**Algaenet4AV | Newsletter**

**January-February 2025**

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What is expected and what is accomplished so far?

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- Downstream Processing
- Final Product Development

**What is expected?**

# Biomass Production

The optimization of the culturing techniques and the development of appropriate manipulations that will result to more efficient and tailored biomass at a large scale. The apply of a number of different culture strategies for the optimization of the productivity of the species-specific and high-value secondary metabolites in microalgal cultures. The test of different growth regimes as microalgae will be grown under different conditions, produce different biomolecules, and in different quantities.

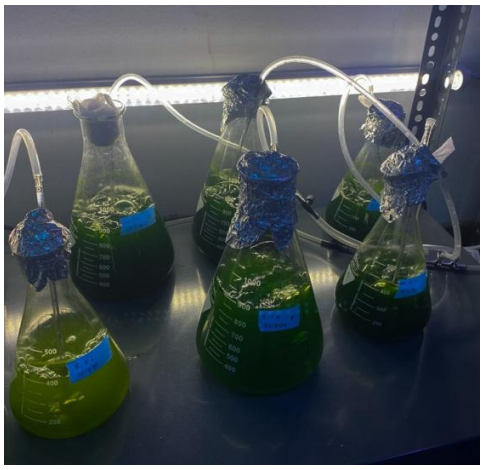

**Figure 1**: Cultivation of microalgae under lab conditions

**What is accomplished so far?**

Several strains have been cultivated for the past year in the facilities of the partners. The strains have been chosen based on bibliography and fellows' experience for their high content in polyphenols and lectins. Apart from their cultivation in optimal conditions, the microalgal cultivations are exposed to various stress conditions such as UV radiation, high salinity, nitrogen starvation and heat. The exposure of microalgae to stress demonstrably leads to the production of secondary metabolites that contribute to the microalgae's' adaptation and survival. Such metabolites are polyphenols and lectins.

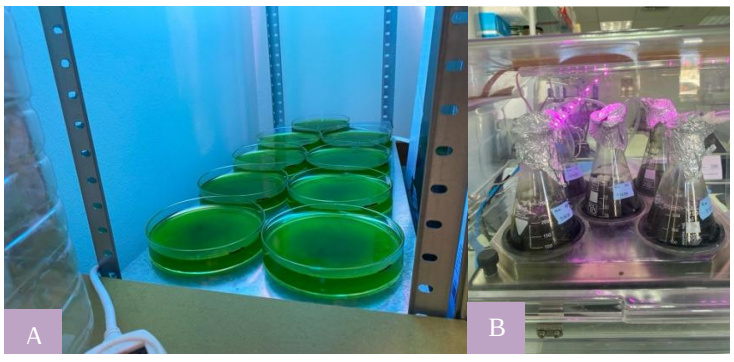


**Figure 2: A:** Microalgae under UV radiation. **B:** Microalgae under heat stress.

**What is expected?**

# Downstream Processing

The employment of downstream processing technologies for the production of the selected polyphenols and lectins. Methods and technologies regarding downstream processing are:

- Development of efficient cell disruption, extraction and fractionation of polyphenols
- Characterization of microalgae lectin enriched fractions
- Production, purification and characterization of microalgae lectins.

Downstream processing will include an application tailored array of related technologies including efficient cell rapture, selection of application-friendly extraction solvents, ultrafiltration, two-phase liquid separation systems, chromatography etc.

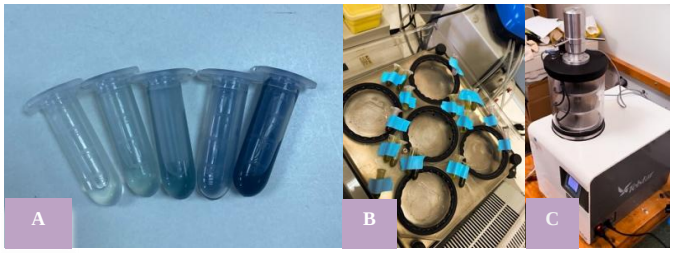


**Figure 3: A:** Standard solutions for gallic acid calibration curve **B:** Extraction in 40oC **C:** Freeze dryer

**What is accomplished so far?**

The progress regarding the downstream processing includes the trial of different methods of cell rapture such as the usage of a disruptor and mortar and pestle. The cell lysis is a critical step for the extraction of any substance that is located in the interior of a cell. It is highly possible that other methods will be tried. As far as the extraction is concerned, different solvents and different extraction conditions such as temperature and incubation time are currently tested. The important point here is to find the best combination of a cell lysis method, a solvent and extraction conditions for the best results. Lastly, on some of the extracts, the HPLC method has been applied, and the results will soon be assessed.

**Figure 4:** Extracts from the same strain with different solvents

**What is expected?**

# Final Product Development

The active pursuit of the development of novel high-added value final products for the cosmetic market. The usage of encapsulation technology in order to boost aqueous solubility, skin penetration and release rate of microalgae's bioactive ingredients. The conduction of stability test on all formulated products according to standard protocols by monitoring physicochemical parameters and microbial content over time. The incorporation of microalgae ingredients encapsulated in carriers or in free form, into cosmeceutical formulations targeting both skin care (antiaging, moisturizing properties, skin whitening, antioxidant properties, UV protective) and antiviral functions.

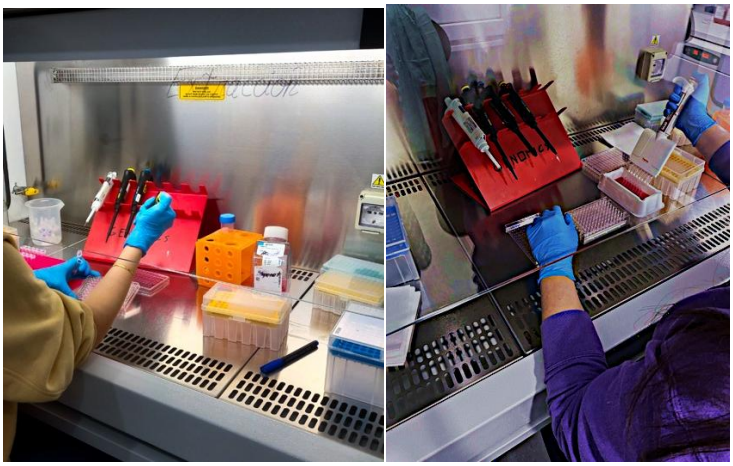

**Figure 5:** Preparation of cytotoxicity tests

## What is accomplished so far?

The first steps for the formation of the products are starting to happen. A few extracts have been sent to the responsible partners to test their stability and effects on cosmetic products. At the same time, the extracts are tested for their cytotoxicity effect on healthy human cells to reassure that they provoke no negative effects and to determine the highest concentration that can be used.

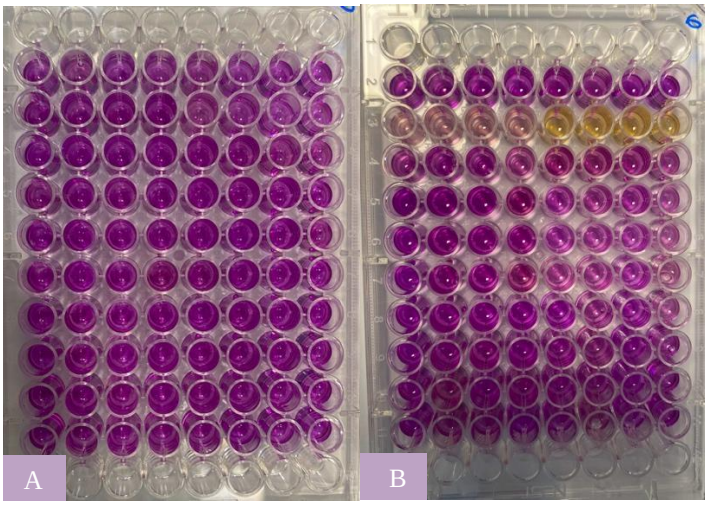


**Figure 6: A:** No cytotoxicity in any concentration (purple color) **B:** Cytotoxicity in the highest concentration (yellowish color)