

# Microwave-assisted Enzymatic Pretreatment of Microalgal Biomass for Recovery of Valuable Bioproducts

Mamta Bhandari<sup>1</sup>, Chhavi Chauhan<sup>2</sup>, Sanjeev Kumar Prajapati<sup>1\*</sup>

<sup>1</sup>Environment and Biofuel Research Lab (EBRL), Department of Hydro and Renewable Energy, Indian Institute of Technology Roorkee (IIT-R), Uttarakhand – 247667 (India)

<sup>2</sup>Department of Environmental Studies, Central University of Haryana

\*Corresponding Author's Email ID: sanjukec@gmail.com

## ABSTRACT

Algae are valuable sources of a wide range of metabolites and bioactive compounds with applications across multiple industries. However, algae have rigid cell walls which resist extraction of intracellular metabolites. Thus, pretreatment is often required for metabolite extraction from algae to improve the yield of desired metabolites. Microwave-assisted enzymatic pretreatment (MAEP) is a promising technology for the extraction of metabolites from algae. It combines the advantages of microwave (MW) and enzymatic pretreatment, which results in high extraction yields, reduced energy consumption, and improved environmental compatibility. The combination of MW and enzymatic pretreatment in MAEP offers several advantages over conventional pretreatment methods. MAEP is faster, more efficient, and more environmentally friendly than conventional methods. MAEP has been successfully used to extract a wide range of metabolites from algae, including lipids, carbohydrates, proteins, pigments, and vitamins. Our findings also showed high sugar release, COD solubilization, and lipid yield, which further evident higher cell disruption and metabolites extraction potential of MAEP. Overall, MAEP is a promising technology for the efficient and sustainable extraction of metabolites from algae. It has the potential to revolutionize the algae industry and enable the production of a wide range of high-value products from this renewable resource.

**Keywords:** Algae, Microwave, Enzyme, Pretreatment, High-value products, Metabolites

