

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM



A

PROJECT REPORT ON

**“PHOTOCATALYSIS- AN EFFECTIVE TREATMENT
FOR TEXTILE WASTEWATER”
(Sponsored by KSCST)**

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ABSTRACT

Pollution of water has become a serious problem due to increase in industrial activities. The wastewater from industries such as textile industries contains a lot of color, toxic, odour, COD and BOD. The textile industry has been recognized as one of the most polluting industries in India, which contribute towards the pollution of water environment. Dyes are extensively used in textile industry. The color present in water bodies is undesirable for the water to be used for aesthetic reasons. Due to high concentration of organics in the effluents and higher stability of modern synthetic dyes, their discharge into rivers is harmful to aquatic life. Treatment technique has to be selected in such a way that it is economical and can effectively treat the colored water. Semiconductor Photocatalysis is an attractive treatment for industrial wastewater. Semiconductor Photocatalysis can be defined as the reaction in which the decomposition of organic substances in an aqueous solution by means of semiconductor like TiO_2 or ZnO in presence of light. Semiconductor Photocatalysis is an aqueous process where the water is integral part of the reaction. Insoluble organic matter is converted to soluble organic compound which are in turn oxidizing and eventually converted to CO_2 and water without emission of NO_2 , SO_2 , HCl , flyash etc. This research study will be carried out in a photo catalytic reactor made up of tin. The reactor consists of rectangular reflector (tin), 400W mercury lamp and water container. Initially the wastewater was blended with catalyst (TiO_2 and ZnO separately) and passed through the reactor provided with a mercury lamp. The effect of operating parameters like pH, catalyst dosage and contact time are studied. The COD removal efficiency is found to be maximum for optimum pH 8, catalyst dose 4g/L for both TiO_2 and ZnO . This treatability study has proved that the semiconductor photocatalysis process could be an appropriate tool for the treatment of textile wastewater.

Keywords: *Textile wastewater, COD, semiconducting photocatalysis, TiO_2 , ZnO*