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NEW EXPLORATION IN BIOMINERAL PROCESSING OF LOW-GRADE ORES AND INDUSTRIAL WASTES

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The mineral processing industry is increasingly facing problems with processing of secondary resources like low grade ores and other industrial wastes for a green zero waste technology and sustainable economy. Failure of the conventional physico-chemical methods adopted for the metal recovery from such secondary resources in terms of economics and eco-friendly approach has doubled the problems in the mineral processing sector. Over the past few years, the advent and approach of microbial processing has seen a revolution in the mineral processing area. The main power of microorganisms is the ability to compensate the redox reaction within mineral matrix resulting in the easy dissolution of metals. However, the problem associated in the microbial processing is the metal toxicity towards microorganisms which has been solved by their adaptation to the higher concentration of heavy metals. It is now believed that these tiny bugs have the tremendous potential to recover metal values from such difficult to treat resources. With all the discussions available on the open literature, more and more information is being offered to understand the eco-physiology

of such microorganisms. The information on the diversity of oxidizers and reducers has enabled us to gather more and more data for their utilization in the mineral processing sector. Genetic manipulation is a powerful and unique tool which can bring drastic changes in the physical, chemical and biological properties in an organism. These changes bring about the extra ability to survive in the extreme environments that does not favour the natural species. Application of microalgae must be given top priorities in industries in solving environmental issues as well by means of remediation, biosorption and latest for energy production. Server directly predicts the key proteins involved in iron and/or sulphur oxidation by several groups of bioleaching bacteria that can be very helpful toward development of a novel microbial consortia. Hence, the applications of such bioinformatics predictions can help to shape the outlook of the bioleaching processing. It is believed that the coming years will see a more advanced and new designed reactors for the bioleaching process in the sustainable biotechnological industry.

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