REMOVE NITRATE CONTENT FROM WATER BY USING NITRONET

[1]Roshan Chavan, [2]Mayuresh Koli, [3]Amit Mane, [4]Rohan Gade, [5]Shubham Jadhav

[1]Prof. P. G. Gaikwad

U.G.Student , Dept.Of Civil Engineering, Shri. Chhatrapati Shivajiraje College Of Engg, Pune. Maharashtra, India.

Abstract : Groundwater is one of the fundamental aid for consuming and agricultural usage. Excessive use of nitrogen fertilizers in agricultural things to do have extended the nitrate degree in groundwater, which severely influences the fitness of human beings and this reason methemoglobinemia (MetHb), generally known as as "blue toddler syndrome". The essential purpose of this scan is to develop a fee nice process, efficient elimination of nitrate and eco-friendly. In this strategy, sodium hydroxide (NaOH) activated coconut shell charcoal used to be used as an adsorbent to evaluate the elimination effectivity of nitrate in groundwater. This test used to be carried out by means of changing the pH value, adsorbent dosage, temperature, preliminary nitrate awareness and contact time. Within the studied commentary from the referred to parameters, it is seen that the optimum elimination of nitrate takes location with the exchange in preliminary nitrate concentration.

Key words – **Nitrate,Nitonet,coconut coir,wooden charcoal .**

I. INTRODUCTION

Groundwater is one of the major resource for drinking and agricultural usage. Excessive use of nitrogen fertilizers in agricultural activities have increased the nitrate level in groundwater, which severely affects the health of human beings and this cause methemoglobinemia (MetHb), commonly called as "blue baby syndrome". Water is the major resource used by humans and every living being in the earth. Due to population increase, deficiency in water occurs. This caused the increase in the usage of ground water. For all the living matter, nitrogen is an essential element. Nitrogen with various oxidation levels are easily soluble in water which is highly toxic to human health. Ground water contamination by nitrate content increased due to the usage of high level nitrate contained fertilizers for agricultural purpose. The other sources of nitrate contaminated water include landfill leakage, leakage of septic tank and municipal storm water runoff. Increased level of nitrate in drinking water affects the haemoglobin which mainly cause blue baby syndrome for infants. It also provokes eutrophication and algal growth in water bodies. To reduce the nitrate level in water miscellaneous methods such as adsorption, ion-exchange, biological denitrification, chemical reduction and reverse osmosis are used. Instead of this methods we adopted nitronet which can be remove nitrate content and other impurities from ground water.

The Nitronet can be prepared from refined cotton, wooden coal, coir, sand etc. to treat the nitrate contaminated water. In this project this material is adopted to make Nitronet. This material is a adsorbent material. The specific properties of this adsorbent used to reduce the nitrate level in water.
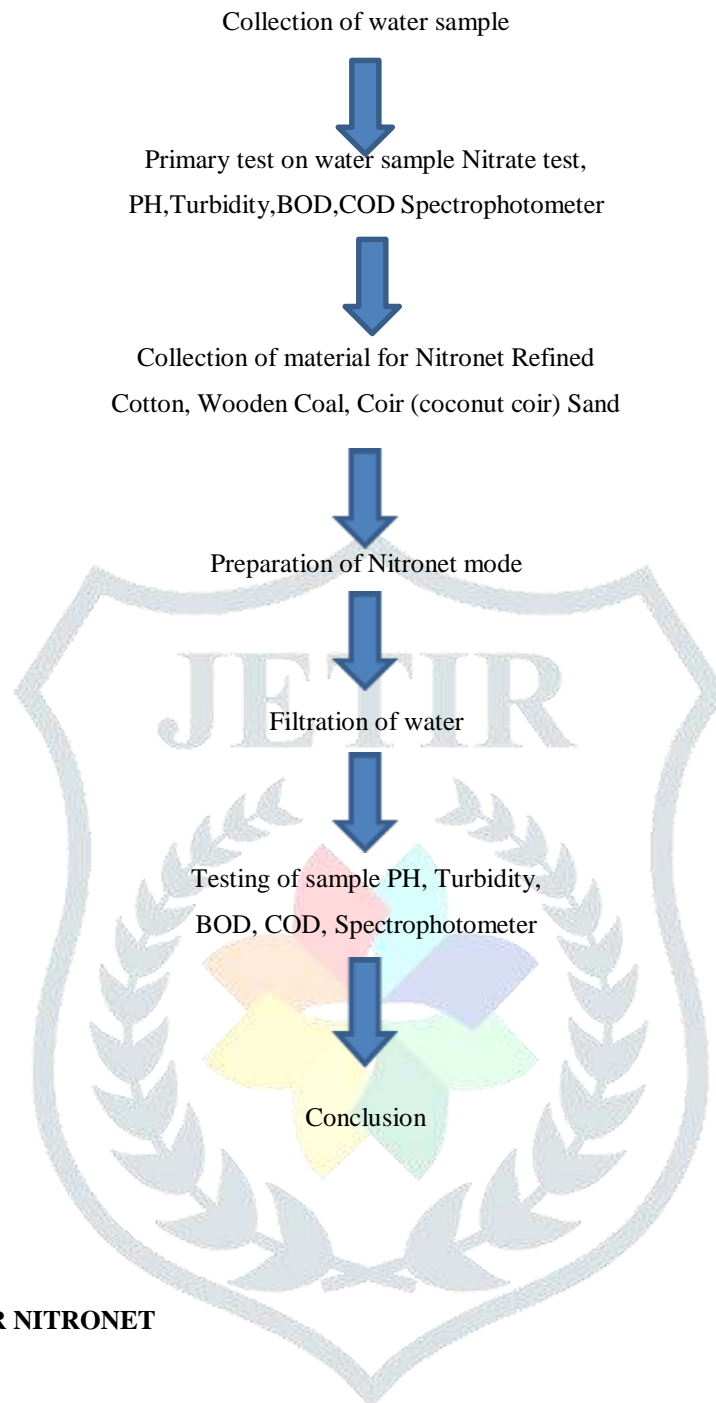
II. OBJECTIVES

1. The prime objective of this project adopt uncomplicated safe and lucrative method to treat the nitrate contaminated water..
2. To invent device called nitronet which can remove at least nitrate from water and bring it to permissible limit that is 45lit/mg as per IS10500-2012 and 10 mg/limit as per limit given by WHO.
3. To make water potable for everyone and reduce the Water pollution

SCOPE

The minimum resources such as coconut coil, sodium hydroxide and potassium nitrate are readily available and used in this process. In this technique a highly carbonaceous absorbent is used. The chosen adsorption technique for nitrate removal is a successful one.

III.   **METHODOLOGY**

Collection of water sample

⬇

Primary test on water sample Nitrate test,

PH,Turbidity,BOD,COD Spectrophotometer

⬇

Collection of material for Nitronet Refined

Cotton, Wooden Coal, Coir (coconut coir) Sand

⬇

Preparation of Nitronet mode

⬇

Filtration of water

⬇

Testing of sample PH, Turbidity,

BOD, COD, Spectrophotometer

⬇

Conclusion

III.I MATERIALS USE FOR NITRONET

III.II Refined cotton :-

They are used for filtering dirt and dust from liquids like water and oil. Among many types of filter cloths available on the market, cotton is often preferred for its cost effective

III.III Wooden charcoal (coal) :-
A filter with granular activated carbon (GAC) is a proven option to remove certain chemicals, particularly organic chemicals, from water. GAC filters also can be used to remove chemicals that give objectionable odors or tastes to water such as hydrogen sulfide (rotten eggs odor) or chlorine.

III.VI Coir (Coconut) :-

Coconut coir powder has an absorption capacity of 1.5% which can increase the absorptive strength of the coconut fiber. This indicates that the potential of water absorption by coconut husk is quite good. Coconut husk fragments provide an effective and durable wastewater filtering medium because they have the right proportion of microspores and macrospores. Microspores are an ideal environment for the microorganisms that make biological wastewater treatment possible.

III.V River sand:-

The sand removes pathogens and suspended solids from contaminated drinking water. A biological community of bacteria and other micro-organisms grows in the top 2 cm of sand. This is called the bio layer. The micro-organisms in the bio layer eat many of the pathogens in the water, improving the water treatment.

III.II Nitronet Model

The Nitronet can be prepared from refined cotton, wooden coal, coir, sand etc. to treat the nitrate contaminated water. In this project this material is adopted to make Nitronet. This material is a adsorbent material. The specific properties of this adsorbent used to reduce the nitrate level in water as well as other impurities.

Fig : Nitronet

IV. EXPERIMENTAL INVESTIGATION

IV.I Primary Test on sample

IV.I.I Actual value of River water

PARAMETERS	PERMISSIBLE (IS 10500:2012)	ACTUAL RIVER VALUE
PH	6.5 – 8.5	7.8
TURBIDITY	1-5 NTU	4.1 NTU
BOD	30 mg/lit	30mg/lit
COD	0-250 mg/lit	88mg/lit
NITRATE	45 mg/lit	70.79mg/lit

IV.I.I Actual value of Well water

PARAMETERS	PERMISSIBLE (IS 10500:2012)	ACTUAL WELL VALUE
PH	6.5 – 8.5	8.3
TURBIDITY	1-5 NTU	7.8 NTU
BOD	30 mg/lit	-
COD	0-250 mg/lit	96mg/lit
NITRATE	45 mg/lit	52mg/lit

V.   **Test and Result**

V.I River Water After filtration

PARAMETERS	PERMISSIBLE (IS 10500:2012)	ACTUAL RIVER VALUE	AFTER FILTRATION RIVER
PH	6.5 – 8.5	8.3	6.8
TURBIDITY	1-5 NTU	7.8 NTU	1.5 NTU
BOD	30 mg/lit	30mg/lit	18mg/lit
COD	0-250 mg/lit	96mg/lit	12mg/lit
NITRATE	45 mg/lit	52mg/lit	28.87mg/lit

V.II Well Water After filtration

PARAMETERS	PERMISSIBLE (IS 10500:2012)	ACTUAL Well VALUE	AFTER FILTRATION WELL
PH	6.5 – 8.5	8.3	7.1
TURBIDITY	1-5 NTU	7.8 NTU	1.4 NTU
BOD	30 mg/lit	-	-
COD	0-250 mg/lit	96mg/lit	32mg/lit
NITRATE	45 mg/lit	52mg/lit	15.57mg/lit

V.III Nitrate Graph

Nitrate Nitrogen Standard Curve

$y = 1.106x + 0.068$

$R^2 = 0.944$
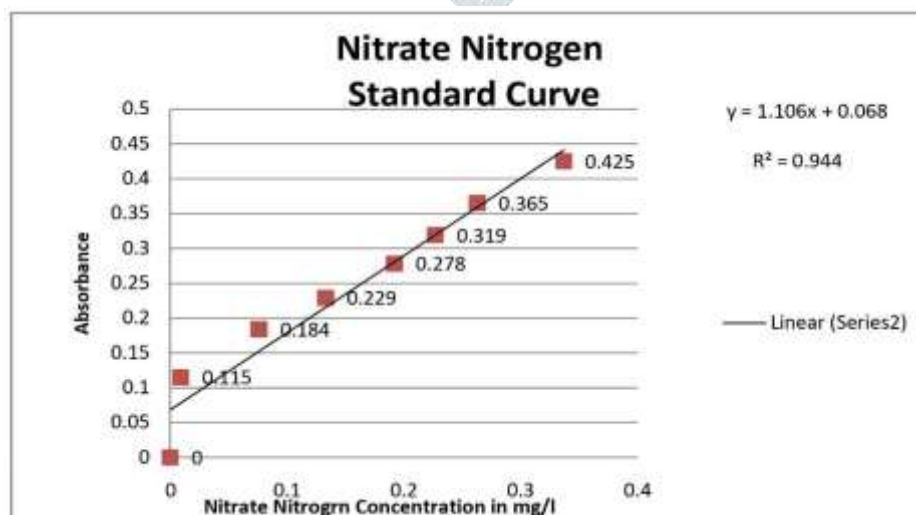
VI.   CONCLUSION

I River Water:

- ➤ It is observed that the pH value will be reduced by 12.82 %.
- ➤ It is observed that the Turbidity will be reduced by 63.41 %.
- ➤ It is observed that the BOD value will be reduced by 40%.
- ➤ It is observed that the COD value will be reduced by 86.36 %.
- ➤ It is observed that the Nitrate will be reduced by 59.21 %.

II Well Water :

- ➤ It is observed that the pH value will be reduced by 14.45%.
- ➤ It is observed that the Turbidity will be reduced by 82.05 %.
- ➤ It is observed that the DO is absent then BOD value will be reduced by 0%.
- ➤ It is observed that the COD value will be reduced by 66.66%.
- ➤ It is observed that the Nitrate will be reduced by 70.05%.

- ❖ It can be concluded that cost of the project required will be less because use of naturally available material. i.e. hence project will be economical.

- ❖ The harmful effect of nitrate ever-rising concentration in aqueous media on both human health and the environment have stimulated extensive research on nitrate removal methods that are both affordable and effective.

REFERENCES

[1] Claudio Della Rocca ,Vincenzo Belgiorno,Sureyya Meric (2006)Overview of in-situ applicable nitrate removal processes.

[2] Archna,Surinder K. Sharma, And Ranbir Chander Sobti (2011)

Nitrate Removal from Ground Water: A Review

[3] N.Sudha,P.Priyadharshini ,J.S. Subaranjani ,K.Pradeepa (2019) Removal of nitrate from water by using activated coconut shell charcoal.

[4] Morteza Mohsenipour , Shamsuddin Shahid, And Kumars Ebrahimi (2014)Removal Techniques of Nitrate from Water.

[5] Fariba Rezvani & Mohammad-Hossein Sarrafzadeh & Sirous Ebrahimi (2016) Nitrate removal from drinking water with a focus on biological methods: a review

[6] Jan Peter Van Der Hoek And Abraham Klapwijk (1986)Nitrate Removal from Ground Water.

[7] P. K. Sharma 1, C. N. Tripahti 1 , S.K. Dubey 1 , P. Srivastava 1 ., N.A. Khan 2 Household Nitrate Removal Technologies: An Overview.

[8] Chunming Su And Robert W. Puls Nitrate Reduction by Zerovalent Iron.

[9] Abhay Burte1 , Anuj Hagawane2 , Mahesh Mone3 , Siddhant Konde4 , Sarangdhar Biradar5 Prof. Kiran Ghorpade6 A Review: Removal of Nitrate from Water by Absorption.

[10] Simona Ciiinska, Vit Mate@, Jakub KrejCi, TomaS Janoch & Eva Kyslikova Water Denitrification by a Immobilized Biocatalyst.