

## ABSTRACT

Conventional methods (activated sludge) are highly intensive in terms of chemicals, energy, land use and are insufficient to fully biodegrade the dyes of synthetic origin due to their complex structures. On the other hand (AOPs.) are very efficient systems but they are highly intensive in terms of energy consumption. The aim of this study was to investigate the efficiency of solar irradiations in replacement of the UV radiations for the conservation of energy. Solar irradiations were utilized in solar assisted photo Fenton process and oxidation ponds.

In the present study treatment of textile effluent and sewage was carried out with H<sub>2</sub>O<sub>2</sub>, UV, UV/H<sub>2</sub>O<sub>2</sub>, Fenton process (FeSO<sub>4</sub>/H<sub>2</sub>O<sub>2</sub>), UV assisted photo Fenton (UV/ FeSO<sub>4</sub>/H<sub>2</sub>O<sub>2</sub>) process, solar assisted photo Fenton process (solar/ FeSO<sub>4</sub>/H<sub>2</sub>O<sub>2</sub>), oxidation ponds, ozone and solar radiation. After treatment with these entire methods removal efficiencies (%) of color, COD and BOD were measured. From the results it was found that by using oxidation ponds and solar assisted photo Fenton process better color removal efficiencies (%) were achieved i.e. 86% and 76 % respectively with less consumption of energy of 0 % and 2.76% respectively as compared to treatment with ozone, UV assisted photo Fenton and UV light. Ozonation resulted in maximum color and COD removal efficiencies (%) i.e. 99 % and 78 % respectively at increased column height in comparison to increased diameter. Treatment of effluent with oxidation ponds was done to assess the effect of all these factors i.e. design of reactor, type of algae and seasonal variation on the treatment efficiency. Overall *Chaetomorpha sutoria*, *Sirogonium sticticum* showed better results than *Zygnema sp* e.g. color removal efficiency (%) of *Chaetomorpha sutoria*, *Sirogonium sticticum* was found to be 92 % whereas with *Zygnema sp* it was observed to be 77 %. *Chaetomorpha sutoria*, *Sirogonium sticticum* was observed to be more efficient than *Zygnema sp* for the removal of physical as well as chemical parameters. The effect of surface area and depth on the treatment efficiency of pond in the summer season was assessed. When surface area was doubled pond system showed an increase of 12 % in color removal efficiency whereas when surface area of pond was reduced to half and depth was doubled it was decreased by 12 % i.e. from 86 %-74 %. Effect of seasonal variation shows that summer batch was found to be very suitable as it gave 100 % decolorization in a relatively short period of four days whereas winter batch gave 74 % decolorization after 8 days of treatment.