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H-LCBF - Harvesting of *Chlorella sp.* with low-cost bio-flocculant: An approach for clean environment with bioprocess engineering

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Harvesting of *Chlorella sp.* with low-cost bio-flocculant: An approach for clean environment with bioprocess engineering (H-LCBF): In order to use microalgae as a feedstock for biofuels and other bioproducts, optimal conditions must be established for harvesting following growth. Prior to downstream bio-processing including cell disruption, oil extraction and trans-esterification for biodiesel production, the microalga must be harvested, dewatered and dried. The common harvesting methods include chemical flocculation, centrifugation, and pressurized filtration. The application of chemical flocculants is problematic with the algal cell surfaces requiring long incubation times following cell growth that result in increased costs. Various process parameters i.e. pH, temperature, contact time, flocculent dose, mixing rate, ionic strength, and settling time *etc*. are act an influencing ones during biomass harvesting. To overcome these barriers, the development of a bio-flocculant and its engineering chemistry (zeta (ζ) potential) for harvesting algae was the key objective in this experimental study. Egg-shell materials were developed as an effective bio-flocculant for harvesting different *Chlorella sp.* Various concentrations of this material (0-100 mg/L) along with differences in contact times (0-50 minutes) were employed to analyze harvesting efficiency. It was found that maximal harvesting (95.6%) was achieved with 100 mg/L of the egg-shell bio-flocculant. Using 100 mg egg-shell bio-flocculant/L, ζ potential analyses were completed to further understand the chemistry leading to maximized harvesting efficiency over a range of pH (2, 4, 8, and 10). These studied defined the influence of pH and in particular demonstrated that maximal harvesting efficiency (99%) was accomplished at a pH of 4. Collectively, these studies found key relationships between the ζ potential and pH that positively impact harvesting efficiency as the first step in bio-processing, which is seen as a boon for a sustainable biofuel economy.

Biography

Richa Kothari has completed his MPhil and PhD (2005) in the Field of Energy and Environment from Devi Ahilya Unversity, Indore, India. She is working as an Assistant Professor (2008) and Deputy Co-ordinator for MSc -Energy and Environment at Babasaheb Bhimrao Ambedkar University, Lucknow, UP, India. Presently, she is a WARI Fellow, (Department of Biochemistry and Department of Civil Engineering), Robert B Daugherty Water for Food Institute, University of Nebraska-Lincoln, under Indo-US Science and Technology Forum. She has published more that 50 papers in reputed journals and book chapters. She has guided research and post-graduate students and has published two books. She has been serving as an Editotrial Board Member of repute in her field.

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