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An International Open Access Journal
UGC and ISSN Approved | ISSN: 2349-5162

INTERNATIONAL JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH

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SSN: 2349-5162 | Impact Factor: 5.87

UGC and ISSN Approved Journals.

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ISSN (Online): 2349-5162

International Journal of Emerging Technologies and Innovative Research is published under the name of JETIR publication and URL: www.jetir.org.

Published in India

Typesetting: Camera-ready by author, data conversation by JETIR Publishing Services – JETIR Journal

JETIR Journal, WWW. JETIR.ORG

ISSN (Online): 2349-5162

International Journal of Emerging Technologies and Innovative Research

ISSN : 2349-5162

PHYSICO CHEMICAL STUDY OF AGRICULTURAL WASTE WATER AFTER TREATMENT OF SOME NATURAL ADSORBENTS

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ABSTRACT:

In present situation water issue become a big problem. Large number of water bodies gets polluted. Discharge of agricultural waste in natural water bodies are harmful to flora and fauna of aquatic system as well as human life, It is necessary to perpetuate the cleanness and purity of water bodies. In this study agricultural waste water is treated with natural adsorbents like dried powder of cotton plant branches and dried powder of banana leaves and peels. Physio- chemical parameters of agricultural waste water were analysed before and after treatment with adsorbents and record very good results.

KEY WORDS:

Agricultural waste water, Adsorbents, Water pollution

INTRODUCTION:

Water is second most essential thing for life after air. In present days water bodies become highly polluted, which is harmful for life system their fore in current scenario water pollution become large misadventure. Polluted waste water is perilous for planet earth, also it changes chemical and physical properties of soil. Ground water quality also affect due to pollution in waste water with heavy metals, various ions and pathogens [1]

In the present investigation the agricultural waste water is collected from the farm of cotton. After collection of water physic chemical parameters like P^H, Total suspended solids, Total dissolved solids, Total hardness, chloride, Turbidity, COD and BOD were analysed after that water sample is treated separately with these two adsorbents. After 25 and 35 minutes these samples are filtered and all the parameters were re-analysed and found very good changes in all the parametric values.

MATERIAL AND METHODS:

In the present work the agricultural waste water is collected from the cotton farm and physio-chemical parameters like P^H, Total suspended solids, Total dissolved solids, Total hardness, chloride, Turbidity, COD and BOD were analysed according to standard methods after that 500 ml.of water sample is treated separately with50 gram each dried powder of cotton plant branches and dried powder of banana leaves and peels in two sets. After 25 minutes and 35 minutes water samples are filter separately and re-analysed all the parameters according to given by APHA. [2]

The results of above study were found quite good.

RESULT AND DISCUSSION:

PARAMETER	UNIT	INITIAL VALUE
P^H		5.1
TOTAL SUSPENDED SOLIDS	Mg/L	650
TOTAL DISSOLVED SOLIDS	Mg/L	2501
TOTAL HARDNESS	Mg/L	690
TURBIDITY	NTU	57.1
COD	Mg/L	122.4
BOD	Mg/L	45.1

Table.1 physico-chemical characteristics of waste water before treatment with adsorbent

PARAMETER	UNIT	INITIAL VALUE	WITH DRIED POWDER OFCOTTON BRANCH	DRIED POWDER OF BANANA LEAVES AND PEELS
P^H		5.1	6.1	6.8
TOTAL SUSPENDED SOLIDS	Mg/L	650	250.2	225.3
TOTAL DISSOLVED SOLIDS	Mg/L	2501	316	201
TOTAL HARDNESS	Mg/L	690	561	550
TURBIDITY	NTU	57.1	21	18
COD	Mg/L	122.4	72.5	67.3
BOD	Mg/L	45.1	26.4	20.3

Table 2 physico-chemical characteristics of waste water after 25 minutes treatment with adsorbents

PARAMETER	UNIT	INITIAL VALUE	WITH DRIED POWDER OF COTTON BRANCH	DRIED POWDER OF BANANA LEAVES AND PEELS
P^H		5.1	6.8	7.2
TOTAL SUSPENDED SOLIDS	Mg/L	650	170.8	155.8
TOTAL DISSOLVED SOLIDS	Mg/L	2501	257	184.5
TOTAL HARDNESS	Mg/L	690	470.4	420.6
TURBIDITY	NTU	57.1	12	10
COD	Mg/L	122.4	52.5	38.3
BOD	Mg/L	45.1	16.4	13.8

Table 3 physico-chemical characteristics of waste water after 35 minutes treatment with adsorbents

P^H :

P^H of water sample shows acidic or alkaline nature of water sample. In the present study P^H of water sample before treatment with adsorbent was found 5.1 which indicate acidic nature of water Gasim at al [3] observed P^H 3.53 in his research. After treatment with adsorbents (dried powder of cotton branch), after 25 minutes- 6.1 and after 35 minutes 6.8 shows that this adsorbent is good to treat acidic water but 35 minutes sample shows better results. Similarly with dried powdered banana leaves and peels show P^H 6.8 after 25 minute treatment and 7.2 after 35 minute treatment. Both adsorbent show higher increase in P^H and theae results are in permeable level of P^H.

TOTAL SUSPENDED SOLIDS:

Initially TSS was noted 650 mg/l. This reduces to 250.2mg/l with dried powder of cotton branch adsorbent with 25 minutes treatment and 170.8mg/l with dried powder of cotton branch adsorbent with 35 minutes treatment .But the results with dried powdered banana leaves and peels 225.3mg/l TSS noted after 25 minute treatment, TSS level more reduce after 35 minutes it was found155.8mg/l.

TOTAL DISSOLVED SOLIDS:

Before treatment with adsorbents TDS value in agricultural waste water was found 2501 mg/l. This is very high. Joshi et al. [4] also observed TDS more than permitted value in sambhar lake water. TDS reduces after treatment with both the adsorbents. With dried powder of cotton branch adsorbent after 25 minutes it reduces 2510 to316 mg/l. and at 35 minute time it reduces to 257 mg/l. In the case of dried banana leaf and peel powder after 25 minutes it reduces 201 mg/l and after 35 minutes it reduces to 184.5 mg/l.

TOTAL HARDNESS

TH in untreated water sample was noted 690 mg/l this value was more than tolerable level. TH reduces after treatment with both the adsorbents. With dried powder of cotton branch adsorbent after 25 minutes it reduces 690 to561 mg/l and at 35 minute time it reduces to 470.4 mg/l. In the case of dried banana leaf and peel powder after 25 minutes it reduces 550.0 mg/l and after 35 minutes it reduces to 420.6 mg/l Dash et al [5] durin his analysis of water sample from Balasore found 1% water samples has TH value beyond desirable level

TURBIDITY

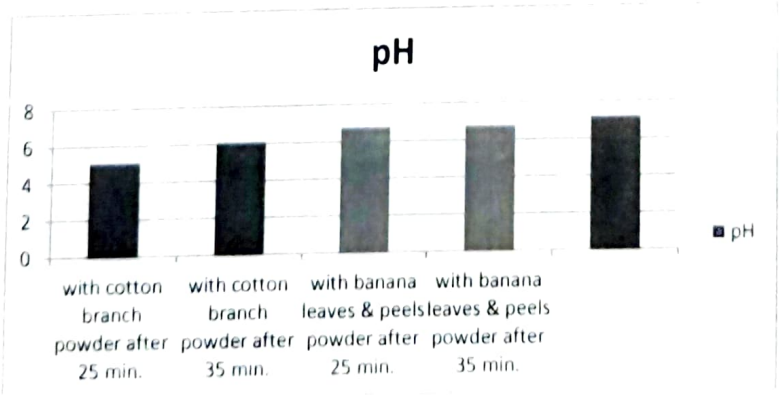
Initially Turbidity in water sample was found 57.1 NTU this is more than desired level. After treatment with dried powder of cotton branch adsorbent after 25 minutes it reduces 57.1NTU to 21 NTU. and at 35 minute time it reduces to 12 NTU. In the case of dried banana leaf and peel powder after 25 minutes it reduces 18 NTU and after 35 minutes it reduces to 10 NTU., but still turbidity is high after treatment with adsorbents.

CHEMICALOXYGEN DEMAND:

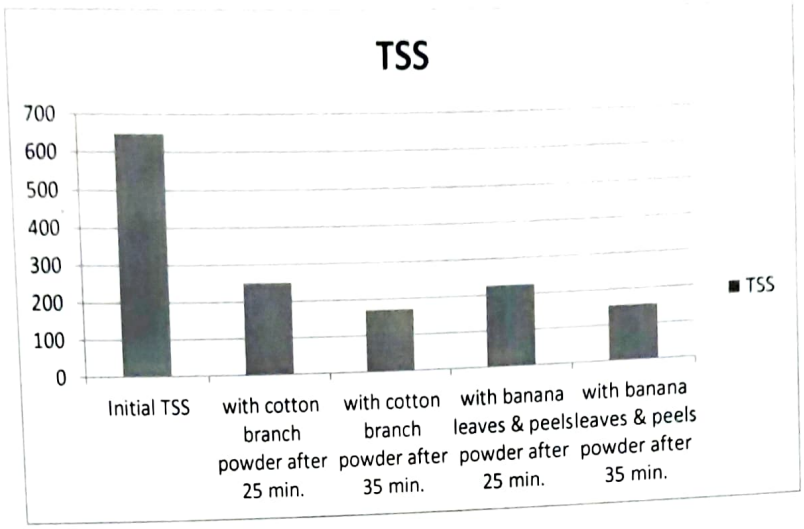
COD is amount of oxygen required by organic matter in a sample of water for its oxidation by strong oxidizing agents. Initially COD was 122.4 mg/l. After treatment with dried powder of cotton branch adsorbent after 25 minutes it reduces 72.5 mg/l and at 35 minute time it reduces to 52.5 mg/l In the case of dried banana leaf and peel powder after 25 minutes it reduces 67.3mg/l and after 35 minutes it reduces to 38.3mg/l., COD level is reduce after treatment but still more than desirable level. But decrease in COD level with both adsorbents was quite good. Patel at.el [6] also noted COD more than permissible level in water sample collected from Amirgadh.

BIOLOGYCAL OXYGEN DEMAND:

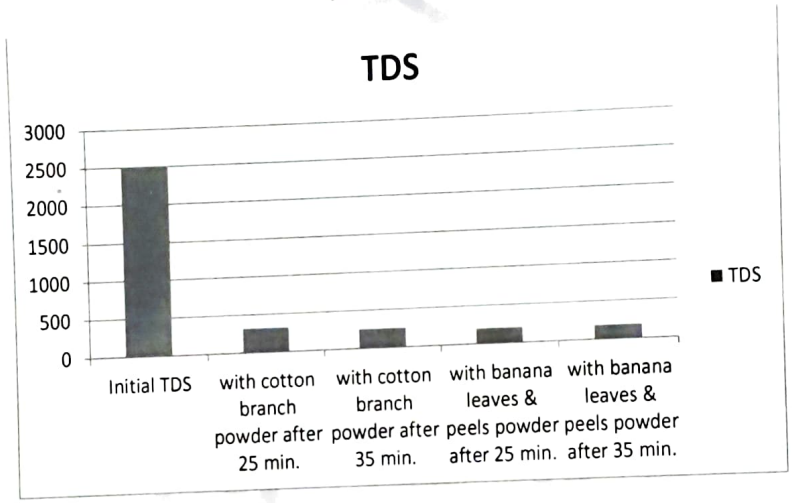
BOD is indicator, not a pollutant. It gives idea about amount of oxygen utilized by micro organism. Initially BOD level was found 45.1 mg/l but it reduces to 26.4mg/l and 20.3mg/l with dried powder of cotton branch and dried banana leaf and peel powder successively after 25 minutes of treatment. BOD level reduces to16.4mg/l and 13.8mg/l with dried powder of cotton branch and dried banana leaf and peel powder successively after 35 minutes of treatment. Sangpal et.al. [7] found Higher BOD level in post monsoon season.



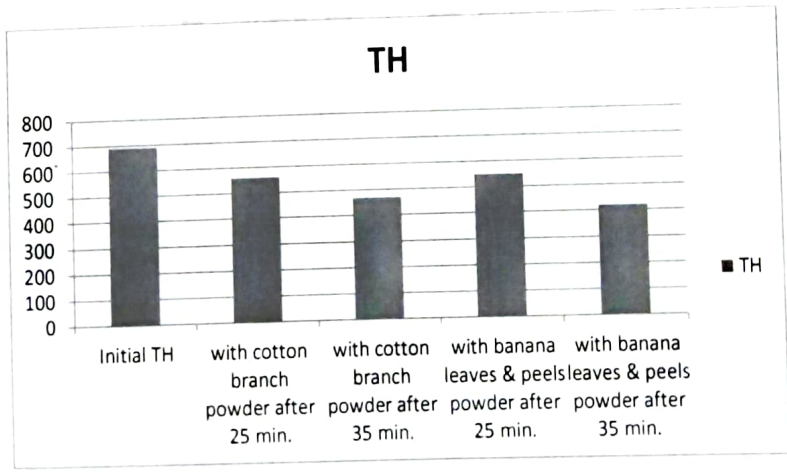
Graph1: pH graph



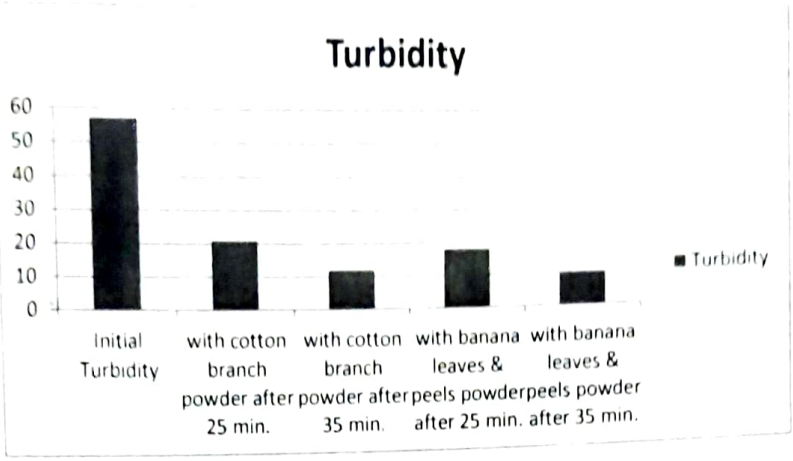
Graph 2: TSS graph.



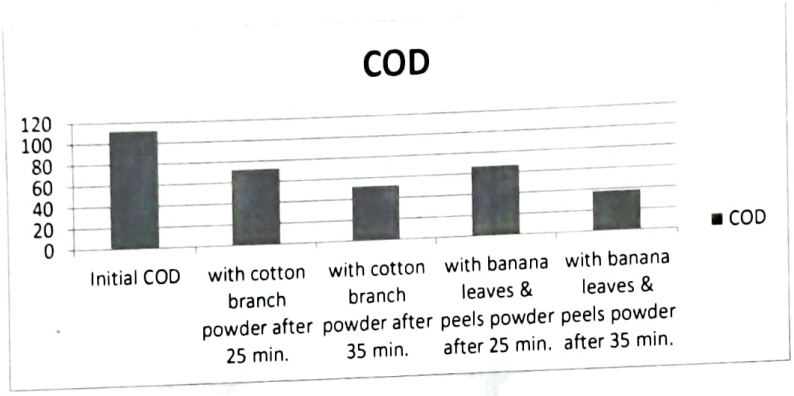
Graph 3: TDS Graph



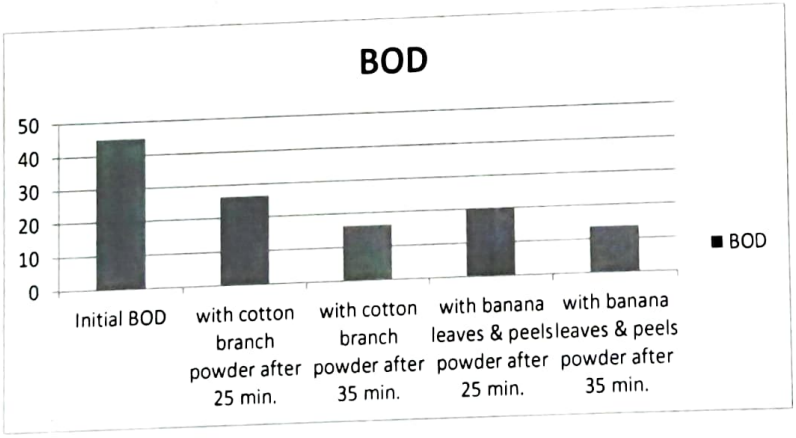
Graph 4: TH graph



Graph 5: Turbidity graph



Graph 7: COD graph



Graph 8: BOD graph

CONCLUSION:

From the above it is observed that P^H of water sample increases after treatment with both the adsorbents and comes within permissible level. All other selected physico-chemical parametric values shows favorable changes. After 35 minutes of treatment show more satisfactory results than that of 25 minutes treatment. The dried banana leaf and peel powder adsorbents shows comparably better results than that of dried cotton branch powder. Both adsorbents are natural eco-friendly, easily available and economically good.

ACKNOWLEDGEMENT:

Author is thankful to the principal J.D.M.V.P.S. A.S.C. College, jalgaon for permission and providing facilities to carry out this work.

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