F&M-C256 or *Isochrysis T. lutea* F & M-M36, modulates the expression of genes involved in lipid metabolism, suggesting that these two microalgae might represent an emerging and promising sources of functional foods or nutraceuticals for the prevention, with different mechanisms, of dyslipidemias and associated diseases.