## MICROALGAL CULTURES FOR GREEN CHEMISTRY, BIOENERGY PURPOSES AND PRODUCTION OF FOOD SUPPLEMENT

**Innovations and Benefits** - Simplified innovative systems for microalgae cultivation in the laboratory, outdoors and under greenhouse, in photobioreactors and protected tanks up to 1,500 L of useful volume. In addition to the use of recycled and / or low-cost containers, unconventional fertilizers and agitation systems are used, which are cheap and have low energy consumption.

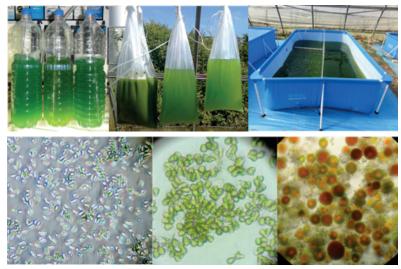
Use - Production of algal biomass for energy purposes, green chemistry, nutraceuticals and restoration of cultural heritage.

Applications and ongoing Activities - Bioenergy: use of liquid digestate as a fertilizer for microalgae crops to be used for biogas production.

Green chemistry: experimentation of crops of Botryococcus braunii and Dunaliella salina for the production of oleic acid and 1,3 butadiene.

Nutraceuticals: production of Artrhrospira platensis (spirulina) to be used as a food supplement or as a source of natural colorants (phycocyanins) for food and cosmetic products.

Restoration of cultural heritage: screening and evaluation of micro- and macroalgae for the production of polysaccharide-based extracts to be applied on paper artefacts (manuscripts, books, drawings) that have deteriorated or are at risk of deterioration.



Microalgal cultures in low-cost containers. From left: 2 L mineral water bottles, 20 L polyethylene photobioreactors, 1,500 L plastic sheet tank equipped with an air lift aerator / agitator with inclined plane

Optical microscope photos of three microalgae. From left: Scendesmus dimorphus, Botryococcus braunii, Haematococcus pluvialis

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	RESEARCH TO PROVE FEASIBILITY			TECHNOLOGY DEMONSTRATION			SYSTEM TEST, LAUNCH & OPERATIONS	
BASIC TECHNOLOGY RESEARCH		TECHNOLOGY DEVELOPMENT		PMENT	SYSTEM/SUBSYSTEM DEVELOPMENT			
TRL 1	TRL 2	TRL 3	TRL 4	TRL 5	TRL 6	TRL 7	TRL 8	TRL 9
TECHNOLOGY READINESS LEVEL								
Energy and sustainable economic development www.enea.it Department of Energy Technologies   Bioenergy, Biorefinery and Green Chemistry Division Biomass and Biotechnology for Energy Lab								

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