

Microalgae cultivation, biotechnological utilization of food by-products and waste, plant cell culture, aquaponics, bivalve mollusc safety and quality

Cognome, Nome dei componenti dell'unità di ricerca:

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#### Abstract

CAISIAL in the past three year until January 2020 worked on the following research projects:

SUSPUFA - Sustainable production of health-promoting n-3 LCPUFA using agro food industry by-products through microalgae – ERA-NET – H2020. The objective of the SUSPUFA project, is to develop an innovative process for sustainable production of high value n-3 long chain polyunsaturated fatty acids (n-3 LCPUFA), using agro food industry by-products through microalgae cultivation and to evaluate the produced n-3 LCPUFAs as fish oil replacement for incorporation in food formulations. <https://susfood-db-era.net/main/content/suspufa>

BOBCAT - Biotechnologies for sustainable production of bio-based commodities and specialty products in a cardoon-based biorefinery – Cariplo foundation. Activity at CAISIAL is scale-up of cardoon cell culture and development of new sustainable media for plant cell culture.

PRESTIGE – Development of new cosmetic ingredients form extremophile microorganisms, coordinated by the company Arterra Biosciences, CAISIAL activity is srelated to scale-up of the project, microalgae cell culture optimization and product demo formulation.

Three projects financed by the "Istituto Superiore di Sanità" and CRISSAP Centre of Campania Region and coordinated by the Experimental Zooprophyllactic Institute of Southern Italy. The projects are related to the assessment of quality and safety of oyster culture in Campania Region, development of new molecular methods for monitoring toxic algal bloom, experimental contamination and depuration of bivalve mussels from enteric viruses.

PON BIOSCIENCE – financed by MIUR and related to the development of bioactive ingredients from microalgae and others vegetable biomass.

Some other projects financed by private company and related to aquaculture.

Key words: microalgae, bivalve mollusks, fish, aquaculture

#### Publications:

-J. Cvejic, A. L. Langellotti, Huber Bonnefond, Vito Verardo, O. Bernard (2019) Microalgae as a source of edible oils. In: Lipids and Edible Oils. 1st Edition. ISBN: 9780128171059. Academic Press. 175-210  
-M. Massa, S. Buono, A.L. Langellotti, A. Martello, G.L. Russo, D.A. Troise, R. Sacchi, P. Vitaglione, V. Fogliano (2019). Biochemical composition and in vitro digestibility of *Galdieria sulphuraria* grown on spent cherry-brine liquid. *New biotechnology*, 53, 9-15.

Amoroso, M. G., Langellotti, A. L., Russo, V., Martello, A., Monini, M., Di Bartolo, I., ... & Fusco, G. (2019). Accumulation and Depuration Kinetics of Rotavirus in Mussels Experimentally Contaminated. *Food and environmental virology*, 1-10.

-V. Zupo, M. Mutalipassi, N. Ruocco, F. Glaviano, A. Pollio, A. L. Langellotti, G. Romano, M. Costantini. Distribution of Toxigenic *Halomicronema* spp. in Adjacent Environments on the Island of Ischia: Comparison of Strains from Thermal Waters and Free Living in *Posidonia Oceanica* Meadows. *Toxins*, Vol. 11 (2) 2019, pag 99.

-M. Massa, S. Buono, A L Langellotti, L Castaldo, A Martello, A Paduano, R Sacchi, V Fogliano, Evaluation of anaerobic digestates from different feedstocks as growth media for *Tetrademus obliquus*, *Botryococcus braunii*, *Phaeodactylum tricornutum* and *Arthrospira maxima*, *New Biotechnology*, Volume 36, 2017, Pages 8-16.

## SUPPLEMENTARY MATERIAL

### Position of the components of the Research Groups

Name	Surname	Position *	Affiliation
Paolo	Masi	PO	UNINA
Anna	Martello	T	UNINA
Antonio Luca	Langellotti	T	UNINA
Giovanni Luca	Russo	PhD S	UNINA
Marco	Baselice	R fellow	UNINA
Maria	Oliviero	PoD	UNINA

\*: PO = Full professor; PA = Associate professor; RU = University researcher; CO = contract; PoD = Postdoctoral fellows; RC = CNR staff or other Institutions Research; T = technician, VR = visiting researcher, S = student

### Equipment

Type	Producer	Year of acquisition
N° 3 – 2500 L ponds under greenhouses (N° 1 greenhouses)	SCUBLA - Udine	2012
N°2 – 8 m <sup>3</sup> climatic chamber fully equipped for small and medium volumes phytoplankton production	SCUBLA - Udine	2003-2017
N°1 – 6 m <sup>3</sup> climatic chamber fully equipped for small and medium volumes heterotrophic cell production	NA	2018
N°1 greenhouse for aquaponics	Pontecorvo - Napoli	2019
N°2 plexiglass and 4 glass photobioreactors (1000 L total)	Microlife + CAISIAL	2013-2019
N° 1 – 0,5 m <sup>3</sup> fully automated climatic chamber for algal strains	Refcon - Napoli	2011
N°2 fully equipped laboratories for microalgae biomass analyses	Many companies	2012

### Technical skills

- Microalgae culture maintenance and production in large volumes
- Wastewater and food by-products utilization in microalgae culture
- Functional chemicals in microalgae: screening, evaluation and biological activities
- Metabolic shift induction in microalgae production
- Screening of microalgae for high value compounds production
- Microalgae for aquaculture productions
- Bivalve mollusks rearing, safety and quality
- Rearing of marine and freshwater fish in in-shore and off-plants