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Sk Riyazat Khadim, Prabhakar Singh, Ankit Kumar Singh, Anupam Tiwari, Abhishek Mohanta, Ravi Kumar Asthana

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Mass cultivation of *Dunaliella salina* in a flat plate photobioreactor and its effective harvesting

Sk Riyazat Khadim, Prabhakar Singh, Ankit Kumar Singh, Anupam Tiwari, Abhishek Mohanta and Ravi Kumar Asthana*

RN Singh Memorial Laboratory, Centre of Advanced Study in Botany, Institute of Science, Banaras Hindu University, Varanasi, India, 221005.

*Corresponding author: R. K. Asthana, Department of Botany, Institute of Science, Banaras Hindu University, Varanasi-221005

Phone: +91-9454161038, Fax: +91-0542-6701124

E-mail address: asthana.ravi@gmail.com, rasthana@bhu.ac.in

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Abstract

Mass cultivation of *Dunaliella salina* was standardized in a flat plate photobioreactor followed by a vertical flat plate photobioreactor. Maximum biomass productivity ($14.95 \pm 0.43 \text{ mgL}^{-1}\text{d}^{-1}$ dry cell weight) was achieved in the latter at inoculum concentration of $\text{OD}_{680\text{nm}} = 0.1$, $100 \mu\text{molm}^{-2}\text{s}^{-1}$ light illumination and 1.0 Lmin^{-1} aeration. Semicontinuous operation with varying KNO_3 and NaHCO_3 concentrations resulted highest biomass productivity ($17.85 \pm 0.55 \text{ mgL}^{-1}\text{d}^{-1}$) at 0.50 mM NaHCO_3 and 15 mM KNO_3 . However, maximum lipid ($16.36 \pm 1.18\%$ dry cell weight) was achieved at 0.75 mM NaHCO_3 and 10 mM KNO_3 . Flocculation studies employing potash alum, $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ or pH showed harvesting efficiencies exceeding 90% in 0.75 mM potash alum or $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ or pH 11, but they yielded low concentration factor (<

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