Abstract

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Ftir spectroscopy as a complementary approach to biochemical analysis of metabolites- a case example of algal biology in the analysis of storage

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Abstract

Simple and rapid analyses of cellular components are required for monitoring metabolite production during algal growth and for optimizing culture conditions to maximize biofuel and biomass production. In this regard, Fourier Transform Infra Red (FTIR) spectroscopy is a well established technique which could be used for this purpose to study algal macromolecular compounds. Our focus is especially on marine haptophytes like Emiliania huxleyi that produce special photosynthetic products such as alkenones (a unique biofuel feedstock), coccloith specific acid-polysaccharides (AP) and other carbohydrates like low molecular mass components (LMCs), which are very useful in bio-geo chemical and physical studies. The physiological functions and metabolic profile of some of the compounds (especially alkenones) are not well known yet. Previously, the analysis of different components was done in quantitative manner by using different analytical instruments like GC-FID, Total Organic Carbon (TOC) analyzer and colorimetry (Bakku et al. 2018). However, using such techniques is a cumbersome task while working with large number of haptophyte strains or time series experiments. Therefore recently we focused to use FTIR spectroscopy as an alternate rapid approach to study haptophytes like E.huxleyi. Using this we detected new spectral information at 1705.5 cm-1 and 1151 cm-1 for rapid analysis of alkenones and APs. We also developed a semi quantification method for APs and a simple approach to monitor LMC accumulation. Comparative results showed that FTIR takes 3 fold less time and achieved approximate quantification in comparison to GC-MS or colorimetric methods (un-published data).

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Biography

Ranjith Kumar Bakku University of Tsukuba, Japan. He is coordinating PhD doctor's thesis in the medicine field. He unfolds a fruitful National and International scientific activity as an experienced microbiologist, having an impressive CV. He is Member in the Board of Scientific Societies, Reviewer in many peer-reviewed journals. He coordinated research projects, published books and more than 200 scientific articles in prestigious Journals. He organized and attended numerous national, international congresses, as president, member in the Organizing Committees, Invited speaker, Keynote speaker or Chairperson. He unfolds a high level activity after years of experience in research, evaluation, teaching and administration both in hospital and education institutions

