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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 compounds**

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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 *Emiliana huxleyi* that produce special photosynthetic products such as alkenones (a unique biofuel feedstock), coccolith 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. 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<sup>-1</sup> and 1151 cm<sup>-1</sup> 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).

### Biography

Ranjith Kumar Bakku is currently working as an Assistant Professor (Bioinformatics) and coordinator for Tsukuba Life Science Innovation Program (T-LSI) at University of Tsukuba, Japan. He received PhD from University of Tsukuba in Environment and Biomass Sciences for the research on Biosynthesis mechanisms of unique Marine-Algal lipids known as alkenones. He also extensively worked on metabolomics using LC/GC MS and FTIR spectroscopy techniques. Prior to his PhD, he received a Master's degree (MTech) in Bioinformatics from University of Hyderabad and a Bachelor's degree (BTech) in Biotechnology from Andhra University, India. His current interests are in Omics analysis and studying photosynthetic organisms.

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