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Batteries recycling process using local isolated thermophile culture

Jefri Jaapar, Wan Azlina Ahmad

Biotechnology Laboratory, Chemistry Department, Faculty of Science, University Technology Malaysia, 81310 UTM Skudai, Johor, Malaysia.

E-mail: jefrijaapar@yahoo.com

The use of batteries has increased over the last 5 years, mainly driven by the development of new consumer electronic appliances. One problem that might arise is the large amounts of spent batteries produced and its disposal. All battery components contribute to the pollution of the environment when improperly discarded mainly due to the metallic content. Most of these metals are considered as carcinogens and can cause serious health problems. In view of this Dewan Bandaraya Kuala Lumpur has embarked on the battery recycling campaign, working together with the Biotechnology Unit, Universiti Teknologi Malaysia, Johor. The purpose of this work is to explore the capability of local thermophilic bacteria in reducing metal content of used batteries. A bio-hydrometallurgical process was used in treating exhausted Zn-Mn batteries. The broken exhausted batteries, consisting mainly of zinc and manganese oxide, is dispersed in 1M of H₂SO₄ and HCl solution and then reacted with 1M of Fe₂(SO₄)₃ and FeCl₃ solution to oxidize the metal compounds present into soluble ions. Thermophilic bacteria can then be introduced at a later stage to enhance the oxidation effects. This study has demonstrated that bacteria were able to maintain the ferric concentration and pH of chemical leaching solution. The application of chemical and bioleaching technologies to treat used batteries has a great potential in hydrometallurgical treatment of dry cell batteries.