

Assessment of Physico-chemical Properties of Waste Water after Treatment with Some Natural Adsorbents

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Abstract:

Living organism cannot survive without water because water is essential for every living thing. Now day water pollution become is gigantic problem. Natural wetlands are polluted due to human activity, industrial waste, agricultural runoff, sewage waste. In the present study waste water goes out from chemistry laboratory of J.D.M.V.P.S. A.S.C. Nutan Maratha College Jalgaon, is collected and its physico-chemical properties were checked then this water sample treated with dried corn cob powder and dried Moringa Oleifira seeds powder after filtration of this water sample all physico-chemical parameter were re-analyzed. Comparison of these analytical values with standard values it was found that values of all physic-chemical parameters decreases and comes within standard limits.

Key Words: *Water pollution, waste water, waste water treatment, natural adsorbents*

1. Introduction:

Life without water cannot be assume. Water is life, but it should be vertuous. Water pollution is cosmic problem in present situation. Water sources become polluted due to various human activities like Industrial waste, agricultural runoff, sewage etc. Urbanisation and longtime discharge of industrial effluents, domestic waste, sewage and solid waste dump cause ground water polluted and create health problem[1] This polluted water is hazardous for all living things. In the present work the investigator try to overcome the problem of polluted water goes out from the Chemistry laboratory of J.D.M.V.P.S. A.S.C. Nutan Maratha College Jalgaon. The number of students in chemistry department of J.D.M.V.P.S. A.S.C. College Jalgaon is from class XI to M.Sc. is very large , when they perform experiment the chemical waste are throwaway in basins which goes out through pipes. In the present study this chemical waste water is collected from the pipes and physic-chemical parameter like pH, Electrical conductance, Total hardness, Total dissolves solids, Turbidity, sulphate and chloride were analyses according to standard methods give by APHA [2], then this polluted water is treated with dried corn cob powder and dried Moringa Oleifira seeds powder, after filtration all the physic-chemical parameters are re analysed and compared with standard values. Corn cob power and dried Moringa Oleifira seeds powder are harmless to living things, easily available low cost and completely biodegradable. The results of this investigation were quite good.

2. Material and Methods:

In the present investigation the corn cobs were collected from local farmers. These corn cobs cut in to small pieces then dried in sun light. Dried corn cob was converted in to powder by grinding similarly Moringa Oleifira seeds were dried and griend to powder. Chemical waste water is collected from the out let of chemistry laboratory when students were performing experiments. Physico-chemical properties like pH, EC, Total hardness, Total dissolved solids, Turbidity, Sulphate, chloride were analysed by standard methods given by Goel & Trivedi & APHA. Then in two different containers dried corn cob powder and dried Moringa Oleifira seeds powder is taken 50 ml of waste water is added to both the containers and stirrer vigorously after 20 minutes the water samples were filtered by the use of filter paper. All the physico-chemical parameters were reanalyzed and compared with standard values (WHO)

3. Result and Discussion:

Table 1

Sr.No	PARAMETER	BEFORE TREATMENT WITH ADSORBENTS	AFTER TREATMENT WITH CORN COB POWDER	AFTER TREATMENT WITH MORINGA OLEIFIRA POWDER	WHO STANDARD
1	pH	3.9	6.9	6.6	6.5-8.5
2	Electrical conductance in μ mhos/cm	501.7	300.1	289.0	
3	Total Hardness- mg/lit	615.4	307.2	300.2	500
4	Total Dissolve - Solids mg/lit	575.0	208.4	201.3	500
5	Turbidity -NTU	16.2	5.5	5.3	5
6	Sulphate mg/lit	375	202	191.2	200
7	Chloride mg/lit	476.2	230	223.4	250

3.1 pH:

pH is measure of acidity and alkalinity. The pH value of water sample collected for analysis before treatment with adsorbent was 3.9. This value was highly acidic this is due to presence of strong acids in waste water, but it increases to 6.9 and 6.6 after treatment with corn cob adsorbent and Moringa Oleifira seeds powder respectively. The hydrogen ion concentration of water is considered as an index of environmental conditions. According to Boyd and Pillai [3.]better fish production could possible in pond water with pH 6.5 to 9.0. The pH 6.9 and 6.6 of the water sample after treatment with adsorbents was found within standard limits of WHO (6.5-8.5) This pH is not harmful for the life of fishes also.

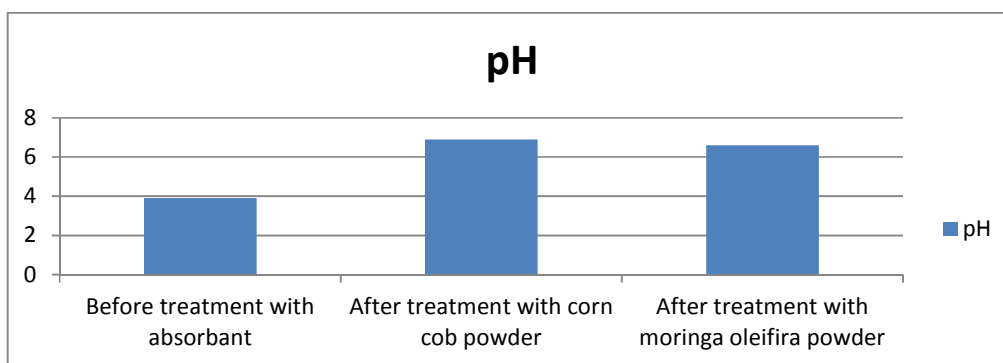


Figure 1. pH Graph

3.2 Electrical conductance:

Electrical Conductivity (EC) is a measure of the capability of a substance to conduct Electrical conductance is due to presence of electrolytes in the water sample. Higher value of electrical conductance in waste water collected for physico- chemical analysis indicates presence of large number of electrolytes in waste water sample. In present study EC value in water sample before treatment with corn cob adsorbent was found 501.7 μ mhos/cm but it reduce to 300.1 and 289.0 μ mhos/cm after treatment with corn cob adsorbent and Moringa Oleifera seeds powder respectively. Electrical conductance affects the taste of water [4].

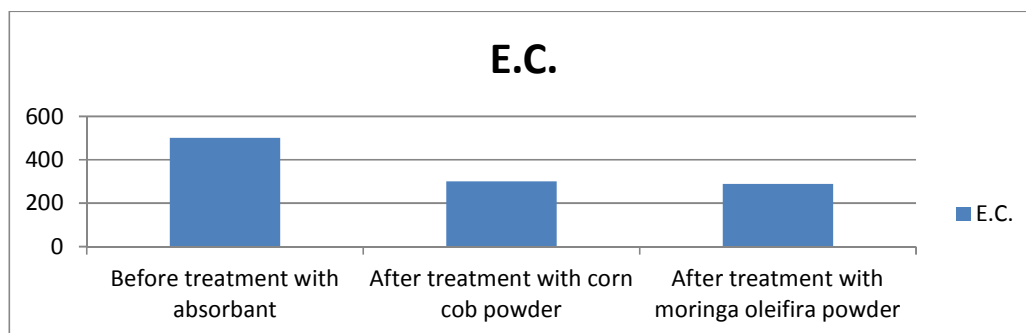


Figure 2. Electronic Conductivity Graph

3.3 Total Hardness :

Total hardness in water sample before treatment with natural adsorbent was 615.4 mg/lit which is more than permissible value given by WHO, but it reduces to 307.2 and 300.2 mg/lit after treatment with corn cob adsorbent and Moringa Oleifera seeds powder respectively comes with in permissible limits given by WHO. Use of hard water causes excessive soap consumption in home, laundries, textile and paper industries [5].

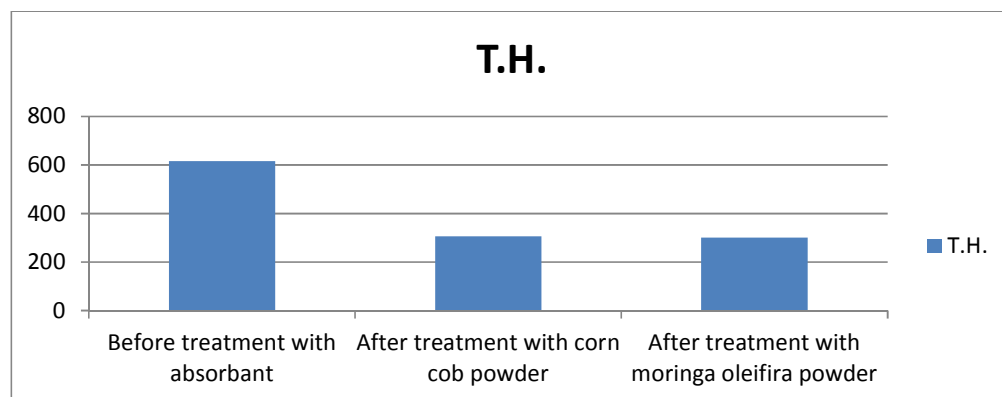


Figure 3. Total Hardness

3.4 Total Dissolve Solids :

Water containing high TDS concentration may cause Laxative or constipation effect [6]. Total dissolved solid in waste water sample was found 575.0 mg/lit. before treatment with adsorbent. This value

was more than standard permissible value given by WHO. When this waste water sample is treated with adsorbent it decreases to 208.4 mg/l with treatment with corn cob adsorbent and 201.3mg/l with Moringa Oleifera seeds powder adsorbent. It comes under standard limits.

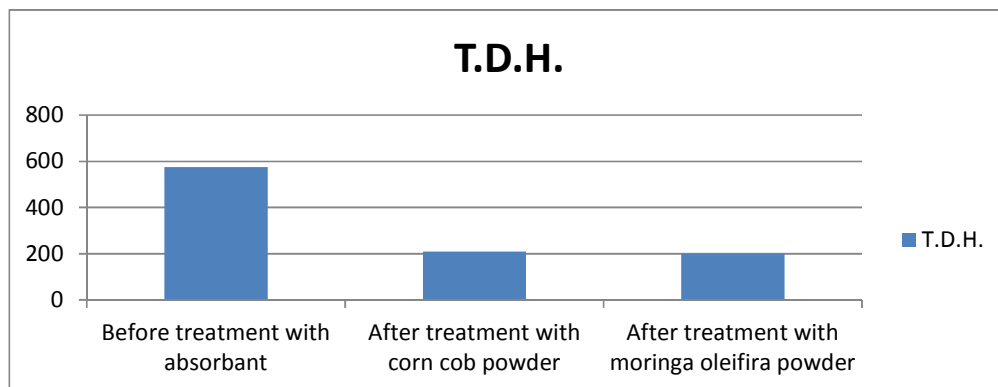


Figure 4.Total Dissolve Solids

3.5 Turbidity:

Turbidity is an expression of the optical property that causes light to be scattered or absorbed rather than transmitted in straight lines through a water sample. Turbidity can raise surface water temperature above normal because suspended particles near the surface facilitate the absorption of heat from sunlight[7]. Turbidity in water is resulted by the presence of suspended matter such as clay, silt, finely divided organic and inorganic matter, plankton, and other microscopic organisms.

Turbidity in water sample collected from outlet of chemistry laboratory was observed 16.2 NTU which is very high, but after treatment with corn cob adsorbent it reduces to 5.5 NTU and with Moringa Oleifera seeds the value was found 5.3 NTU both the values come close to standard value given by WHO.

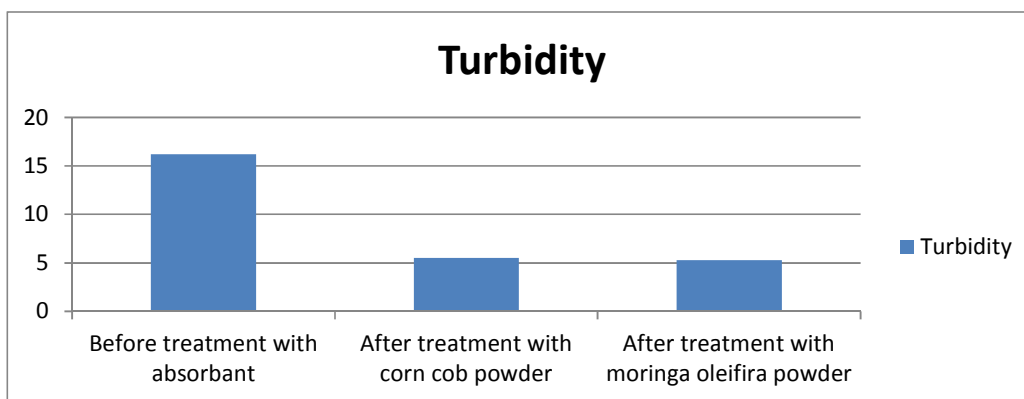


Figure 5. Turbidity Graph

3.6 Sulphate:

Sulphate in water sample before treatment with adsorbent was noted 375 mg/l. This value is very higher than standard value of sulphate given by WHO. After treatment with corn cob adsorbent sulphate

level reduces to 202 mg/lit and with Moringa Oleifira seeds it was 191.2mg/lit which come close to WHO standard 200 mg/lit. High level of sulphate gives a bitter taste to water [8].

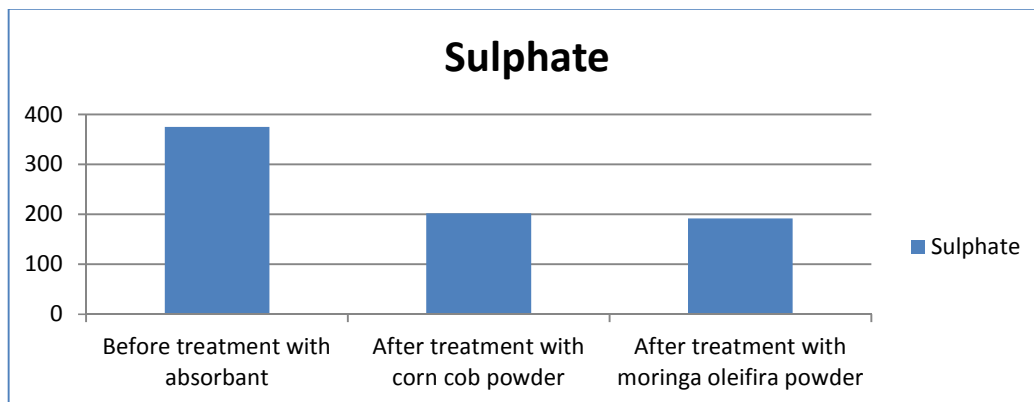


Figure 6. Sulphate Graph

3.7 Chloride:

High concentration of chloride may result both from natural and anthropogenic sources such as runoff containing salts, the use of inorganic fertilizers, landfill leaches, septic tank waste, animal feeds, industrial effluents, irrigation drainage [9]

Chloride in untreated water sample was found 476.2 mg/lit. This value is too large than that of standards of WHO, but after treatment with corn cob adsorbent it reduces to 230 mg/lit and 223.4 mg/lit with Moringa Oleifira seeds. This value is little more than standards. After treatment it reduces to 246.2 mg/lit and 252.8 mg/lit with treatment with both adsorbents respectively.

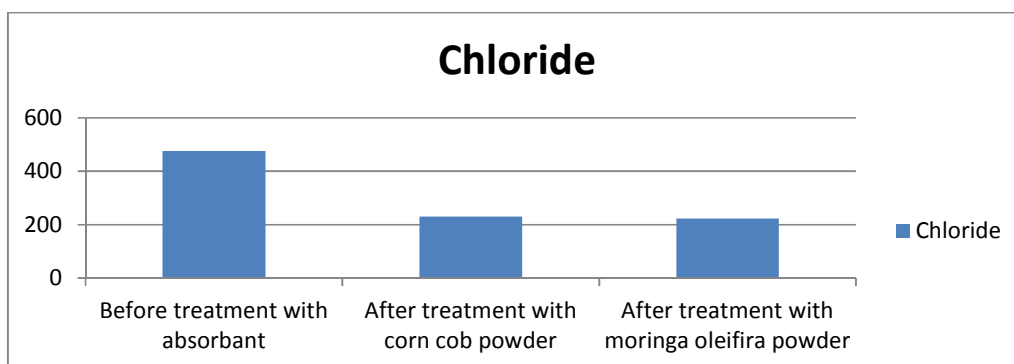


Figure 7. Chloride Graph.

4. Conclusion:

From the present investigation it is observed that the drain water goes out from chemistry laboratory is highly chemical polluted. All the parametric values in the sample are beyond standard limits given by WHO. This waste water sample when treated with dried corn cob powder and Moringa Oleifira seeds powder as an adsorbent the pH value comes under the standard permissible level but with Moringa Oleifira seeds

powder investigators get better result. E.C. also decreases with both the adsorbents. Parametric values like Total Hardness, Total dissolved solids, Turbidity were found beyond permissible level in untreated sample but after treatment with dried corn cob powder and dried Moringa Oleifera seeds powder as adsorbent these value comes under permissible limit. Sulphate and chloride value were found beyond the permissible value after treatment with adsorbent, sulphate decreases more than that of chloride.

The overall result of use of these natural dried adsorbents was very good, but use of dried Moringa Oleifera seeds powder as adsorbent gives better results for all parameters. Corn cob and dried Moringa Oleifera seeds powder is bio degradable easily, available and economically good.

5. Acknowledgement:

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