

**PHOTOCATALYST EFFECTIVENESS OF HYDROGEL TITANIUM
DIOXIDE(TiO₂) AGAINST COLORS, pH, AND MORTALITY**

(Daphnia magna)

ABSTRACT

Chemical wastewater treatment will produce sludge in large quantities, causing new problems for handling the sludge. Oxidation using ozone is not only high cost but also ineffective to reduce sulfur in waste. The use of activated carbon in wastewater treatment containing dyes results in a high percent reduction in dyes, but the price of activated carbon is relatively expensive and will also increase the equipment costs for regenerating the activated carbon. In our research at the ISPO competition in 2019, we conducted research related to the Effectiveness of Titanium Dioxide (TiO₂) Stone Photocatalysts on Dyes, pH, and Mortality (*Daphnia magna*) with the first result decreasing water dye levels by 85.73%, increasing pH from 8 to 11 and mortality *Daphnia magna* cannot live in less than 5 minutes (Abdul and Ariq 2019). The thing that is evaluated in this study is the increase in pH that occurs so that the microorganisms cannot survive. The increase in pH that occurs is caused by a mixture of white cement in the manufacture of Titanium Dioxide stones. This is what encourages researchers to continue our research so that the TiO₂ can be used in the same timeframe as TiO₂ stone and the resulting pH is environmentally friendly. It is from this background that the researchers tried to examine the **Photocatalyst effectiveness of Hydrogel Titanium Dioxide (TiO) against colors, pH, and Mortality (*Daphnia magna*)**. The research used 10 grams, 15 grams and 20 grams of Hydrogel Titanium Dioxide which was added to artificial wastewater and exposed to UV light for 5 and 10 hours as a photocatalyst process. Measurement of color reduction levels using a spectrometer was carried out at the ITB Chemical Laboratory. Within 5 hours of UV irradiation, the highest reduction in dye levels was 73.52% at 15 grams of Hydrogel Titanium Dioxide and within 10 hours of UV irradiation, the highest reduction in dye levels was 72.88% at 20 grams of Hydrogel Titanium Dioxide. The pH level in all normal samples was pH 7. The high mortality value of *Daphnia magna* in all samples was shown that only 2 died out of 30 samples.

Key words: Hydrogel TiO₂, pH, *Daphnia magna*