COSMINNOV 3rd
COSMETIC INNOVATION DAYS

UN ÉVÉNEMENT COSMETIC VALLEY FRANCE

Flash Communication

GREEN CHEMISTRY & SUSTAINABLE COSMETIC BIOTECHNOLOGY & COSMETIC APPLICATIONS

C. Laroche, Université Blaise Pascal - Clermont Ferrand, France

Polysaccharides from microalgae: new sources of bioactive molecules

Microalgae are present in all existing earth ecosystems, representing a large variety of species living in a wide range of environmental conditions. It is estimated that more than 50,000 species exist, but only a limited number have been identified and studied. Over the last decade, the use of microalgae for third generation biofuel production and carbon dioxide sequestration has become a challenge worldwide. The major advantage of microalgae is high yields of lipids production without requiring any arable land. Nevertheless, processing costs are still too high to be profitable, leading to a need to find high value by-products in addition to biofuel. Depending on the microalgae species, various high-value compounds may be extracted such as pigments, antioxidants, polysaccharides, unsaturated and long chain fatty acids, vitamins, and biomass, which are largely used as bulk commodities in different industrial sectors (e.g. pharmaceuticals, cosmetics, nutraceuticals, functional foods…). In this context, we have developed strategy of exopolysaccharides production from marine microalgae cultivated in photobioreactors, and downstream processes for their extraction, purification and desalting with the objective to identify new structures with biological activities. For this, culture media were analyzed and modified according to a stœchiometric study of their composition taking into account the chemical composition of the microalgae biomass. Quantification of dioxygen production as function of pH, temperature and irradiance could be performed, allowing to determinate optimal culture conditions for photosynthetic activity and so, for CO2 consumption leading to higher rate of exopolysaccharide productions. These modifications were later validated during cultures in photobioreactors and their impacts on exopolysaccharide production quantified. After extraction and desalting of EPS notably by tangential ultrafiltration, structural investigations were performed on the isolated polymers. Some of these EPSs showed original sulphated structures and were successfully tested for their efficiency to reduce infection of HFF cells (human fibroblasts) by a microsporidia: Encephalitozoon cuniculi