# Research Highlights from Dr. Kiran Bala's Research Group

In Biofuels Research lab., we have been working with various green and blue-green algae species indigenously isolated from contaminated sites. These algae species are being explored for their biomass and lipid profile in context to biodiesel generation, carbon fixation potential and wastewater treatment. Selecting tolerant microalgal strains and further enhancing their ability to tolerate higher concentrations of contaminant by gradually increasing the concentration is very important in making the overall process efficient and economically feasible. Main goal is combining the process of algal biodiesel development with waste water treatment and greenhouse gas fixation. The purified wastewater can be channelled back into receiving water bodies, while the biodiesel can fuel buses, construction vehicles and farm equipment simultaneously handling air pollution issues.
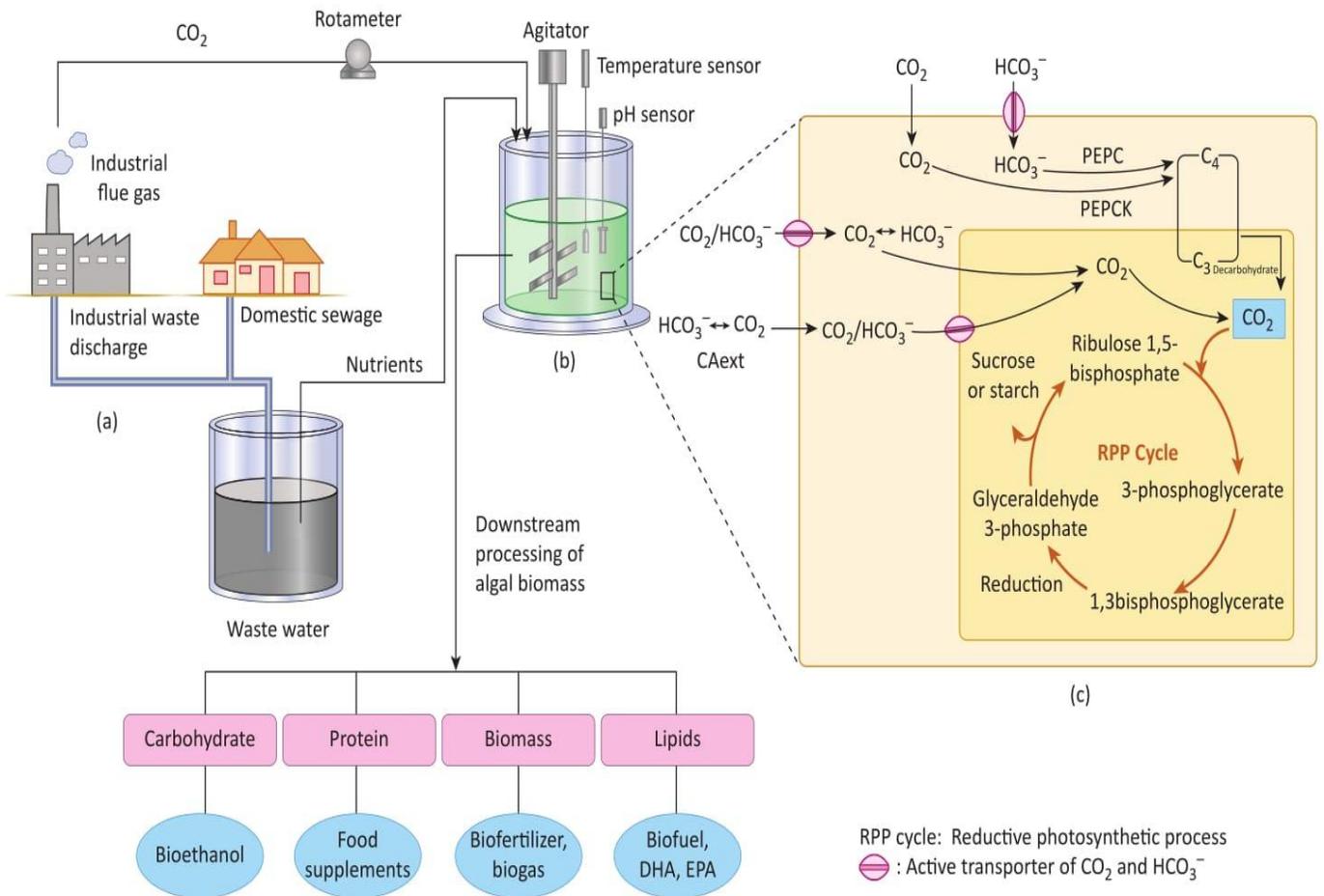
Following this idea we are exploring various strategies for maximizing lipid content, increasing the rate of cell growth, identifying superior chemical inducers, utilizing metabolic engineering and genomics as well as developing simple and efficient bioreactor systems and raceway ponds, suitable harvesting, lighting, extraction and refinery systems. Optimization of various growth parameters, effects of other pollutants present in wastewater, cost effective algae harvesting and oil extraction technology, mass cultivation in open ponds/ photobioreactors, molecular level studies to understand the mechanism, etc. are some of the major objectives of our research team. All these efforts would help in the identification of alternative renewable source of energy which can maintain environmental and economic sustainability.
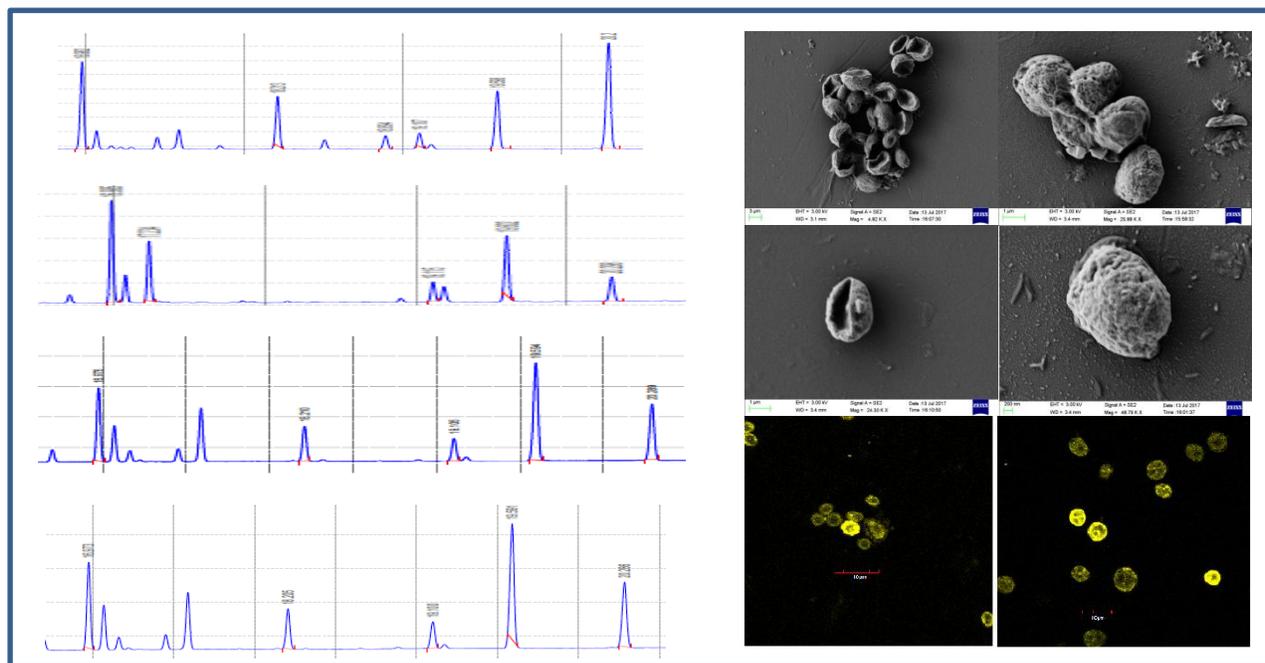
Algal species are further trained by cultivation in specific wastewater in monoculture and combinations with other algal strains and even bacterial community. Criteria for selection of algal cultures are synergism with existing microbial community in wastewater, algal biomass production rate, biomass settling ability and nutrient removal rate. This training and characterization of algal community will provide new research directions for cost effective and eco - friendly treatment of domestic and industrial wastewater.