Improved knowledge on processing seaweed waste

Academia Advisors Ltd. specializes in consultations and research projects as the study of algae biomass use. Company has developed collaboration with University of Latvia researchers in order to study the future seaweed species (green, previously studied brown-brown biomass) in form of extracts and granules for improvement the production process for enterprises in agricultural industry.

INDUSTRIAL CHALLENGE AND EXPERIMENT

Research responds to the industrial need …

The company was searching for the most appropriate recycling methods and processing equipment needed for upgrading its product and applying new knowledge to the specific plants in the growth laboratory. The experiment suggested for the company was primarily aimed at evaluating the most appropriate method for processing of seaweed for agricultural use.
The materials used in the experiment were trees' ashes extracts in combination with seaweed extracts. The supporting researchers addressed the question on which extraction method provides best results (composition of elements) for possible fertilizer. The technique used for conducting the experiment was ultrasound and microwave extraction of algae used in several treatments with different reagents, standard compounds and solvents. Composition of the elements were determined by the following methods: Gravimetric; Kjeldal method; Spectrophotometry; Gamma spectrometry; Titrimetry; OIE Manual.

New knowledge received?

The experiment gave the information about the composition of the elements of the product from different treatments and made it possible for the company to continue the development of a new product from the material. As regards direct implications for material science, the experiment provided overview on methods for the conversion of seaweed biomass into natural extracts. The study provided a deeper insight on seaweed biomass "behavior" and changes in elements using different extraction methods. The obtained products were characterized in terms of the content of micro- and macro-elements and toxic metals. The experiment proved a good quality of the resulting extracts in terms of nutrient content and low toxic metal content.

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The image of the dry algae sample

The algae extracts using two different extragents

Steps ahead

The findings highlighting the sufficient quality of the resulting extract in terms of nutrient content and low toxic metal content, provided the needed understanding of what will be needed in next phase for upgrading the product. The new knowledge provided better insights on the need for further evaluation of the product in the germination tests. In parallel, the complimentary research on antibacterial properties of algal extracts will be of importance for the product development. Notifying this, the company together with the researchers and IReC's experts analyzed the process ahead underlying the need in testing examples on specific plants in growth laboratory. As the methods used in treatments did not solve the problem of filtration and stabilization of material, this challenge needs to be addressed in the next phase. Finally, the company was considering search for potential suppliers of extraction equipment to calculate production costs involved with different capacity and to address economic feasibility.

Last but not least …

The study provided additional knowledge on local algae (the Baltic sea) composition and outlined the best methods for extraction of macro- and micro-elements. Additionally, the study has leveraged a better understanding of the seaweed biomass which is a significant issue for coastal municipalities who are urged to utilize seaweed as biowaste, following the latest EU requirements regarding recycling of waste.