



Physico- Chemical Study of Waste Water by Using Some Natural Adsorbents

Dr. Madhuri Satish Patil * & Dr.Sudhakar P.Mote

Jdmvps Nutan Maratha College Jalgaon

Abstract:

Water Is life, but now a days water bodies becomes polluted municipal corporation uses chemicals to treat water these chemical are harmful to human health as well as high cost. In present investigation waste water collected from Hated Mali Nalla was treated with three different coagulants (Moringa Oleifira seeds powder, dried ground nut shell powder and fifty-fifty percent mixture of both) used as natural adsorbent to treat water sample It was observed by comparing physico-chemical parameters of waste water before and after treatment with three different coagulant the values of parameters like pH, T.S., TDS, Hardness were reduced. These coagulants are natural, harmless and edible, readily available as well as of low cost.

Key Words: Waste water treatment, Natural adsorbent, Water pollution

Introduction:

Life without water cannot be imagined. Water is life, but now a day water bodies like river, lakes, streams get polluted. Water pollution is a huge problem in India. Water bodies are contaminated by human activities, biological, toxic, organic, inorganic, agricultural and industrial pollutants. All these degrade the water quality. Chemical coagulants such as $Al_2(SO_4)_3$ (alum), Ferrous Chloride ($FeCl_2$) etc. are used by Municipal Corporation to purify this polluted water. But these chemicals mainly aluminum in excessive amount cause pre-senile dementia (nervous disorder). The water natural adsorbents are used to minimize such health problems and to avoid high cost chemicals.

In the present research work dried Moringa Oleifira seeds powder, dried ground nut shell powder and fifty- fifty percent mixture of both are used as natural adsorbent to treat water sample collected from Hated Mali Nalla near village Kuwarkheda Dist. Jalgaon (M.S.) . These two natural substances are non toxic (1) edible and harmless for human health. Moringa Oleifira and ground nut are found in large quantity in Jalgaon District Maharashtra. One of the natural adsorbent Moringa Oleifira also has medicinal value and use to treat water from long time (2,3,4,5,6)

Material and Methods:

For this investigation dried Moringa Oleifira seeds powder, dried ground nut shell powder and fifty- fifty percent mixture of both are taken and converted in to powder by grinding. This powder is used as adsorbent. For this study Water sample were collected as per standard methods from hated Mali Nalla.

Samples were directly treated with these adsorbents. Physico- chemical analysis was carried out before and after treatment. 25 gram of each adsorbent was mixed with 500 ml of water sample separately and stirred it well for one hour. Then it is allowed to settle for half an hours. After settlement of (sedimentation) coagulates supernatant water was used for physico-chemical analysis. Before treatment and after treatment physico- chemical analysis of water was carried according to standard methods.

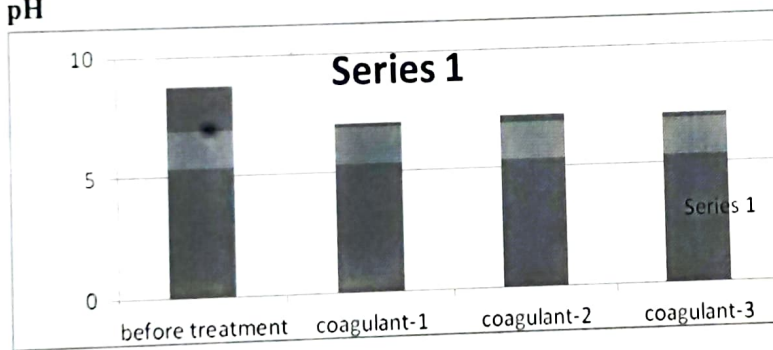


Result and Discussion:

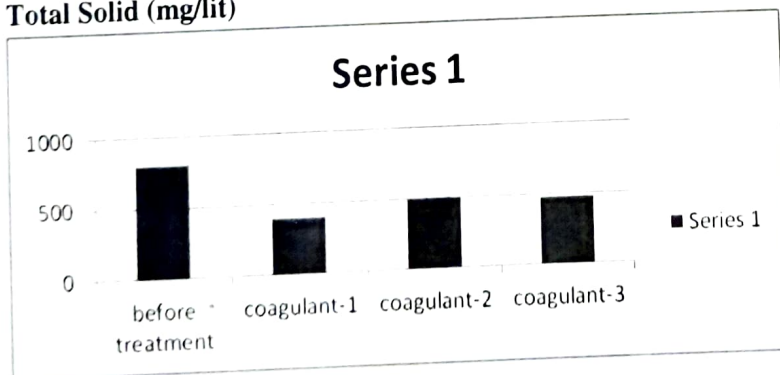
Sr.No	Parameter	Before treatment	After treatment with coagulant			WHO
			Coagulant-1	Coagulant-2	Coagulant-3	
1	Colour	Faint brown	colourless	colourless	colourless	colourless
2	pH	8.8	7.05	7.2	7.16	6.5-8.5
3	Turbidity NTU	15.4	3.4	4.7	3.61	5
4	T.S. mg/lit	798	401	502	475	500
5	T.D.S. mg/lit	658	232	315	300	500
6	Acidity mg/lit	37	5	5.9	5.5	
7	Alkalinity mg/lit	127	90	96	92	200
8	Chloride mg/lit	40	5.1	6.2	5.9	250
9	Hardness mg/lit	190	160	175	169	

Graphical representation of the physic-chemical parameters-

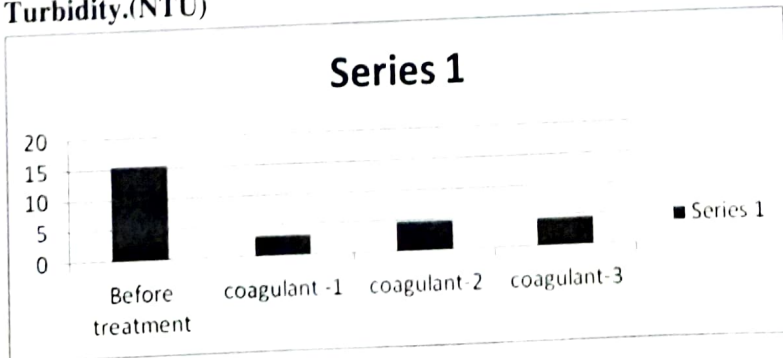
pH



Total Solid (mg/lit)

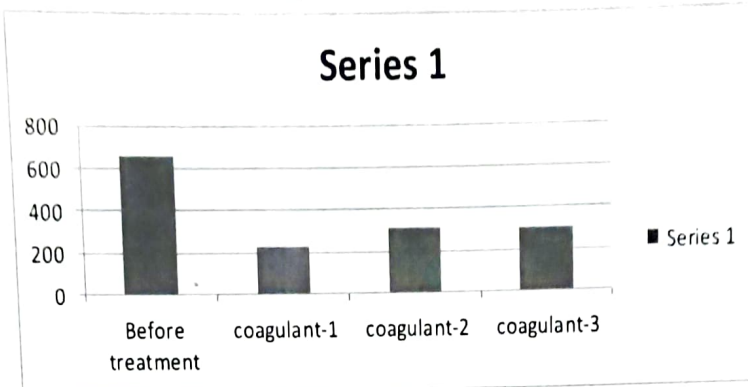


Turbidity.(NTU)

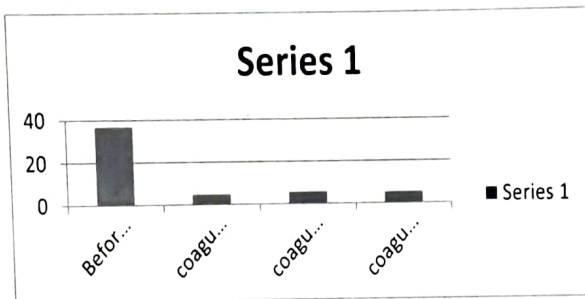




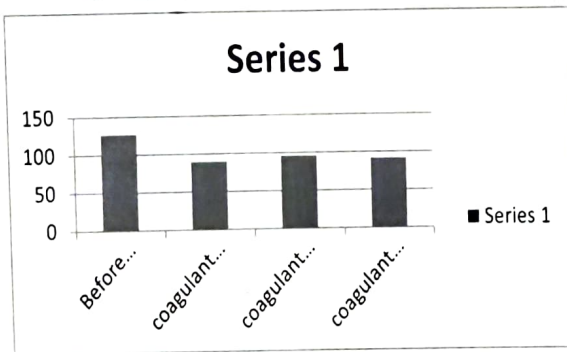
Total Dissolved Solids (mg/lit)



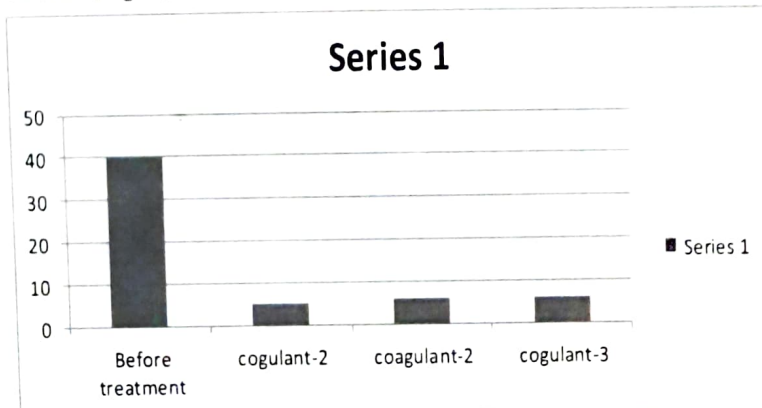
Acidity (mg/lit)



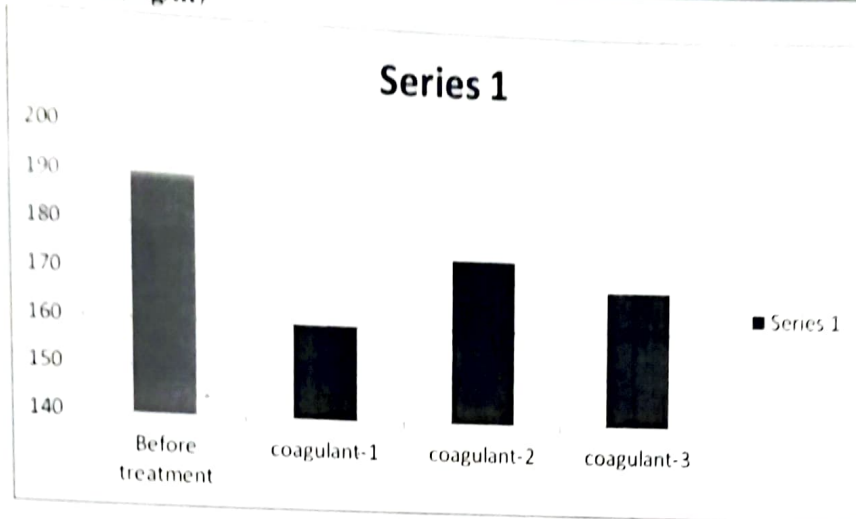
Alkalinity (mg/lit)



Chloride(mg/lit)



Hardness(mg/lit)



Colour:

Initially colour of the water sample was fait brown after treatment brownness was completely removed. Water samples become coloueless after treatment with all the three coagulants

pH:

During present investigation pH of water sample collected from Hated Mali Nalla was 8.8 which is slightly more than standard values, but after treatment with the value of pH comes with the standard limits. With treatment with coagulant no.1 it was 7.05. With treatment with coagulant no.2 it was 7.2. With treatment with coagulant no.3 it was 7.16. This is due to adsorption of proton from water sample by the coagulants.

Turbidity:

Turbidity level and intensity of illumination is an impotent factor to maintain water quality (7). Before treatment with coagulants turbidity was found 15.4 NTU. This value was very high than that of standard value of turbidity, but after treatment with coagulant no-1 it decreases to 3.4 NTU coagulant no-2- 4.7NTU and coagulant no-3-3.16.NTU. Moringa Oleifira seed powder removed 90-99% of turbidity in the treated water (8)

Acidity:

Acidity of the untreated water sample was found to 37 mg/lit. After treatment with coagulant no-1, no-2 and no-3 the value of acidity reduces to 5.0 mg/lit, 5.9 mg/lit, 5.5mg/lit respectively.

Alkalinity:

Alkalinity of water sample collected from Hated Mali Nalla was found 107 mg/lit before treatment with any coagulant, but this value reduces to 90 mg/lit, 96 mg/lit and 92 mg/lit with adsorbent no-1, adsorbent no-2 and adsorbent no-3 respectively and comes under 100 Alkalinity reduces due to coagulation on the surface of coagulants(9)

Chloride:

The chloride level was found 40mg/lit in water sample collected from Hated Mali Nalla. The level of chloride was found to reduce after treatment with adsorbents. With coagulant no-1

this value was found reduce more than that of remaining two adsorbents it was found 5.1mg/lit, 6.2 mg/lit and 5.9 mg/lit with adsorbent no-1, adsorbent no-2 and adsorbent no-3 respectively

Hardness:

Hardness was analyzed by standard methods given in APHA (9) Hardness was found 190mg/lit in the sample collected from Hated Mali Nalla abut after treatment with coagulants this value reduces to 160 mg/lit, 175 mg/lit and 169 mg/lit with coagulant no-1, coagulant no -2 and coagulant no -3 respectively. Hardness of the water sample is reducing due to adsorption on the surface of the coagulants.

T.S. and T.D.S. :

TDS in water found due to content of carbonate, bicarbonate, chloride, calcium, magnesium, phosphate, nitrate, organic matter and salt(10) The value of TS and TDS reduces effectively after treatment with coagulants no 1 , 2 and 3.

Conclusion:

From the present investigation it was observed that by the use of these adsorbents physico- chemical values of the water sample collected from Hated Mali Nalla was reduces and the physico- chemical parameters like pH, Turbidity, T.S., T.D.S., Chloride, Hardness which is more than standard limits in the water sample collected from Hated Mali Nalla the colour of the water sample before treatment with coagulants was faint brown but after treatment with all three coagulants water sample become colourless. After comparison of action all coagulants it was found that the value of all parameters reduces more in the case of coagulant no-1 (dried Moringa Oleifira seeds powder) but least in the case of coagulant no-2 (dried ground nut shell powder) But the results of physico- chemical analysis with coagulant no-3 (fifty- fifty percent mixture of both Moringa Oleifira seeds powder and dried ground nut shell powder) was found to be reduce more than that of coagulant no -1 and less than that of coagulant no-2. It is concluded that all the three coagulants can be used to treat polluted water the cost of all these is very less and all are edible, natural and harmless but coagulant no-1 (dried Moringa Oleifira seeds powder) parametric results was found very good.

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