

## DEGRADATION OF DYES USING MICROORGANISM

Industrialization increases use of dyes due to its high demand in paper, cosmetic, textile, leather and food industries. This in turn would increase wastewater generation from dye industrial activities. Various dyes and its structural compounds present in dye industrial wastewater have harmful effects on plants, animals and humans. Synthetic dyes are more resistant than natural dyes to physical and chemical methods for remediation which makes them more difficult to get decolorize. Microbial degradation has been researched and reviewed largely for quicker dye degradation. Genetically engineered microorganisms (GEMs) play important role in achieving complete dye degradation. This paper provides scientific and technical information about dyes & dye intermediates and biodegradation of azo dye. It also compiles information about factors affecting dye(s) biodegradation, role of genetically modified organisms (GMOs) in process of dye(s) degradation and perspectives in this field of research. By releasing of azo dye through textile effluent, textile industry is the main cause of water pollution resulting into acute effect on environment and human health. Development of any eco-friendly and cost-effective method that may address the drawbacks to physical or chemical methods of dye removal is the recent global priority. Physical or chemical methods for textile wastewater pretreatment are of high cost, extremely energy consuming, and environmentally low efficient and generate toxic sludge. Thus, the use of microbial technique for textile dye degradation will be eco-friendly and is probably a lucrative alternative to physico-chemical processes. Microbial enzymes, viz. lactase and azo reductase, are cost-efficient, easy to harvest, easily downstream processable, and effortlessly mobilizable. Recent research trends on nanoparticle-microbial enzyme conjugates are also highly efficient to remove the azo dye from textile waste within a few minutes. But unfortunately, due to some gap between academia and industry, these methods remain only limited up to laboratory and its industrialization is still a challenge. The present review is an illustrated compilation of the use of microbial enzymes in removal of textile dyes.

Keywords Textile industry. Synthetic azo dye. Microbial enzyme . Dye degradation