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Introd ction

Biomining is the process of extracting minerals from their ores through the metabolic action of microbes including certain species of fungi such as Aspergillus niger and Acidithiobacillus species of bacteria such as Acidithiobacillus ferrooxidans etc. Biomining is more instrumental in the bioleaching of sul dic ores that contain sul des in its chemical composition. Bioleaching or biomining is a natural process where basically microorganism facilitates the extraction of a mineral by creating acidic condition i.e. by the production of sulfuric acid. Biomining was an ancient and unnoticed process until it came to limelight as a phenomenon in the 1950s a er the discovery of acidophilic microbes. Today around 20% of copper and 5 % of gold is extracted through the process of biomining. Other metals such as nickel, zinc etc. are produced in small quantities through biomining. Microorganisms accomplish the process of biomining by either oxidizing the desired metal and thus dissolving it into the solution directly like copper from chalcopyrite ore or oxidizing the surrounding atoms (Fe and As) in the mineral compound e.g. arsenopyrite and making the desired metal such as gold more accessible for extraction and isolation. ese two procedures of biomining are known as bioleaching and bio-oxidation respectively. Generally mineral should have iron or reduced form of Sulphur. e microbes grow by oxidizing

streams due to mineral waste pose a very serious threat to the environment and ecosystem and its reduction to Cr-III and its subsequent removal from the environment is need of the hour. Several techniques are being studied and used to cope with this environmental menace. But of all the techniques, bioleaching is considered to be the most plausible solution as it uses indigenous bacterial species to remediate Cr-VI which is pretty much natural and economical process. For this purpose, a chromate resistant bacterial strain Cr8 was isolated from chromite slag identi ed as Pseudomonas stutzeri. P. stutzeri Cr8 reduced Cr (VI) at initial concentrations of 100 and 200 mg L−1 Cr (VI) completely within 24 hrs, whereas it reduced almost 1000 mg L−1 Cr (VI) at the end of 120 hrs. Moreover, soil column leaching experiments were performed which revealed that bacterial cells reduced Cr (VI) leachate at a faster rate and that almost disappeared at the end of 168 hrs.

Material & Methods

Chromite ore Sample Collection

Table2: Periodic pH of samples containing coal mine water and bacteria

Coal mine ater sample (Hana, Balochistan)	Initial pH (16/05/2018)	pH on (04/06/2018)	pH on (26/06/2018)
C.M. W+9K media+FeSO4	2.5	1.60	1.49

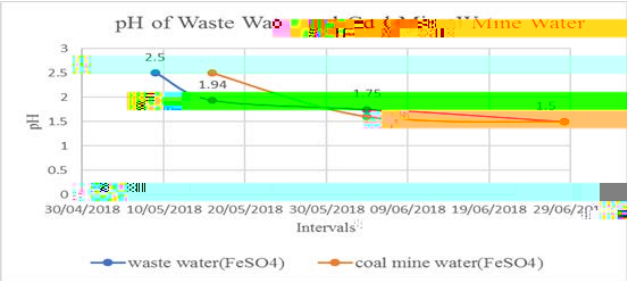

Fig re 1: Graph displaying pH variation in wastewater and coal mine water samples used for isolation of bacteria

pH of Samples containing Chromite ore and Bacteria