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MICROALGAE BISCUITS – SENSORY, PHYSICAL AND CHEMICAL PROPERTIES, ANTIOXIDANT ACTIVITY AND IN-VITRO DIGESTIBILITY

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Abstract:

Microalgae use as food is still poorly developed in Europe due to high cost, low demand and strict Novel Foods legislation. The aim of this work was to evaluate biscuits, a food product consumed on a daily basis, as microalgae vehicle.

Arthrospira platensis F&M-C256, *Chlorella vulgaris* Allma, *Tetraselmis suecica* F&M-M33 and *Phaeodactylum tricornutum* F&M-M40 were studied.

Two content levels were tested: 2%(w/w) typically used in algal-based products and a significantly higher content, 6%(w/w), to provide additional algal-bioactives.

The biscuits sensory and physical properties were evaluated during 8 weeks and no significant differences were found ($p < 0.05$) in terms of colour and texture stability. *A. platensis* biscuits presented the highest sensory

scores. Besides, this alga also provided a significant ($p < 0.05$) structuring effect, in terms of biscuits texture and dough viscosity.

All microalgae-based biscuits showed significantly higher total phenolic content (TPC) compared to the control. *P. tricornutum* biscuits exhibited the highest TPC (0.31 and 0.62 mgGAE/g for 2 and 6% biscuits).

Microalgae biscuits presented significantly higher in vitro antioxidant capacity (AC) compared to the control (from +45% to +307%). 6% *T. suecica* biscuits presented the highest AC (25 mmolTEAC/kg).

The microalgal biscuits in vitro digestibility (IVD) was also assessed. No significant difference in IVD between microalgae biscuits and the control (IVD 95%) was found, although, as expected, biscuits added with 6% Chlorophyceae biomass exhibited the lowest

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digestibility (87%).

In general, increasing microalgae content from 2% to 6% resulted in a significant increase in the biscuits TPC (on average +115%) and AC (on average +69%), while digestibility was slightly lower (-5.9% on average).

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About the institute:

LINKING LANDSCAPE, ENVIRONMENT, AGRICULTURE AND FOOD - LEAF
LEAF is a new research centre resulting from the merging of four research units from the Instituto Superior de Agronomia, the oldest and more prestigious school of Agriculture and Food Science of Portugal and one of the Schools of the University of Lisbon. We are uniquely positioned to conduct studies on the whole agro-food chain, dealing with main issues on a variety of scales, from cells and microorganisms to landscape design.

LEAF is committed to innovation, particularly for obtaining new economic, ecological and safe products and technologies that can be incorporated into the food supply chain, benefiting partners and society in general.

We support young talented scientists wishing to develop a career in research, to place the technology transfer in the agenda as a priority, to strength advantageous relationships with stakeholders, including industry, business, local, regional and governmental authorities. Our research addresses not only the immediate competitiveness of the economy but also the long-term sustainability of production in global markets together with the maintenance and improvement of natural resources.

14:10 - 15:50 Session 8:

Novel foods and animal feed

Chair: Maria Barbosa, Wageningen University - with reservation

Microalgae biscuits – sensory, physical and chemical properties, antioxidant activity and in-vitro digestibility

Ana Paula Batista, University of Lisbon (Portugal)

How extrusion parameters affect the sensory properties of meat alternatives derived from soy and spirulina

Stephanie Grahl, Georg-August-University Goettingen, (Germany)

Impact of processing on n-3 long chain poly-unsaturated fatty acids derived from microalgae

Lore Gheysen, KU Leuven University (Belgium)

Micro Algae for Aquaculture; Converting Art into Technology

William van der Riet, Tomalgae cvba (Belgium)

Raising broilers without antibiotics, thanks to algae

Pi Nyvall Collén, Olmix Group (France)

15:50 - 16:20 Coffee break

16:20 - 17:40 Session 9:

Algae cultivation: from laboratory to commercial plants and marketing in Europe

Chair: Birgit Schmidt-Puckhaber, DLG e.V.

Distributing light into photobioreactor volume to produce high-density algal biomass

Ladislav Nedbal, Forschungszentrum Jülich (Germany)

Eco-logic Green Farm at Società Agricola Serenissima (Italy): organic microalgae production in an integrated plant

Giacomo Sampietro, Fotosintetica & Microbiologica Srl (Italy)

The use of heterotrophy as a tool to overcome the long and costly autotrophic scale-up process for large scale production:

a case study for *Chlorella vulgaris*
Rui Gomes, CMP-ALGAFARM (Portugal)

„Closing the gap“ - Continuous Availability of high Quality Microalgae-Biomass

Marcella Langer, Global Biomass EXchange (Germany)

17:40 - 17:50 Closure of the conference

Concluding remarks and key messages to take away

Prof. Mario Tredici, Chair of the AlgaEurope Scientific Committee

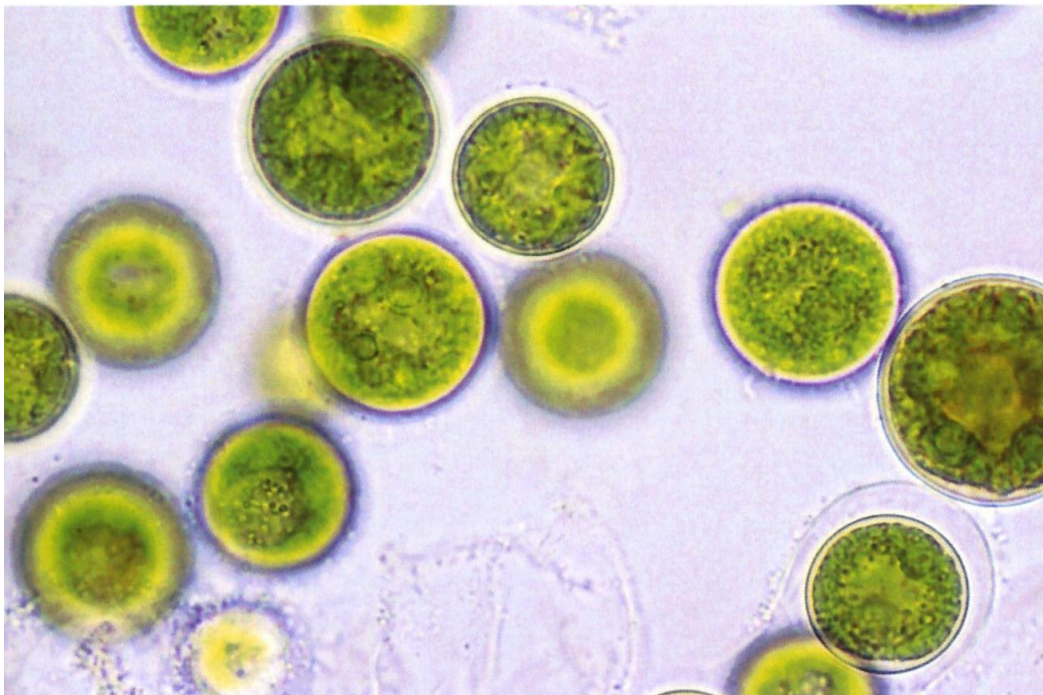
Kyriakos Maniatis & Vítor Verdelho, Conference Co-Chairs



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