



Marine microalgae are a very large group of organisms; from 30000 to more than 200000 species live in the oceans

- They comprise a largely unexplored group of organisms
- Collection of microalgae from the natural environment is inexpensive and non-destructive
- They can be massively cultivated in the laboratory using PHOTOBIOREACTORS

Photobioreactors allow cultivation under a wide variety of conditions

- Modulation of chemical and physical parameters can increase the growth rate
- Minimization of costs to produce algal biomass.

microalgal extracts on tumor and normal human cell lines, following the experimental procedure described below.

**EXTRACTION** → **MTT ASSAY** → **REAL TIME** → **WESTERN BLOTTING** → **FLOW CYTOMETRY**

- EXTRACTION:** We perform different types of extraction protocols, in collaboration with chemical partners
- MTT ASSAY:** Viability assay to study the potential antiproliferative effects of extracts
- REAL TIME:** RT<sup>2</sup> Profiler PCR Arrays kit (Qiagen) to study variation in gene expression levels
- WESTERN BLOTTING:** Western Blot to study the variation in protein expression levels
- FLOW CYTOMETRY:** Flow cytometry distinguish cells different phases of the cycle.

Carotenoids are associated with the prevention of age-related macular degeneration, cataract, certain cancers, rheumatoid arthritis, muscular dystrophy and other problems. As microalgae represent a renewable source of carotenoids, there is the need to find species with high carotenoid content and that can be cultivated in large scale.

Green microalgae with high growth rate under controlled laboratory conditions. We investigated the antioxidant and protective effects of *T. suecica* against oxidative damage in a human cell line treated with hydrogen peroxide. We demonstrate the radical scavenging activity of the extract and the increase in the expression of genes and proteins involved in cell protection and repair mechanisms after oxidative damage.

**Fig.2.** Cell viability of human lung adenocarcinoma cells treated with H<sub>2</sub>O<sub>2</sub> (+) and recovery effect of the extract. Control is represented by the horizontal line. Significant difference between the treated groups is indicated by asterisks.

**Fig.3.** Oxidative stress response expression in human lung adenocarcinoma cells treated with H<sub>2</sub>O<sub>2</sub> (+) and recovery effect of the extract. Control is represented by the horizontal line. Significant difference between the treated groups is indicated by asterisks.

15.11 | 13:30

AMPH. 1.8 (CP)

**SUSTAINABLE AND HIGH-EFFICIENT PRODUCTION**

**OF TETRASELMIS SUECICA AS INNOVATIVE PRODUCT**

**WITH HIGH BIOLOGICAL VALUE FOR COSMECEUTICAL MARKET**

## CHRISTIAN GALASSO

STAZIONE ZOOLOGICA OF NAPLES "ANTON DOHRN", INTEGRATED MARINE ECOLOGY DEPARTMENT, MARINE BIOTECHNOLOGY LAB

Microalgae have attracted great attention as natural compound producers. Cosmeceutical industry represents the field with more interest for the marine sources and compounds. *Tetraselmis suecica* is a marine microalga rich in tocopherols, carotenoids, chlorophyll, and. In my previous study, I have investigated the potential cosmeceutical application of this species, characterizing the pigment content of ethanol/water extract of *T. suecica*. Moreover, I have analysed the protective effect of this extract against oxidative damage, demonstrating that *T. suecica* possesses a strong antioxidant and cell repairing activity on human lung cells. This total extract targets the dehydrocholesterol reductase-24 and prostaglandin reductase 2 genes and reduces the levels of prostaglandin E2 (patent pending). With this project, I intend to investigate the variation of bioactive pigments and biological activity along the growth curve of the *T. suecica* (HCMR). Moreover, I would perform more in deep study using explanted human tissues for the analysis of antioxidant, repairing, anti-inflammatory and regenerative properties of *T. suecica* extracts.

### SHORT CV

Christian Galasso studied Medical Biotechnology at the University of Naples "Federico II". He defended his PhD dissertation in Marine Biotechnology 4 months ago at the University of Naples 'Federico II'. During his PhD project, he studied the marine model organism sea urchin *Paracentrotus lividus* in order to create a molecular tool for the study of programmed cell death. Moreover, he conducted drug discovery studies for the identification of new marine natural compounds from marine organisms, with potential antiproliferative, anti-inflammatory, antioxidant and antineurodegenerative effect. At the moment, he is a young researcher at Stazione Zoologica of Naples, involved in an Italian research project for the identification of marine species with cosmeceutical and nutraceutical industrial applications.