“Synthesize novel bioactive esters based on precious phenolic compounds that are found in the halophyte Salicornia plants.”

Io what is your main project task?

In Aquacombine project, my main task is to synthesize novel bioactive esters based on precious phenolic compounds that are found in the halophyte Salicornia plants.

Can you please explain this more detailed?

Yes, for sure. Halophyte plants are a rich source of phenolics that have numerous health benefits, such as antioxidant, anti-inflammatory and antiaging properties. Our goal at Luleå is that the new synthesized esters will maintain the precious activities of the parent bioactive compound, but their properties will be enhanced and improved for enabling their implementation as cosmetic ingredients or functional feed and food. In other words, we aim to stabilize phenolic acids, such as ferulic acid, to enable their industrial implementation as functional agents. To achieve the stabilization of ferulic acid towards stabilized esters, we apply a green and sustainable technique, using enzymes as biocatalysts.

What added value do you expect from the project?

We expect that the project will offer novel routes for the sustainable and efficient utilization of halophyte plants, such as Salicornia, towards achieving a circular economy. The currently unused parts of Salicornia can be valorised for recovering nutritious and health boosting bioactive compounds, proteins, lipids etc, alongside with biofuels production for green energy.

What makes this project so special?

The sustainable aspect. Focusing on the health benefit aspects, utilizing nature’s compound palette, found within plants, is a sustainable strategy for novel cosmetic food and feed products.

Most surprising result during the last two years?

The most surprising result for us was to discover that halophyte extracts have novel bioactive properties that could be revolutionary for human health and boosting immunity. Moreover, we were mesmerized by the rich palette of compounds that can be found in extracts of halophyte plants and thus the many routes that were unravelled to us for their further stabilization.

What makes the Aquacombine topic so important?

Plant biomass is a renewable resource that can used to obtain high-added value products as alternative to fossil-based products. As plants harvest CO2 during their lifetime due to photosynthesis, using them to produce novel nutraceuticals and biofuels can lead to establishing sustainable and zero net carbon production cycles.

The topic is also strongly aligned with EU's Green Deal and goals for achieving a zero net carbon economy by 2050. Moreover, the Aquacombine project can be a paradigm for utilization of halophytes, a plant that is cosmopolitan and can be found in many parts of the world, being a valuable resource for local farmers.

If you could wish for something for the project, what would it be and why?

I wish that the project's results will be applied fast in the near future towards developing smart integrated aqua cultures and halophyte cultivation within Europe. Halophyte plants have been known in folk medicine to have many beneficial effects on human health. A holistic approach for their valorisation leaving zero waste could be a major step towards achieving a carbon zero economy. Moreover, halophytes are resilient plants that can be grown in remote areas with high salinity, enabling land use and limiting the need for irrigation.

Io Antonopoulou is an Associate Senior Lecturer at Luleå University of Technology.

Luleå University of Technology is experiencing strong growth with world-leading competence in several areas of research.

The Luleå team: Paul Christakopoulos, Ulrika Rova, Leonidas Matsakas and Io Antonopoulou. The team is leading WP4 and participate in WP5 and WP9. Plant biomass utilization and developing sustainable and zero net carbon processes using biotechnology is one of the major pillars of their activities as group within Luleå University of Technology.

Co-funded by the European Union's Horizon 2020 research and innovation programme under Grant Agreement NO. 862834. Any results of this project reflect only this consortium's view and the European Commission is not responsible for any use that may be made of the information it contains.