BOOK OF ABSTRACTS

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POSSIBLE APPLICATIONS OF *TISOCHRYSIS LUTEA* F&M-M36 AND *ARTHROSPIRA PLATENSIS* F&M-C256 EXTRACTS AS ANTINFLAMMATORY AGENTS

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Functional foods offer, in addition to their nutritional value, a health advantage due to the beneficial activities of their natural bioactive components. These beneficial activities may be interesting in order to help in the control of several inflammation-based diseases acting synergistically with the common used drugs (e.g. NonSteroidal Anti-Inflammatory Drugs, NSAIDs, glucocorticoids) and consequently reducing their relevant side effects [1, 2, 3]. In this context, microalgae represent potential functional foods rich in compounds with biological activities that are interesting for human health, such as antioxidant, anti-inflammatory, and anti-lipidemic compounds [4, 5, 6, 7]. The aim of the study was to evaluate the anti-inflammatory effects of the methanolic extract of *Tisochrysis lutea* F&M-M36 (METiso) and the aqueous extract of *Arthrospira platensis* F&M-C256 (AEAp) by determining their inhibitory effects on pro-inflammatory mediators in lipopolysaccharide (LPS)-stimulated murine macrophage (RAW264.7 cells). Their effects were compared to those of pure fucoxanthin (FX) and phycocyanin (PC).

The expression of cyclooxygenase-2 (COX2), cytokine-inducible nitric oxide synthases (iNOs) and heme oxygenase-1 (HO-1) genes was measured by RT-PCR in the cellular lysate and Prostaglandin E2 (PGE2) concentration was quantified in the culture medium by using a competitive enzyme immunoassay.

The METiso was able to reduce the LPS-stimulated production of PGE2, dose-dependently, exhibiting a higher effect compared to that of FX at a concentration comparable to that present in the microalgal biomass. On the contrary, only the water-soluble phycobiliprotein PC, modulated significantly the expression of the pro-inflammatory genes COX2 and iNOs. However, both METiso, AEAp and single compounds up-regulated the expression of HO-1 in the presence of LPS, suggesting the involvement of the nuclear factor erythroid 2–related factor2 (Nrf2) signaling pathway that plays an important role in inhibiting the production of pro-inflammatory cytokines.

In conclusion, these preliminary results indicate that METiso and AEAp extracts inhibit inflammatory responses via the up-regulation of Nrf2/HO-1 pathway and METiso was also able to directly act on COX2 reducing the PGE2 production. These two microalgae have potential for the control of inflammatory chronic diseases and could be potentially used as antinflammatory agents.

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