Assessment of Heavy Metal in Textile Industrial Waste Water and its Treatment by Photocatalytic degradation with TiO2 nano catalyst

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Abstract-Water pollution is a widespread and worldly problem, a special reason for this problem is that today many types of organic and inorganic substances are being found in water directly and indirectly, these substances are due to some industrial waste water, such as due to paint industry, fertilizer industry. The more water is used, the more polluted water is released. Heavy metals are also present in this waste water, such as lead, chromium, cadmium etc. The concentration metals are easily determined by atomic absorption spectrophotometer. When photocatalytic process is done with the variation of time, we get the value of heavy metal decreases from 65%to 70%.

Keywords: Textile wastewater, titanium dioxide nanocatalyst, photoreactor, Heavy Metal

1. INTRODUCTION

Water pollution is a widespread and worldly problem, a special reason for this problem is that today many types of organic and inorganic substances are being found in water directly and indirectly, these substances are due to some industrial waste water, such as due to paint industry, fertilizer industry. Due to chemical industry, and domestic and municipal waste are continuously discharging more than their permission value in water, due to which water is getting polluted today.

These industries mix their waste water in one way or the other and These industries pollute the water, without treating it, they mix their waste water directly into the water source, due to which the water is polluted, due to these waste water, the clean water is also polluted and the amount of organic and inorganic substances in the water increases.

Which we can see by the method of calculation of water parameter set by APHA, the value of these comes more than the standard value of water due to which we can tell that water is getting polluted which is a big problem in textile industry. Many chemicals are used in the process of oil and textile industry uses more water in all processes.

The more water is used, the more polluted water is released. Heavy metals are also present in this waste water, such as lead, chromium, cadmium etc. which we can determine the value of heavy metal by suggest process TiO2 is an active photocatalytic catalyst.

which is used for waste water treatment and degradation process and which acts as a very helpful catalyst and its results are also surprising because it shows the value of heavy metal after waste water treatment is also reduced so we can say that TiO2 acts as a good photocatalytic degradation catalyst.

Wastewater treatment is essential to allow human and industrial effluents to be disposed without bringing danger to human health as well as to prevent unacceptable damage to the natural environment (Li et al., 2004). Conventional wastewater treatment consists of combination of several processes namely, physical, chemical and biological, to remove solids, organic matter and, sometimes nutrients from the wastewater. Improvements of determining the effects of wastewater discharges have led to the adoption of stringent environmental laws, which define the degree of treatment necessary to protect water quality.

2. METHODOLOGY

2.1. Study area: -

The study would be conducted in the area textile industries of Budni Sehore district. Two textile industries are established on a large scale in Budhni.

2.2. Material & Method:

The wastewater samples of this study were obtained from the manufacturing fabric textile industries. The fresh wastewater samples were collected from the influent collection of the wastewater sampling site using one-litre plastic bottles. were washed thoroughly using distilled water. Material- photo reactor, TiO2 nano catalyst, textile wastewater.

2.3. Analysis of heavy metals by Atomic Absorption Spectrophotometer (AAS) "

The concentration metals are easily determined by atomic absorption spectrophotometer. The atomic absorption uses essentially monochromatic radiation to excite vaporized atoms in their ground state. The instrument consists of a light source, a cell, a monochromator, and detection system.

"Data analysis in AAS"

Report the result as follows: liquid sample

$$\text{Metal concentration, mg/L} = A \times B/C$$

Where,

A = concentration of metal in digested volume, mg/L

B = Final volume of digested solution, ML

C = Sample size, ML

3. RESULT AND DISCUSSION

Table: - Photocatalytic degradation process with variation of time.

S. No	Time on stirrer Min.	Temp. ^{0}c	Amount of TiO_2 nano catalyst	SAMPLE					
				Value without photo degradation and TiO_2 nano catalyst dose			Value with photo degradation and TiO_2 nano catalyst dose		
				Heavy Metal			Heavy Metal		
				Pb	Cr	Cd	Pb	Cr	Cd
1	120	30	0.50 mg/L	1.20	0.12	0.11	1.17	0.11	0.11
2	240	30	0.50 mg/L				0.80	0.10	0.9
3	720	30	0.50 mg/L				0.40	0.7	0.6
4	960	30	0.50 mg/L				0.13	0.5	0.4

When photocatalytic process is done with the variation of time, the temperature nano catalyst quantity is kept constant in this, after 720 and 960 minutes on the variation of time, we get the value of heavy metal decreases from 65%to 70%.

4.CONCLUSION

Many chemicals are used in the process of oil and textile industry uses more water in all processes. The more water is used, the more polluted water is released. Heavy metals are also present in this waste water, such as lead, chromium, cadmium etc. which we can determine the value of heavy metal by suggest process TiO2 is an active photocatalytic catalyst. photocatalytic process is done with the variation of time the value of heavy metal decreases from 65%to 70%.

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