



## Analysis of Drinking Ground Water Quality in Rural Area Region.Tal : Bhusawal, Dist. Jalgaon, Maharashtra.

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### Abstract: -

*The open well water quality in Varangaonregion was assess which is used in domestic as well as agricultural purposes.*

*The open well samples were collected from the five wells around this region. The physico-chemical parameters such that colour, odour, temperature, pH, Electrical conductivity, total hardness, total dissolved solids, calcium, magnesium, chloride, total alkalinity, dissolved oxygen, chemical oxygen demand and biological oxygen demand were analysed and to know monsoon status in this region of water quality. Drinking water quality of Premonsoon season was better than post monsoon season, one samples were slightly alkaline along with high dissolved solids.*

**Key words :-** Drinking water standards, water quality, ground water, physico-chemical parameters.

### Introduction :-

Water is one of the abundantly available substance in nature, It is an essential constituents of all animals and vegetables matter and forms about 75% of the matter of earth crust<sup>1</sup>.

Water is mostly used for industrial and municipal purposes in this area open well water is used only for agricultural as well as drinking purposes<sup>2</sup>.

Today human activities are constantly adding industrial, domestic and agricultural waste to ground water reservoirs at an alarming rate<sup>3</sup>. Ground water contamination is generally in irreversible i.e. once it is contaminated it is difficult to restore the original water quality of the aquifer. Excessive mineralization of ground water degrades water quality producing an objectionable taste, adour and excessive hardness<sup>4</sup>.

It is always better to protect ground water first rather than recycling on technology to clean up water from contaminated source<sup>4,5</sup>.

Polluted ground water is the major cause for the spread of epidemics and chronic diseases of man. It cause typhoid, jaundice, dysentery, diarrhea, tuberculosis and hepatitis<sup>6,7,8</sup>.

The use of polluted ground water for irrigation purposes severely damages crop and decreases grain production<sup>9</sup>.

### Study area :-

The Varangaon area lies between latitudes 30°19'28" and longitudes. 38°28'35" Thermal Power Station , Ordnance factory Varangaon, Milk plant, ash pond are situated in this region. The ground water quality of the study area is adversely affected by ash water by thermal power station. Increased population and improper drainage system have potential to influence the ground water quality <sup>5</sup>.



**Sample collection: -**

The sample collection consist of well in rural area, ground water samples collected from five (5) well at various locations within study area during pre and post monsoon season. Details of sampling location are as follows. Samples were collected in plastic container to avoid unpredictable changes in characteristics at 8 am to 11am. As per standard procedure<sup>1</sup>

**Drinking water samples in the study area are as follows. :-**

- S1- Nageshwar temple well
- S2- Vilhala village well (Near to ash pond)
- S3- Susari village
- S4- Near Achegaon village
- S5- Renukamata Temple

**Material and methods :-**

The collected samples were analysed for different physico-chemical parameters such as temp, colour, odour, pH, electrical conductivity, TDS, DO, COD, BOD, Alkalinity, Total Hardness, Calcium, Magnesium hardness and chloride as per the standard methods. And the results were compared with the Indian standard for potable water<sup>5</sup>.

**Results and discussion :-**

The water quality of different ground water samples have been carried out for temp, pH, Electrical conductivity, Total dissolved solids, Total hardness, total alkalinity, calcium, magnesium, chlorides dissolved oxygen, biological oxygen demand, and chemical oxygen demand, The status of water quality of these ground water sources are presented in table<sup>5,9</sup>.

The pH of ground water samples varied between 6.8 to 7.3 and 7.1 to 7.6 during pre and post monsoon season respectively. The pH value of Vilhala village well water was found to be 7.6 which is higher in all the samples<sup>6,13</sup>.

Electrical conductivity varied between 260 to 477 and 340 to 514  $\mu\text{mho/cm}$ . in pre and post monsoon season respectively. The same trend was observed in case of TH of various ground water sources. If varied from 54 to 98 and 110 to 198 mg/l pre and post monsoon season respectively<sup>8,9</sup>. Total dissolved solids ranges between 250 to 310 and 270 to 380 mg/l pre and post monsoon season respectively. Value are slightly higher in post monsoon than pre monsoon season<sup>10</sup>. The total hardness of sample Vilhala village is moderately hard<sup>11</sup>.

The calcium ranges 21 to 84 mg/l and 118 to 240 mg/l in pre and post monsoon season respectively<sup>12</sup>, magnesium ranges 30 to 50.8 and 132 to 140 mg/l pre and post monsoon season respectively, chloride ranges 15 to 19.1 and 17.8 to 31.5 mg/l in pre and post monsoon season respectively<sup>13</sup>.

Alkalinity ranges from 140 to 215 and 185 to 225 mg/l in pre and post monsoon season respectively<sup>14</sup>.

Dissolved oxygen ranges from 3.14 to 4.15 and 4.28 to 5.39 mg/l pre and post monsoon season respectively, chemical oxygen demand 1.98 to 3.05 and 2.00 to 3.10 mg/l in pre and post monsoon season respectively, and biological oxygen demand varied from 0.4 to 1.2 and 2.8 to 4.5 mg/l in pre and post monsoon season respectively<sup>14</sup>.





### Conclusions:-

In general ground water quality of Varangaon region in rural area of well water is not harmful to human being except near to ash pond Vilhala village open well (S2) hardness is higher 200mg/lso hard water and sample S1 ,S3,S4, S5 are moderately hard S1,S3 in pre monsoon season are soft water this is due to the percolation of ash water from ash pond vilhala village.

### Acknowledgement: -

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Comparative Physico-Chemical Analysis of Omkareshwar Dam Reservoir Water  
(Narmada River) in Pre Monsoon and Monsoon Season- M.P., India

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**Abstract:**

River Narmada is one of the biggest and important rivers of India. This river covers 98,797 sq. K.M. surface in India. This river is Line of Life of state Madhya Pradesh and Gujrat. Many dams are constructed on this river. One of this is at Omkareshwar Reservoir in omkareshwar in Nimad M.P. In the present study samples of water were collected from omkareshwar reservoir in pre monsoon and monsoon season. Various parameters were analyzed and compared these results with standard values according to WHO, BIS standard values.

**Key words:** River Narmada, Water pollution, Physico - chemical analysis, Narmada dam

**Introduction:**

Earth surface is covered by 70 percent of water but only 3 percent of this water is useful for drinking. Life without water cannot be imagined but no a day water bodies get polluted due to human activities like industrial waste, municipal sewage, domestic waste, agricultural runoff. Polluted water affects on human health. Higher value of Hg causes weakness of tongue, deafness. Sewage water contamination causes typhoid, jaundice and amoebiosis.

Polluted water affects on aquatic eco system it also affects on soil. Alkalinity may increases due to polluted water. Bacteria and micro organisms may die due to polluted water. Alternation in flora and fauna also occurs due to pollution (dammed site) Ogbeibu at al. 2002(1)

Narmada River is sixth largest river in India. Narmada is Holy River. River Narmada originates from Amarkantak. Many dams are constructed on this river. This helps to solve the problem of water for agriculture domestic use and industrial use. Hence investigators analyzed omkareshwar dam (Built on River Narmada) water in pre monsoon (may 2018)and monsoon season (August2018) and compare these results with standard values according to WHO and BIS.

In this investigation parameters like Temperature, PH, electrical conductance, TH, TDS, Turbidity, Sulphate, chloride and BOD are measured in pre monsoon and monsoon season.

**Material and Methods:**

Water sample were collected from the omkareshwar dam in pre monsoon and monsoon season as per standard methods given in APHA (2) in sampling bottles. All the parameters like pH, E.C. ,Turbidity, hardness(calcium & magnesium), nitrate, phosphate, sulphate, chloride, Dissolved oxygen were analyzed in laboratory according to procedure given in APHA

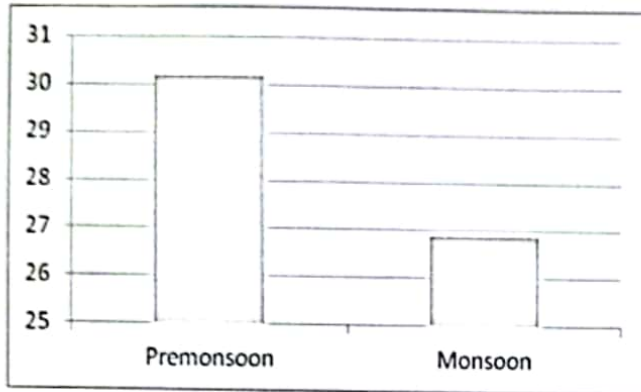
**Result and Discussion:**

Sr. No.	Parameter	Pre monsoon season	Monsoon season	WHO
1	Temperature in ° C	30.2	26.9	30 ° C
2	pH	8.4	7.9	6.5-8.5
3	EC in µmhos/cm	400.5	301.2	

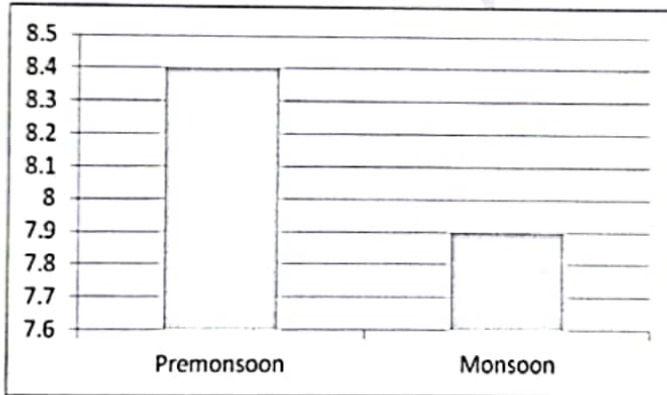


4	Total hardness mg/l	196.2	110.2	500
5	Total dissolved solids mg/l	189	225	500
6	Turbidity NTU	4.9	6.8	5
7	Sulphate mg/l	2.6	2.9	200
8	Chloride mg/l	23.6	20.2	250
9	BOD(PPM)	0.9	1.2	3-5

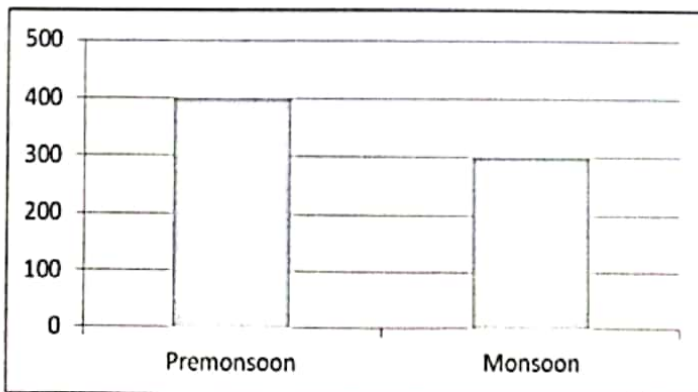
**Temperature:**



**pH**



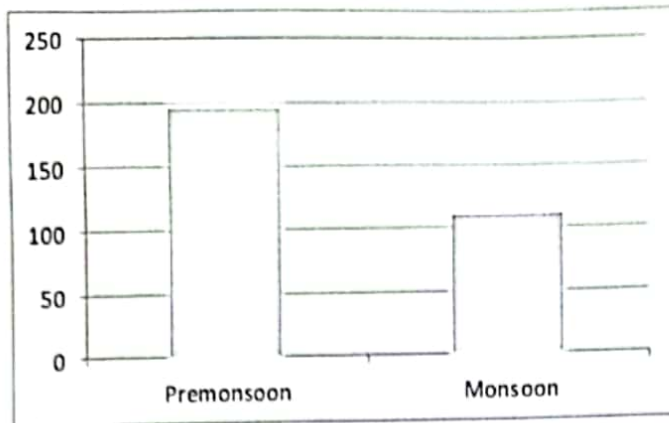
**EC**



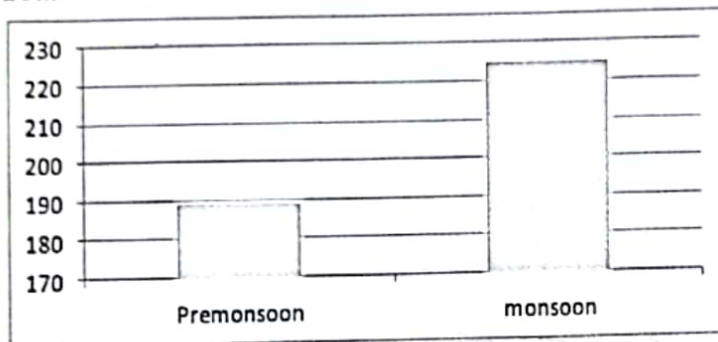




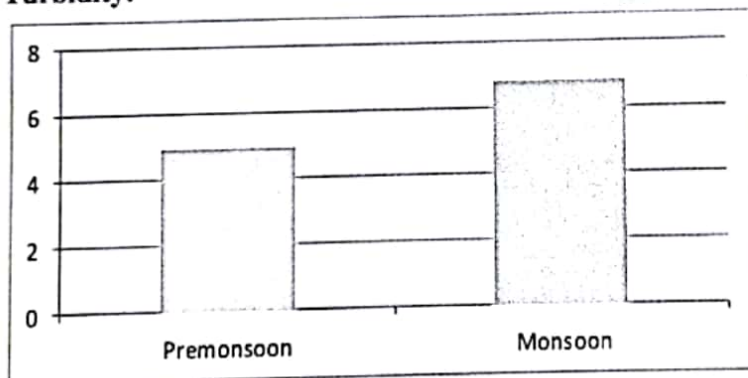
**Total Hardness:**



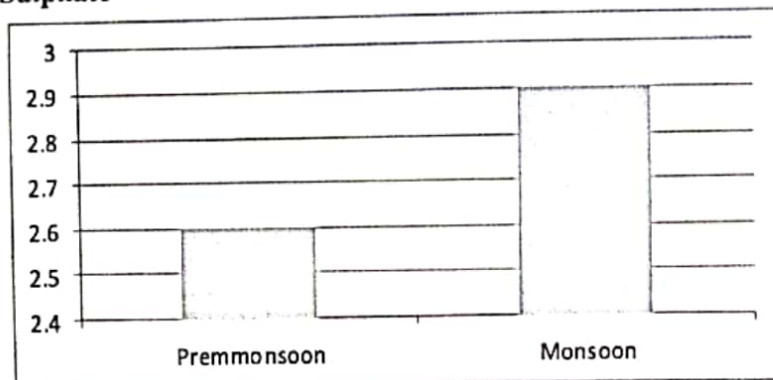
**Total Dissolve Solid:**



**Turbidity:**

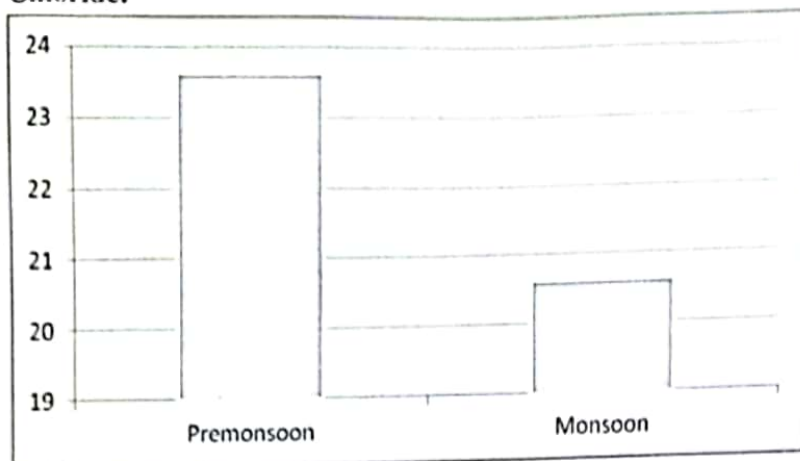


**Sulphate**

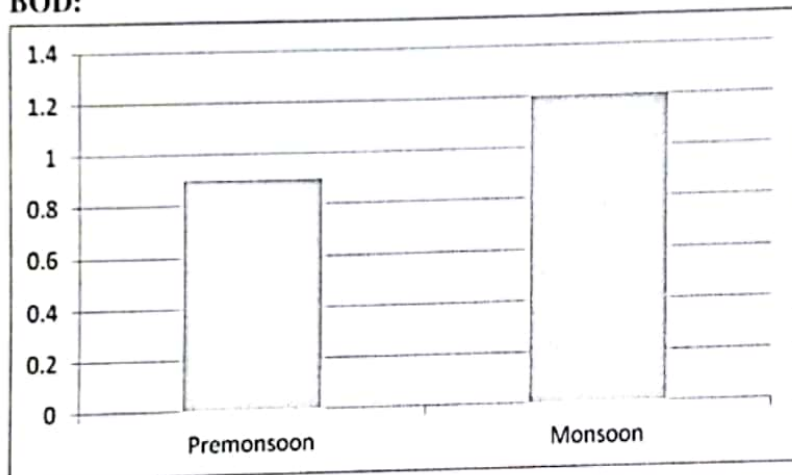




**Chloride:**



**BOD:**



**Temperature:**

Temperature is important parameter. Temperature affects on aquatic system, low temperature is not good for microbial growth (3). In the present investigation temperature in pre monsoon and monsoon season was observed 30.2 ° C and 26.9 ° C.

**pH:**

pH of Narmada dam- Omkareshwar water was found in pre monsoon season was observed 8.4 the value of pH reduces to 7.9. In wet season pH comes in acidic side (4). In monsoon season the value of pH reduces due to run off of salts dissolved in river water.

**Electrical conductance:**

Electrical conductance gives an idea of TDS and salinity. Taste of drinking water affected by Electrical conductance (5) Electrical conductance of Narmada dam water in pre monsoon was observed 400.5 µmhos /cm. The value of electrical conductance decreases to 301.2 µmhos /cm. This decrease is due to run of salts in rainy season. Layalakshmi (2011) Observed 3350 µmhos /cm(5) This value is very high. The values of EC in present investigation were within the standard values.

**T.H.:**

T.H. of Narmada dam water was calculated by standard methods the value of TH in pre monsoon was found 196.2 mg/Lit while the value of TH reduces to 110.2 mg/Lit in monsoon. In summer season TH value is higher than that of rainy season. Rashic et.al. (2014) found hardness 125-136 mg/lit in pre monsoon and 131-186 mg/Lit in his investigation.(6)

**T.D.S. :**

TDS in water sample is contain of carbonates , bicarbonates, chlorides, calcium, potassium, nitrate sodium, magnese organic matter and other salts(7)TDS value found more (225mg/lit) in monsoon season but this value was less in pre monsoon. These values are within standard limits. Helen et al (2011) found maximum TDS 3955 mg/lit in investigation. (8)

**Turbidity:**

Turbidity value was observed 4.9 NTU in pre monsoon season and 6.8 NTU in monsoon season in the Narmada dam water. These values were lower than that of standard values.

**Sulphate:**

Sulphate level in Narmada dam water in pre monsoon was found 2.6 mg/Lit this value increases to 2.9 mg/lit in monsoon season. The sulphate level in both pre monsoon and monsoon was found within the standard limits.

**Chloride:**

The chloride level in river water affected by sediments, sewage and industrial waste. The chloride level in Narmada dam water was observed in pre monsoon season 23.6 mg/Lit and in monsoon this level decreases to 20.2 mg/Lit. In pre monsoon and monsoon the concentration of chloride was found with in standard values.

**BOD:**

BOD is Biological oxygen demand BOD is directly related to organic material present in water sample. The BOD level 0.9 was observe in pre monsoon season the value of BOD increases up to 1.2 in monsoon season. Hassanat et.al observed BOD in pre monsoon 6.8 to 12.57 this value reduces to 3.9 to 4.98 in winter (9) Gupta et.al found BOD 4.00 in Kewara dam water(10)

**Conclusion:**

From the above investigation it is observed that temperature of Narmada Dam water in pre monsoon as well as in monsoon season was found within the standard level so it is not harmful to aquatic eco system. Temperature in monsoon season was found less than that of pre monsoon. pH in pre monsoon was found more than that of monsoon. pH in both the seasons was found slightly acidic but within the standard value. Similarly all other parametric value like EC, TH, TDS, Chloride, Sulphate, BOD are observed with in standard level.

**Acknowledgement:**

Authors are 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.





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

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### 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 Oleifera 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 Oleifera 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 Oleifera and ground nut are found in large quantity in Jalgaon District Maharashtra. One of the natural adsorbent Moringa Oleifera also has medicinal value and use to treat water from long time (2,3,4,5,6)

### Material and Methods:

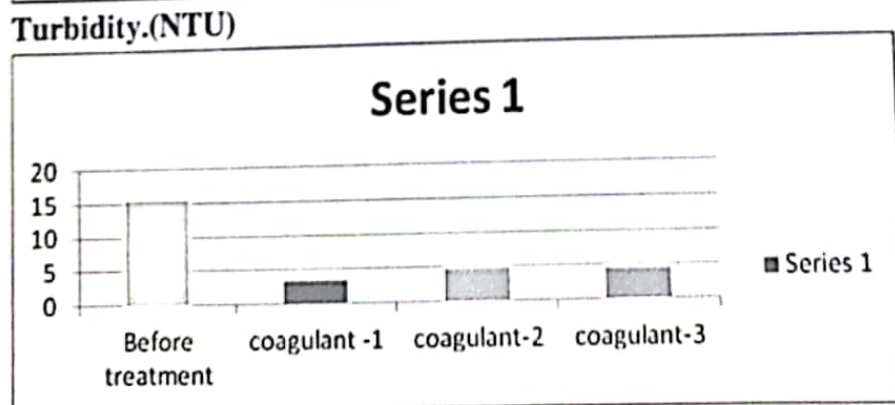
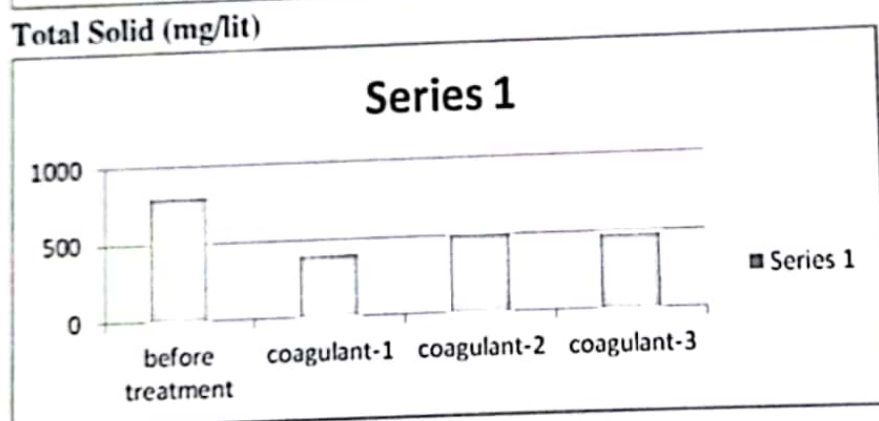
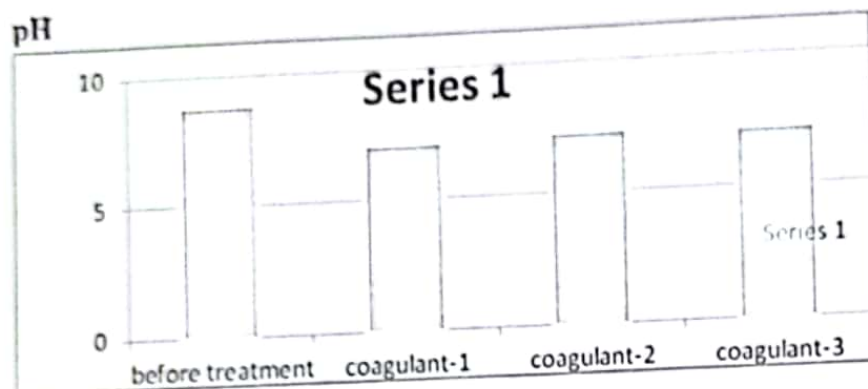
For this investigation dried Moringa Oleifera seeds powder, dried ground nut shell powder and fifty- fifty percent mixture of both are taken and converted in to powder by grinding. This powder is used as adsorbent. For this study Water sample were collected as per standard methods from hated Mali Nalla.

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-



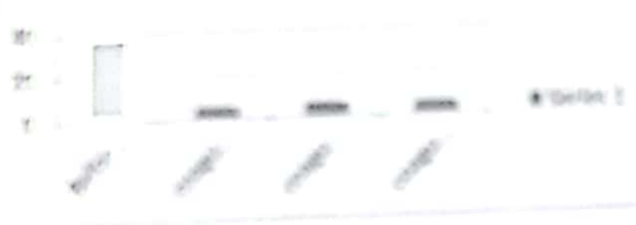
Total Dissolved Solids (mg/l)

Series 1



Alkalinity (mg/l)

Series 1



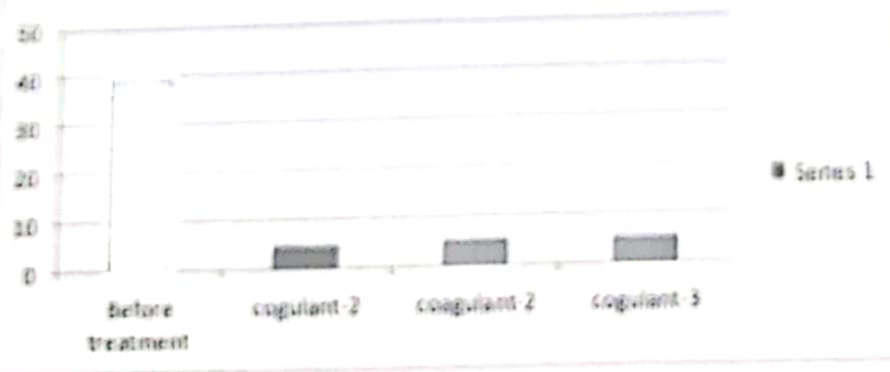
Alkalinity (mg/l)

Series 1



Chloride (mg/l)

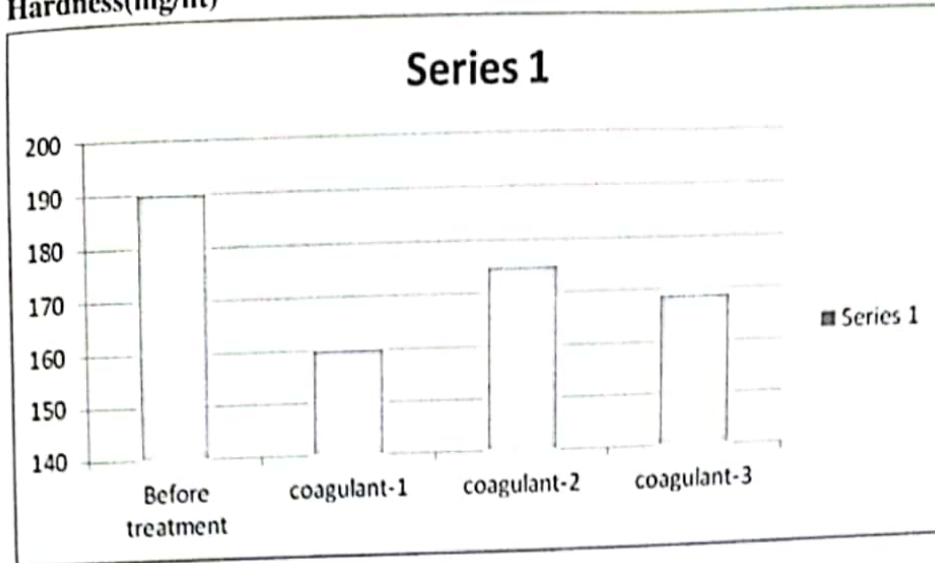
Series 1







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.1 it was 7.2. With treatment with coagulant no.1 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 mg/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 but 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 Oleifera 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 Oleifera 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 Oleifera seeds powder) parametric results was found very good.

#### Acknowledgement:

Authors are 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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