Purification of Kaolin in Meetiyagoda Kaolin Deposit, Sri Lanka by Bio Leaching for Removing Iron Oxide Impurities

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Meetiyagoda Kaolin has both iron and titanium impurities which cause deep coloration in it. Deep coloration in Meetiyagoda kaolin is the main barrier for most of the applications where the higher whiteness is necessary. This study was aimed to purify kaolin and enhance the whiteness properties by removing iron oxide impurities using microorganisms under bioleaching method. Bacteria and fungi were isolated from iron rich Meetiyagoda soil. Iron tolerated microorganisms were selected by inoculating the isolated microorganisms in nutrient media impregnated with different known concentrations of iron (200, 400, 600 and 900 ppm). Kaolin samples with three particle sizes (125-150, 63-125, and less than 63 microns) were separately treated with the screened microorganisms and the soluble iron concentration of the treated samples was measured under different time intervals using Atomic Absorption Spectroscopy. Out of screened bacteria and fungi types the most tolerated and the most suitable bacteria type and fungi type to leach iron impurities was investigated. Bio leaching ability was increased with the increasing particle size. The most convenient particle size was 125-150 microns. This biological treatment has shown one of the most effective processes for removing iron impurities and enhancing the whiteness properties of kaolin. The study concludes that the bioleaching method can be used for purification of kaolin in Meetiyagoda by using soil microorganisms and it can significantly improve the quality of kaolin from an industrial point of view.

Keywords: Kaolin, Bacteria, Fungi, Bioleaching