

**DEVELOPMENT OF MICROBIAL COMBINATION TO
EXTRACT Fe²⁺ FROM ILMENITE**

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by

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Abstract

Value addition through ilmenite upgrading for the production of pure rutile (TiO_2) can be a gainful utilization of titanium bearing mineral resources of Sri Lanka. Therefore this research aims to extract Rutile from Ilmenite using microorganisms and it will be more efficient and cost effective method to convert ilmenite to rutile in Sri Lanka by using locally available raw materials. Bioleaching has been suggested as an alternative to traditional mining techniques in extraterrestrial environments. This study was a continuous of the previous study of "The Use of Microorganism in the Process of Extracting Rutile from Ilmenite" by Wijepala Abeysinghe Mudiyansele Asanka Nuvansiri Illankoon. Previous study has proved the leaching mechanism of the particular microorganisms on ilmenite. But the previous study had tried only the individual microbial leaching process. In this study, it was focused to find the best microbial combinations to dissolve Fe^{2+} from ilmenite. The biological leaching experiments were conducted using bacteria, fungi and biofilms. Those Microorganisms, which were taken from Pulmudai beach area and isolated and both strains were able to grow in the PD and NA media (Previous study). From the previous study best iron leaching fungi (F2) and two best iron leaching bacteria (B5 & B6) were selected for this study. By using the different combinations of B5,B6 and F1, three types of biofilms were formed. Then All the individual types and the combinations of the above microbes were inoculated to the ilmenite samples and iron leaching amount was weekly measured by AAS for consecutive seven weeks. According to the AAS results F1 individual fungi strain has leached more iron than other types. Though the combinations (Biofilms) have failed to reach the best efficiency level they have beat the B6 individual bacteria type. Finally all the microbial inoculated mediums were increased their pH values than their initial pH. That implies the microorganisms are directly contributed for the increasing of the iron leaching rate in ilmenite.