

## Press Release

### MULTI-STR3AM microalgae biorefinery project overcomes food, feed, and fragrance demanding industry tests

The MULTI-STR3AM innovative concept, based on the use of a biorefinery cascade approach to maximize the value of all microalgae biomass fractions (ingredients), has been tested by the end-users in food, feed, and fragrance industries with great success.

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Feedback from major industry partners on the potential of the MULTI-STR3AM results is extremely positive. Following an intense 4-year work period, the project team is proud of its R&D achievements, considering that its biorefinery in Portugal has already produced 31 microalgae samples for testing in food, feed, and fragrance applications, from *Spirulina*, *Dunaliella*, *Nannochloropsis*, and *Chlorella*.

Beside the biorefinery development, the project has already achieved other important results, mainly the integration of industrial side streams – such as nitrogen-rich effluent and industrial brine effluent – as feedstock for microalgae cultivation (trials made by A4F-Algae for Future and Phycom project partners).

#### Prototypes scale-up

During the final year of the project, which ends April 2025, partners will expand their trials, scale up their prototypes for further testing and evaluate the formulation of products.

To boost microalgae productivity, optimise biorefining processes and support industrial partners, the project also involves IMIC, iBET and LNEG research institutes.

“As the biorefinery expands, process optimisation is an ongoing process to reach the best conditions for microalgae fractioning and purification,” says Cristina Matos, head of biorefinery at A4F-Algae for Future in Portugal.

#### Multiple ingredients & diverse applications

The industry is looking for new sustainable sources of protein that do not have animal origin. “The vegan food and cosmetics market is, in fact, eager for solutions, as the current vegan food products available on the market have low or no protein content,” explains Mariana Doria, MULTI-STR3AM project coordinator.

“In the case of phycocyanin – adds Mariana – the intense blue colour, of biological origin, is already used as food pigment, and it can replace synthetic pigments in the cosmetics and other consumer care products. This may avoid allergic reactions when products have skin contact for instance, and has the advantage of biodegradability when its disposal.”

Another example of an ingredient produced by Multi-Str3am’s biorefinery, carotenoids with high  $\beta$ -carotene content – a precursor to vitamin A in the human body. It is known for its vibrant orange colour and its health benefits. “ $\beta$ -carotene can also be produced by chemical synthesis and industrial biotechnology, and microalgae can be a competitive and sustainable source for the EU market. Synthetic  $\beta$ -carotene production is limited to its all-trans isomer, while the microalgae production of  $\beta$ -carotene has the advantage of being the unique source of 9-cis- $\beta$ -carotene, which as a high bioactivity,” explains Cristina Matos. “This ingredient is a common food colouring, present also in supplements, skincare, and animal feed. As an antioxidant, it is associated eye and skin health, and some studies also suggest benefits in the immune system,” – complements Cristina.



*The Bio-based Industries Joint Undertaking's project MULTI-STR3AM addresses the challenges of scale of microalgae-based products by integrating sustainable multi-strain, multi-method and multi-product microalgae biorefinery in industrial side streams. This EU-funded project is designed to help close the gap between research and industrial scale on microalgae cultivation.*

*The MULTI-STR3AM project is coordinated by A4F – Algae for Future (PT), and brings together the companies ForFarmers (NL), International Flavors & Fragrances (IFF, NL), Phycom (NL), UpField (NL), and the R&D institutions IMIC CAS - Centre Algatech (CZ), Instituto de Biologia Experimental e Tecnológica (iBET, PT), and Laboratório Nacional de Energia e Geologia (LNEG, PT).*

More information: [www.multi-str3am.com](http://www.multi-str3am.com)

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