



# Treatment of Industrial Effluent by Using Coagulant

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**ABSTRACT:** Industrialization played an important role in Social-economy of the country. The gold industry is a source of occurrence of various pollutants. Generally, lot of water is used and lot of waste water generated from industries due to their processes and washing purpose. A large number of chemical are used for the production of potable water and in the treatment of waste water effluents. The coagulant used for jar test apparatus. Water analysis test for pH, Hardness, turbidity, COD, BOD, TS, TDS, TSS, Natural coagulants moringa oleifera, datura metal leaf used to reduce the environmental pollution. We are planning and designing a water treatment plant in the gold manufacturing effluent.

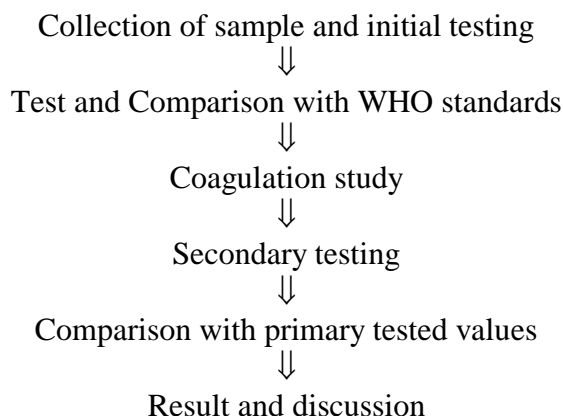
**Index terms:** BOD, COD, TS, TDS, TSS, Datura metal

## I. INTRODUCTION

Effluent is an out flowing of water or gas to a artificial body of water from a structure such as wastewater treatment plant, sewer pipe, or industrial outfall. The industry of gas and oil deals with a huge amount of wastewater as a by-product to explore the gas and oil. This a massive quantity of wastewater represents produced water and it increases when the operation time is well, and approximately that increase can reaches to 70%. The wastewater that produced from industry of sewage or domestic contains compounds: Inorganic and organic. Industrial effluents discharged to sewer form an important part of the load on the average sewage treatment plant. Water pollution is the contamination of water bodies, usually as a result of human activities. Water bodies include for example lakes, rivers, oceans, aquifers and groundwater. The result of water pollution contaminants are introduced into the natural environment. For example, releasing inadequately wastewater into artificial water bodies can leads to degradation of aquatic ecosystem. The color of varies with the ambient conditions in which water is present. While relatively small quantities of water appear to be color less, pure water is a slight blue color that becomes a deeper blue as the thickness of the observed sample increase pH is a logarithmic scale used to specify the acidity or basicity of an aqueous solution. An approximately the negative of the base 10 logarithm of the molar concentration, measured in unit of moles per litre, from hydrogen ions. Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles is generally invisible to the naked eye, similar to smoke in the air. BOD is the amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in the given water sample at certain temperature over a specific time period. The COD is an indicate measure for the amount of

oxygen that can be consumed by reactions in a measured solution.

## II. FLOWCHART



### Collection of Sample and Initial Testing

Industrial effluents discharged to sewer form an important part of the load on the average sewage treatment plant.



**Figure 1: Collection of sample  
Initial testing and comparison of who standard**

Sl.NO	Experiment	Analyzed Result	WHO Standard
1	Colour	White	Colour less
2	pH	5.7	6.5 to 8.5
3	Turbidity	63 NTU	5NTU
4	Hardness	500mg/l	100-300mg/l
5	Total solids	2000 mg/l	1500mg/l
6	Total dissolved solids	1100 mg/l	1000mg/l
7	Total suspended solids	900 mg/l	500mg/l
8	Dissolved oxygen	6.4ppm	4ppm
9	BOD	2.7ppm	0
10	COD	20.8 ppm	0

## Coagulation Study

For the study of coagulation jar apparatus has been used. The doses considered for the natural coagulants are 1gm, 2gm, 3gm. the jar apparatus has the three beakers and three steel paddles which helps in the agitation process. The initial speed of agitation is 100 rpm for 2 min, followed by 40 rpm for 30 min. the setting time applied for this coagulation process is 60min.



**Figure 2: Jar test**

## Material

The leaf of moringa oleifera, datura metal are collected and dried naturally by sunlight. The dried leaves were ground to fine powder by domestic blender. This powder was sieved through



425  $\mu\text{m}$  sieve. Moringa oleifera leaves are a good strategic for various conditions associated with heart disease, diabetes, cancer and fatty liver. Moringa leaves are rich in many important nutrients, including protein, vitamin B6, vitamin C, riboflavin and iron.

**Figure 3: Moringa Oleifera Leaf**



**Figure 4: Moringa Oleifera Leaf Powder**

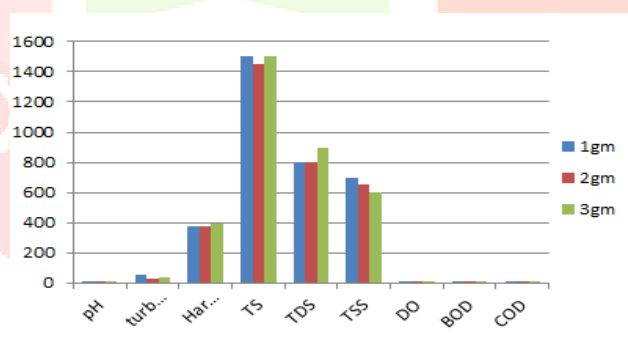
Datura metal is well known for its insecticidal, herbicidal, anti-fungal, anti-bacterial, anti-cancer, anti-inflammatory and anti-rheumatoid activity. Datura is also rich in rheumatoid compounds. The present paper summarizes the phyto-chemistry, traditional uses and pharmacological actions of the plant datura metal. Datura leaves are used to treat pain. The paste of roasted leaves is applied over the area to relieve pain.



**Fig 5: Dried Datura Leaf**

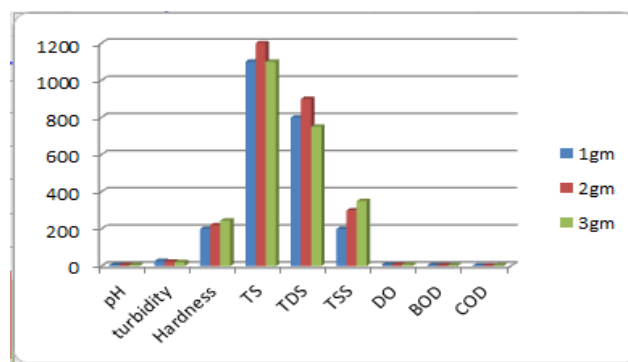


**Fig 6: Dried Datura Leaf Powder**



**Graph 1: Datura Metal**

Graphical Representation of Various Parameters of Datura Metal

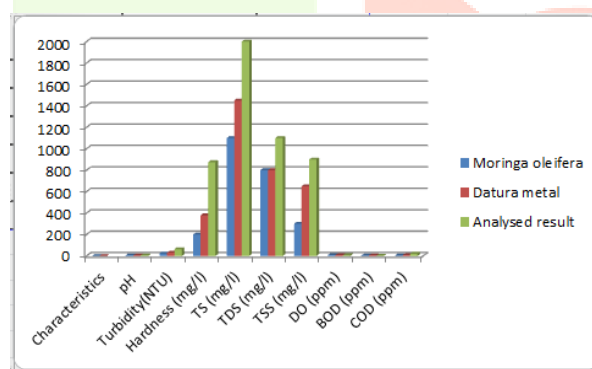


**Graph 2: Moringa Oleifera**

Graphical Representation of Various Parameters of Moringa Oleifera

## Comparison of Various Dosages of Coagulant and Initial Testing

SL. NO	Characteristics	Natural coagulant		
		Moringa oleifera 1gm	Datura metal 1gm	Analyzed result
1	pH	5.8	5.8	5.7
2	Turbidity(NTU)	22 NTU	30 NTU	63NTU
3	Hardness (mg/l)	200mg/l	379mg/l	500mg/l
4	TS (mg/l)	1100 mg/l	1450mg/l	2000 mg/l
5	TDS (mg/l)	800mg/l	800mg/l	1100 mg/l
6	TSS (mg/l)	300mg/l	650 mg/l	900 mg/l
7	DO (ppm)	8ppm	7.2ppm	6.4ppm
8	BOD (ppm)	3.8ppm	5.2ppm	2.7ppm
9	COD (ppm)	3.2ppm	8.1ppm	20.8 ppm
10	Colour	Light yellow	Green	White



Graph 3: Comparison of Various Dosages of Coagulant and Initial Test

### III. PURPOSE OF THE SYSTEM

Purpose of the system is water treatment in add by natural coagulant moringa oleifera and datura mental used for high blood pressure, hypercholerolemia, diabetes, insulin resistance, non –alcoholic liver disease, cancer and many other conditions but there is no good scientific evidence to support these uses. Fresh leaves from MO are a good source of vitamin A. The seeds of Datura used in the treatment of stomach and intestinal pain that result from worm infestation, toothache, and fever from inflammation. Polluted water treatment reduces the level of chemical oxygen in agriculture land.

### IV. EXISTING SYSTEM

The experimental methods that were used in the coagulation/ flocculation treatment for wastewater were carried out by using jar test. Cicer arietinum seed, Eggplant seed and Radish seeds were collected and then dried naturally by sunlight. The natural coagulant of

eggplant seed, when used as a coagulant, seems to be more effective than Cicer arietinum seed and radish seed for reduction of turbidity while the radish seed is more effective than eggplant seed and Cicer arietinum seed for reduction of oil content from wastewater. Cicer arietinum is more efficient in reducing of COD when compared with the other two coagulants that used; this is depending on the presence of protein in the natural coagulant. The highest removal of oil, COD and turbidity were 99.42%, 88.2% and 95.91% with Eggplant plant, Radish and Cicer arietinum seed, respectively. Finally result of the reduced by the cod, turbidity and oil.

## V. PROPOSED SYSTEM

The artificial of the different operation involved in sewage, irrespective of the products size, generate wastewater in different magnitude. This kind of gold manufacturing effluent should be allowed to mix the municipal wastewater as it will results in a shock load. The experimental methods that were used in the coagulation treatment for wastewater were carried out by using jar test. The water treatment process is due by natural coagulant: moringa oleifera, datura metal.Reduction in the values of turbidity, total solids, TS, TDS, TDS, dissolved oxygen, biological oxygen demand & chemical oxygen demand.

## VI. ADVANTAGES

1. Polluted water treatment reduces the level chemical oxygen in agriculture land.
2. Moringa oleifera leaves and datura metal leaf used in water treatment processed by may lower blood sugar level and lower cholesterol level.
3. This species of datura is extensively used in Ayurvedic and religious purposes and is widely used for the treatment of asthma, cough and cold and pain full conditions.
4. The natural coagulant using by the water treatment process may increase the pH level.
5. The water treatment process is due to reduced by the environmental pollution.
6. Low cost and it's available in many places.

## VII. CONCLUSION

The characteristics of untreated tie wastewater are pH -5.7, COD -20.8 mg/l, BOD- 2.7 mg/l, total solids -1500 mg/l, suspended solids – 600 mg/l, dissolved solids – 900 mg/l, turbidity –63NTU. The optimum dosage of moringa leaf powder, Datura metal leaf powder as a coagulant is found to be 1gm/500ml, 2gm/500ml, and 3gm/500ml respectively. The optimum pH of moringa leaf, Datura metal is found to be 6.4 & 5.9 respectively. Among the two natural coagulants, the maximum reduction of the percentage of reduction in the values of turbidity, total solids, TS, TDS, TDS, dissolved oxygen , biological oxygen demand & chemical oxygen demand for the dosage of 1 gm. Moringa oleifera 90.3%, 80.6%, 85%, 91.1%, 92%, 60%, 95% .

## VIII. REFERENCE

1. Anastasias, K., kalderis, D. and Diamadopoulos, E.(2009) Flocculation behavior of mallow and okra mucilage in treating wastewater. Desalination, volume 249, page no 786-791
2. Babu, R. and chaudhuri, M. (2005) Home water treatment by direct filtration with natural coagulant. Journal of water and health, volume 3, page no 27-30.
3. Davis M.L. and corn well, D.A (2008) Introduction to environmental engineering. McGraw – Hill companies, New York, volume 45;page no.75-80
4. Sundari, S. and Kanakarani, P., Journal of Industrial Pollution Control 2001, 17(1): pp.83-97.
5. Kalibbala, National Water and Sewerage Cooperation, Kampala, Uganda Makerere University Institute of Environment and Natural Resources, P.O. Box 7062, Kampala, Uganda.
6. Apex Institute of Technology & Management, Pahala, Bhubaneswar – 752101 (Orissa) India  
A P.G. Department Of Chemistry, Sambalpur University, Burla – 768019 (Orissa) India
7. Khader , Mohammed and Mirghaffari Department of Chemical Engineering, University of Technology, Iraq Department of Natural Resources Engineering, Isfahan University of Technology, Iran
8. Laboratoire Génie Eau Environnement, Faculté des Sciences et Techniques, BP 146 Mohammedia, Maroc
9. Patel H. Vashi R.T. Department Of Chemistry, Navyug Science College Rander Road, Surat - 395009, Gujarat, India
- 10 N.B.Prakash, Vimala Sockan, P.Jayakaran International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 3, Issue 2, March 2014 Waste Water Treatment by Coagulation and Flocculation ..
11. Mr. H.M. Jena dept of chemical engineering national institute of technology Rourkela.
12. Devrimci, H.A, Tuksel, D.A. and Sanin, F.D.(2012) Algal Alginate: A Potential Coagulant for Drinking water treatment Desalination, volume 299, page no.16-21.