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Project Report
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**COST EFFECTIVE GRAPHITE OXIDE/ACTIVATED
CHARCOAL ENCRUSTED SAND BASED SURFACE
WATER PURIFICATION TECHNIQUES FOR RURAL
COMMUNITIES**

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Abstract

Availability of safe drinking water is a smoldering issue and is of paramount importance for the human race. The rural communities are affected majorly in terms of water scarcity and poor quality of existing water. It is well established that microbial disinfection of water can be carried out by various chemical, physical and hybrid techniques. Although different methodologies for water disinfection have been experimented, there has never been a universal solution for microbial inactivation for potable waters. The pursuit for better, efficient, and economical methods continues to intrigue humankind, and research in this area is increasing day by day. Globally, scientists are attempting to come up with new methods for disinfection of water. Age-old techniques of disinfection, such as filtration, usage of metals, etc are being tried all over again as such or with some variation (Pandit & Jyoti, 2013). Recently, scientists have figured out a way to convert regular sand, an agent used frequently in water purification, into "super sand" with a greater filtering capacity. Researchers coated sand granules with Graphite Oxide (GO). It was noted that the GO-coated sand was able to absorb concentrations of dissolved mercury, a lethal toxin, and organic dye five times as often as pure sand (Gaot et al, 2011). Given that this can be synthesized using room temperature processes and also from cheap graphite sources, it is likely to be cost-efficient. The present study was conducted with the aim to explore this process further in terms of its effectiveness on removal of various physical, chemical and biological pollutants commonly encountered in surface water. Graphite oxide, prepared by using Hummers's method was used to coat 300 micron sized sand. 100 mg, 200 mg & 500 mg of graphite coated sand was used to treat Halassur lake water. Similar experiments were performed with same concentration of sand and graphite oxide alone. The disinfection was assessed by Total coliform count in EMB Agar which indicated that increasing concentration gave better results and graphite coated sand resulted in higher disinfection. Tests based on pH, hardness, iron content, total alkalinity and chlorides indicated that graphite coated sand was effective in bringing down these parameters to within the prescribed limits for potable water as prescribed by the ISO standards for drinking water. Based on the results obtained the said process appears to be promising as a disinfection method for potable water. However further in depth study still remains to be done before it becomes a commercial reality.