Algal Biotechnology in a New Era:from Upgrading Biomass Production to Creating Both Ecological and Social Values

Qin Song*[1]

[1]Yantai Institute of Coastal Zone Research – China

Abstract

Algal biotechnology-the application of biotechnological tools to optimize algal biomass production and unlock its multidimensional value-is entering a transformative era shaped by global climate crises and technological revolutions. With global temperatures estimated to exceed 1.45∘C by 2040 and intensified environmental pressures, algal biomass distribution (including seaweed cultivation, microalgal production, and wild harvesting) is experiencing profound spatial and metabolic reorganization. Recent breakthroughs in synthetic biology, CRISPR-based genome editing, and multi-omics integration are transforming algae from simple biomass producers into versatile platforms for tackling interconnected socio-ecological challenges. This presentation synthesizes pioneering innovations in algal value chain transformation, highlighting their dual capacity for ecological restoration and social value generation within the context of climate change and AI-driven industrial transformation.

Keywords: Algal biotechnology, Algal biomass, Climate change, Seaweed cultivation, Ecological restoration

*Speaker