

Screening of Extremophilic Microorganisms to Recover Lithium from Spent Mobile Batteries Through Bioleaching

Sailaja Priyadarsini, Alok Prasad Das*

Department of Life Sciences, Rama Devi Women's University, Bhubaneswar, Odisha, India

*Corresponding author

ABSTRACT

Lithium-ion batteries have become integral to modern society, driving the transition toward a wireless, interconnected, and fossil-fuel-free world. The rising demand for these batteries, especially in mobile devices, has led to an increase in spent batteries, presenting significant challenges in both environmental management and resource recovery. The global lithium-ion battery market, valued at USD 54.2 billion in 2023, is projected to grow at a compound annual growth rate (CAGR) of 15.5%, reaching USD 147.3 billion by 2030. Despite their widespread use, lithium, a crucial element in these batteries, is often discarded, leading to resource depletion and environmental harm. This study investigates the potential of extremophilic microorganisms for lithium recovery from spent mobile batteries via bioleaching, a sustainable and environmentally friendly process. The research focuses on isolating lithium-resistant bacteria from e-waste-contaminated environments, to harness their ability to recover lithium. Four bacterial strains, designated were isolated using nutrient agar supplemented with 100 mM lithium chloride (LiCl) at neutral pH and 32°C. Upon screening for lithium tolerance in media containing LiCl concentrations ranging from 100 to 500 mM, only one strain exhibited the highest resistance, thriving at a concentration of 500 mM lithium. Identification through 16S rRNA sequencing revealed the strain as *Acinetobacter baumannii* (NCBI gene bank accession number PP425896). These novel strains will be further investigated for their potential in bioleaching under optimized process parameters to extract lithium from spent lithium-ion batteries. This work highlights the potential of extremophilic microorganisms in the bioleaching process, contributing to both resource recovery and the reduction of environmental impacts associated with battery waste disposal.

Keywords: Lithium, Lithium-ion battery, Bacteria, Extremophiles

How to Cite

Sailaja Priyadarsini, Alok Prasad Das, "Screening of Extremophilic Microorganisms to Recover Lithium from Spent Mobile Batteries Through Bioleaching", *AIJR Abstracts*, p. 37, Mar. 2025.



©2025 Copyright held by the author(s). Published by AIJR Publisher in "Abstracts of International Conference on Current Perspectives on Extremophiles and Their Biomolecules" (CUPEB 2025), 24-26 March 2025. Organized by Sarojini Naidu Government Girls PG (Autonomous) College, Bhopal-462012 (MP), India.

DOI: 10.21467/abstracts.177

ISBN: 978-81-984081-3-6 (eBook), 978-81-984081-9-8 (Paperback)