Fermentation Potential of the Brown Seaweed Himanthalia elongata for the Development of Active Ingredients.

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Résumé

With increasing interest in their nutritional and biochemical potential, marine macroalgae are emerging as sustainable and valuable resources. Among them, the brown seaweed *Himanthalia elongata*, abundant in Brittany, exhibits high potential due to its phenolic content, and is therefore promising for applications in the field of health or nutraceuticals. In a sustainable development context, microbial digestion, also known as fermentation, and specifically lactic acid fermentation, stands as a promising tool for this seaweed valorisation.The biochemical composition of *H.elongata* offers a diversity of bioactive compounds. From its polysaccharide-rich cell walls to the presence of intracellular reserve sugars, this brown macroalgae appears to be a suitable candidate for microbial fermentation. While bacterial fermentation of land plants is well established, its application to marine algae remains unexplored. In order to understand the microbial mechanisms behind fermentation and its applicability to *H.elongata*, a thorough description of the fermentation process is required. This highlights complex metabolic pathways, aeration-dependent growing behaviours and exclusive substrate conversion. Moreover, endogenous bacteria from the algae's holobiont can play an additional role in the process. As any biological process, fermentation requires well optimized conditions. Different biomass pretreatment methods can help to maximize the substrate bioaccessibility and therefore the microbial digestion. Optimal process parameters and monitoring techniques are also crucial to increase its efficiency. Additionally, the bioactivity of the resulting fermented extracts is of particular interest. Further research and experiments are needed to fully evaluate the feasibility of *H.elongata* fermentation and the subsequent functional properties of the obtained extracts.

Mots-Clés: Seaweed Fermentation, Marine Biotechnology, Nutraceuticals, Himanthalia elongata

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