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A LOW COST ADSORBENT TO TREAT WASTE WATER COLLECTED FROM CHEMISTRY LABORATORY

Madhuri S. Patil
Department of Chemistry, J.D.M.V.P.S. A.S.C. College, Jalgaon

ABSTRACT:

Living things cannot survive without water because water is essential for every living thing. Now day water pollution become is huge problem. Natural Water bodies are polluted due.to human activity, industrial waste, agricultural runoff, sewage waste. In the present investigation waste water goes out from chemistry laboratory of J.D.M.V.P.S. A.S.C. College Jalgaon, is collected and its physic-chemical properties were checked then this water sample treated with dried corn cob powder after filtration of this water sample all physic-chemical parameter were re-analyzed. Comparison of these two 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, natural adsorbent

INTRODUCTION:

Life without water cannot be imagined. Water is life, but it should be pure. Water pollution is huge problem in present situation. Water sources become polluted due to various human activities like Industrial waste, agricultural runoff, sewage etc. Urbanisation and prolong 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 investigation 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. 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 , 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 after filtration all the physic-chemical parameters are re analysed and compared with standard values. Corn cob power is harmless to living things, easily available low cost and completely biodegradable. The results of this investigation were quite good.

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. 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 50 ml of this waste water is slowly poured in a glass container in which 30 gram of adsorbent already filled (dried corn cob powder) after 20 minutes the water sample is filtered by the use of filter paper. All the physico-chemical parameters were reanalyzed and compared with standard values (WHO)

RESULT AND DISSUTION:

Sr.No	PARAMETER	BEFORE TREATMENT	AFTER TREATMENT	WHO STANDARD
1	pH	3.2	6.9	6.5-8.5
2	Electrical conductance in μ mhos/cm	804.7	303.1	
3	Total Hardness- mg/lit	702.4	310.2	500
4	Total Dissolve -Solids mg/lit	610.0	208.4	500
5	Turbidity -NTU	17.2	5.5	5
6	Sulphate mg/lit	375	202	200
7	Chloride mg/lit	476.2	230	250

pH:

pH is measure of acidity or alkalinity. The pH value of water sample collected for analysis before treatment with corn cob was 3.2. This value was highly acidic this is due to presence of strong acids in waste water, but it increases to 6.9 after treatment with corn cob adsorbent. 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 of the water sample after treatment with adsorbent is within standard limits of WHO (6.5-8.5) This pH is not harmful for the life of fishes also.

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 804.7 μ mhos/cm but it reduce to 303.1 μ mhos/cm after treatment with corn cob adsorbent. Electrical conductance affects the taste of water [4].

Total Hardness :

Total hardness in water sample before treatment with natural adsorbent was 702.4 mg/lit which is more than permissible value given by WHO, but it reduces to 310.2 mg/lit and comes with in permissible limits given by WHO. Use of hard water causes excessive soap consumption in home, laundries, textile and paper industries [5].

Total Dissolve Solids :

Water containing high TDS concentration may cause Laxative or constipation effect [6].Total dissolved solid in waste water sample was found 610.0 mg/lit. before treatment with corn cob 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. It comes under standard limits.

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 17.2 NTU which is very high, but after treatment with corn cob adsorbent it reduces to 5.5 NTU and come close to standard value given by WHO.

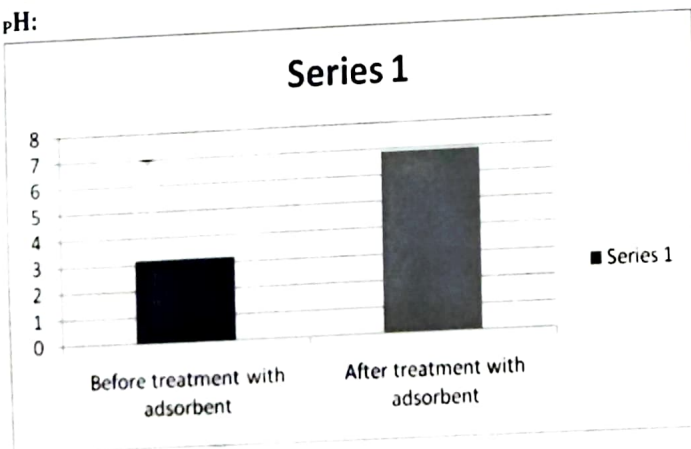
Sulphate:

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/l and come close to WHO standard 200 mg/l. High level of sulphate impart a bitter taste to water [8].

Chloride:

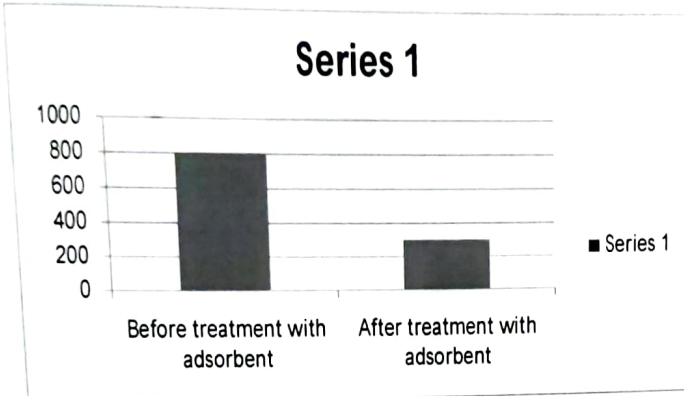
High concentration of chloride may result both from natural and anthropogenic sources such as run off containing salts, the use of inorganic fertilizers, landfillleaches, septic tankwaste, animalfeeds, industrial effluents, irrigation drainage [9] Chloride in untreated water sample was found 476.2 mg/l. This value is too large than that of standards of WHO, but after treatment with corn cob adsorbent it reduces to 230 mg/l. This value is 20mg/l more than standards. After treatment with it reduces to 246.2 mg/lit.

pH:

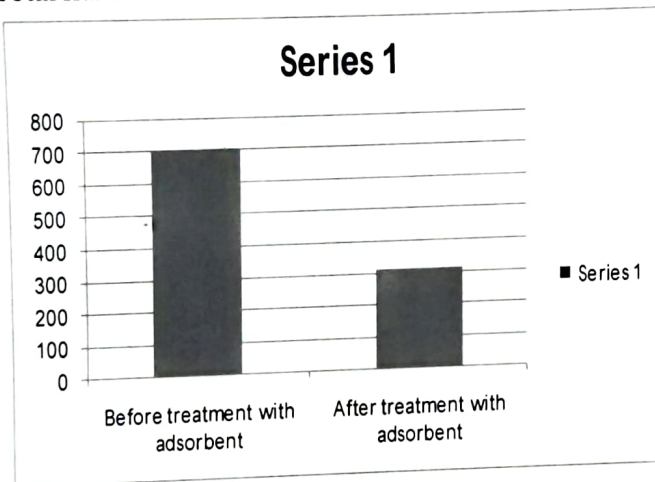




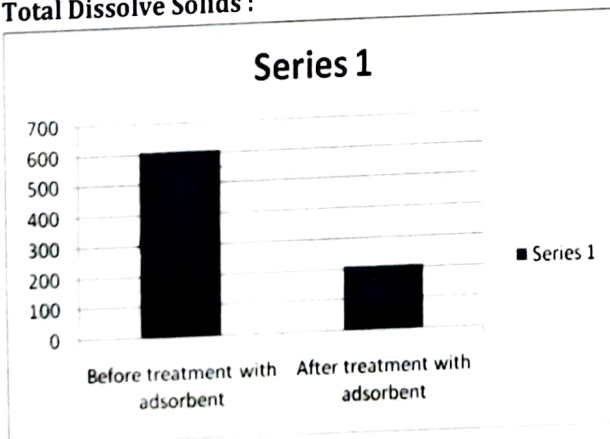
sElectrical conductance:



Total Hardness:

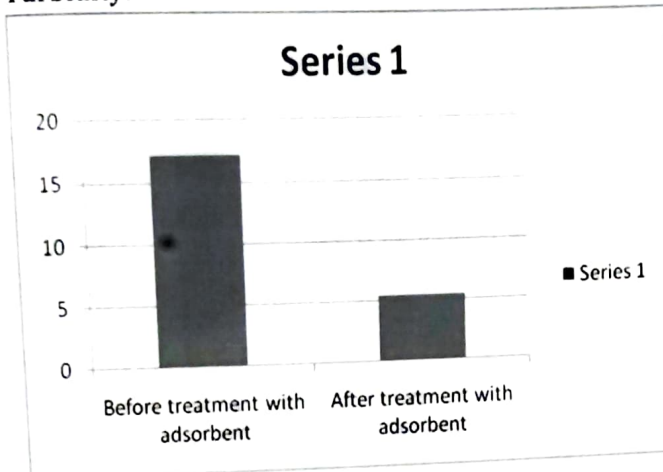


Total Dissolve Solids :

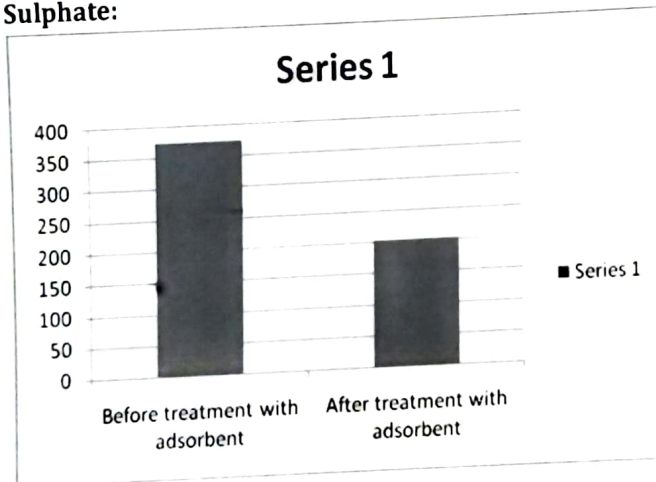




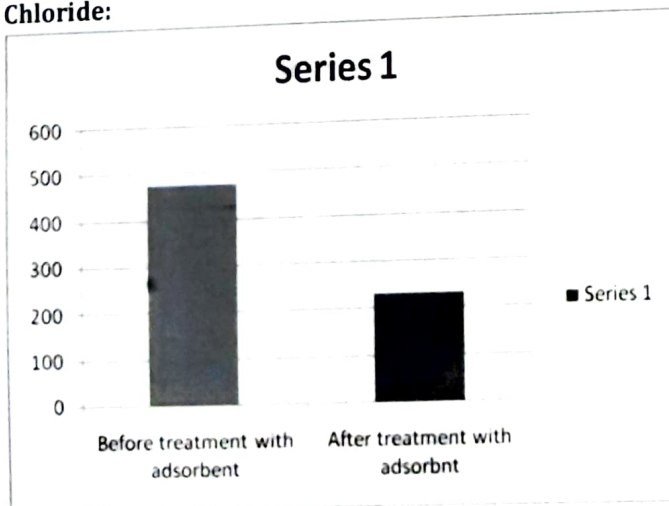
Turbidity:



Sulphate:



Chloride:





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 is beyond standard limits given by WHO. This waste water sample when treated with dried corn cob powder as a adsorbent the pH value comes under the standard permissible level (6.9). E.C. also decreases 303.1 μ mhos/cm from 804.7 μ mhos/cm. 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 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 this natural dried corn cob powder adsorbent is very good. Corn cob is bio degradable easily, available and economically good.

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