



INSPECTION AND SLIGHTLY MODIFICATION IN WATER TREATMENT PLANT OF NORTH NANDED CITY

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Abstract

The importance of water from only a quantity view point was recognized in the earliest days & the importance of quality come to be recognized gradually in the later days. There are number of peoples are suffering from water related disease in world. Now a most of the conventional treatment plant carried the traditional method or old method to run their plant. So it is not sufficient to remove all the impurities present in water. Due to which most of people use the purifier equipments on their personal level like water purifier, but it is not affordable to all people, who they are totally depend on municipal water supply for quality of water.

So, the study has provided an the process of slightly modified of conventional water treatment plant & from the result obtained proven that sufficient modification of supply is possible by the use of some alternatives giving a feasible option for drinking water to all people & they are trust to the quality of water.

Keywords: quality, modification, affordable, diseases, traditional

I. Introduction

Next to the air, the other important requirement for human life to exist is water. Water is available in various forms such as rivers, lake, streams etc. The earliest civilizations organized on the banks of major river systems, required water for drinking, bathing, cooking etc. But with the advancement of civilization the utility of water enormously increased and now such a stage has come that without well-organized

public water supply scheme, it is impossible to run the present civic life to the develop the towns. The importance of water from only a quantity viewpoint was recognized in the earliest days and the importance of quality come to be recognized gradually in the later days.

The correlation between water quality and incidence of diseases was first established in 1849 by Dr. John Snow when cholera appeared in London during the summer and 14,600 deaths were reported.

Every 8 seconds, a child dies from water related disease around the globe. 50% of people in developing countries suffer from one or more water-related diseases. 80% of diseases in the developing countries are caused by contaminated water (A. Jagadeesh). The majority of these cases occur in rural areas of developing nations where the water supply is polluted with a variety of microorganism including viruses, fecal coli forms and protozoa and adequate sanitation is unavailable (L. F. Caslake 2004). In most of water treatment plant coagulation, sedimentation and filtration together compose a type of treatment called clarification. Clarification removes many microorganisms from the water along with suspended solids. But clarification by itself is not sufficient to ensure the complete removal of pathogenic Bacteria or viruses. A portable water must be more than crystal clear-it must be completely free of diseases causing microorganism to accomplish this the final treatment process in water treatment plants is disinfection which destroys or inactivates the pathogens (Nathan son; 2005). Now a most of the conventional treatment plant carried the traditional method or old method & run there

plant due to various factors are affected. It is not sufficient to remove all the impurities present in the water. Due to which most of people use the purified equipments on their personal level like Water Purifier for purchase from local water supplier. It is not affordable to all people, they are totally depend on municipal water supply. Due to which maximum diseases are seen from water born. Water is a basic need of all living being & my project is deals with human life. The objective of the present study is to determine the study of present conventional treatment plant & how their efficiency increases with slightly modified them so it is easily available & affordable to all human being in term of quality.

II. Materials and Methods

In existing water treatment plant I use some materials for modification of the water treatment plant such as; Scraper & tiles for aeration process which is purchased from local store. Sodium aluminates & ferric chloride for the process of coagulation which is purchased from local chemical store. The heating unit of the apparatus was prepared at an aquatic equipment fabrication workshop and the heating coil was prepared at a refrigeration manufacturing unit for disinfection process by using solar method. The storage unit was procured from a local bottled water supplier & sheet metal from fabrication shop. The main perspective behind the working design of the apparatus is to use the available solar energy to eliminate or reduce the bacteriological and physiological contaminants with the help of the solar spectrum and heat energy of the same. The concept behind the design revolves around the optimum exposure of the sample to the heat and solar spectrum as well as the optimum use of the available energy so as to achieve sustainable benefits in terms of results. The water samples were taken from each & every unit of water treatment plant for the purpose of testing. The influent and effluent were analysed for purity parameters viz. pH, total alkalinity, hardness, microbial content, chloride content. All analysis was done referring to the “standard methods for examination of drinking water” by APHA (American Public Health Association) (1995). The parameters and the methods used are given in the table. The some experiment process was done as a batch process.

The experiment was conducted in the city of Nanded, Maharashtra (19.1383° N, 77.3210° E)

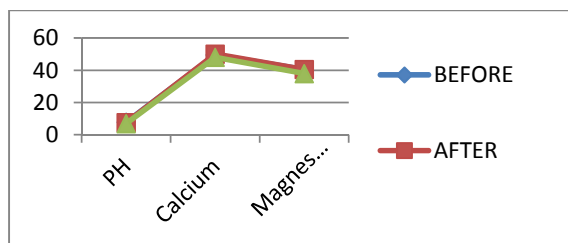
located in the marathwada region part of Maharashtra state in the months of February, March, April and May when the weather condition in the day was usually bright and sunny with the ambient temperature ranging between 33° C to 39° C. The study area was setup on the roof of the Dept of Civil Engineering, MPGI, Nanded.

III. Results and Discussions

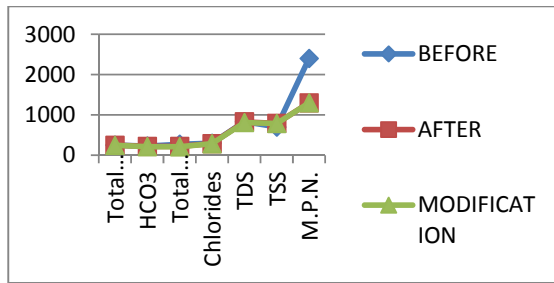
A. Physico, Chemical & Bacteriological Examination Of Water

a) AREATION PROCESS

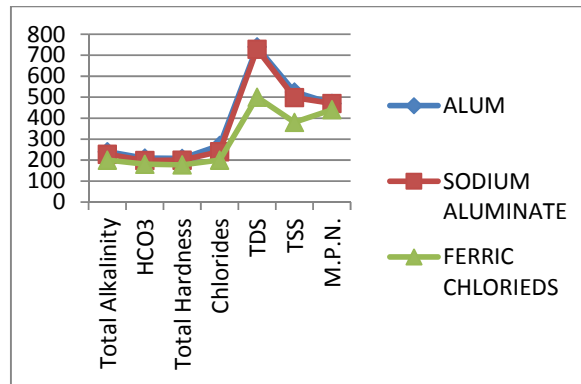
S R. N O.	PARAME TER	BEFOR E	AFETR	SLIGHT LY MODIFI ED
1	Color	Slightly Yellow	Slightly Yellow	Colorless
2	Odor	Routeen egg	Routeen egg	Odorless
3	PH	7.8	7.5	6.9
4	Total Alkalinity	250.7	248.3	245
5	HCO3	227.2	220.5	213.6
6	Total Hardness	272	220.4	210.4
7	Calcium	49.3	50	48
8	Magnesium	40.45	40.45	38
9	Chlorides	298.2	290	285
10	Total Dissolved Solids (TDS)	832.9	828.7	810
11	Total Suspended Solids (TSS)	700.6	792.2	787.5
12	M.P.N.	2400	1300	1300



COMPARISON AT AERATION PROCESS



COMPARISON AT AERATION PROCESS



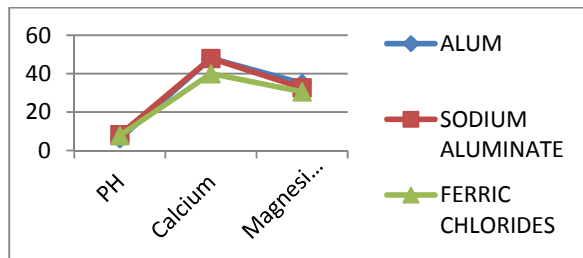
COMPARISON AT COAGULATION PROCESS

b) COAGULATION PROCESS

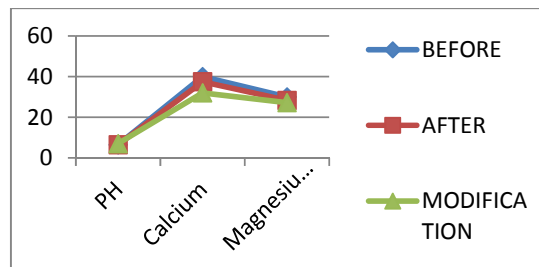
SR . N O.	PARA METE R	BEFOR E	AFET R	SLIGHTLY MODIFIED
1	Color	Colorless	Slightly whitish	Colorless
2	Odor	Odorless	Odorless	Odorless
3	PH	6.2	8.3	7.8
4	Total Alkalinity	240	228	200
5	HCO3	209.6	198.3	180.7
6	Total Hardness	208.4	200	177.5
7	Calcium	48	48	40
8	Magnesium	35	32.7	30.6
9	Chlorides	270	240	200
10	Total Dissolved Solids (TDS)	740	728.8	500
11	Total Suspended Solids (TSS)	525	498.3	380
12	M.P.N.	470	470	440

c) FILTRATION PROCESS

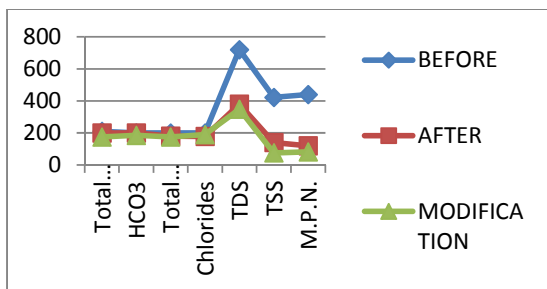
SR . N O.	PARA METE R	BEFOR E	AFET R	SLIGHTLY MODIFIED
1	Color	Colorless	Colorless	Colorless
2	Odor	Odorless	Odorless	Odorless
3	PH	6.5	6.5	7.00
4	Total Alkalinity	210	200	175
5	HCO3	200	200	185
6	Total Hardness	200	180	175
7	Calcium	40	37.48	32
8	Magnesium	30	28.3	32.6
9	Chlorides	200	178.3	190
10	Total Dissolved Solids (TDS)	720	380.3	348.2
11	Total Suspended Solids (TSS)	422	140.4	575.5
12	M.P.N.	440	120	82



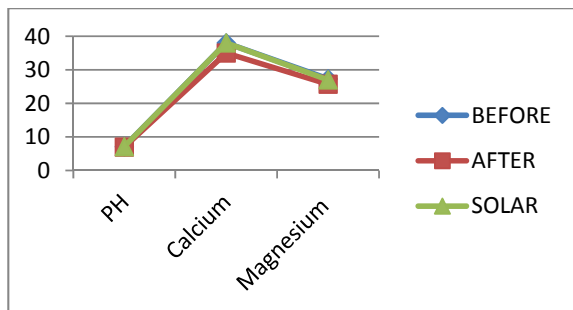
COMPARISON AT COAGULATION PROCESS



COMPARISON AT FILTRATION PROCESS



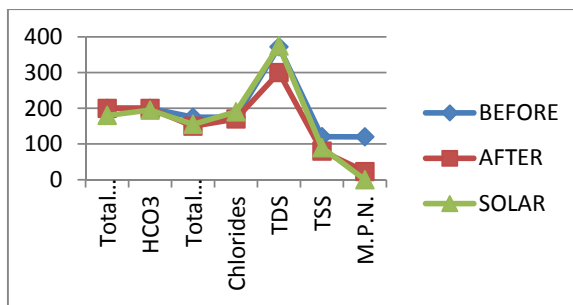
COMPARISON AT FILTRATION PROCESS



COMPARISON AT DISINFECTION PROCESS

d) DISINFECTION PROCESS

SR . N O.	PARAMETER	BEFORE	AFTER	SLIGHTLY MODIFIED
1	Color	Colorless	Colorless	Colorless
2	Odor	Odorless	Odorless	Odorless
3	PH	7.12	7.00	7.12
4	Total Alkalinity	200	200	180
5	HCO3	200	200	195
6	Total Hardness	175	150	155
7	Calcium	38	35	35
8	Magnesium	27.3	25.7	36
9	Chlorides	175	170.2	190
10	Total Dissolved Solids (TDS)	372.3	300	375
11	Total Suspended Solids (TSS)	120.5	80.3	90
12	M.P.N.	120	23	NIL



COMPARISON AT DISINFECTION PROCESS

IV. DISCUSSION

The study has provided insight on the process of modification of conventional water treatment plant and analysis of each & every units of conventional, slight modification of water treatment plant can be done. The results obtained have proven that sufficient modification of supply water is possible by the use of some alternatives giving a feasible option for drinking water.

The above modification has succeeded in each & every unit is possible to deactivate the common human pathogens found in drinking water. The time required for the some modification was less as compared to conventional water treatment plant except disinfection. After running a batch of different samples all the parameters are within range of drinking water table, hence the water is suitable for drinking purposes & which gives best result as compared to conventional water treatment plant. Some times in conventional water treatment plant required hugs amount of chemicals such as chlorine, which is toxic in nature & required storage problem. If this chlorine gas cylinder leakages which gives adverse effect to nearer environment. The results show that the disinfection achieved in conventional water treatment plant is well within the WHO parameters for drinking water. The results of disinfection obtained in the samples by

using solar disinfection are gives better result than use of chlorination. The results also show that this slightly modification is best suitable conventional water treatment plant. They show that the method of solar disinfection is economical and applicable on a small budget too.

A) *Limitations*

The slightly modification has it's share of limitations. Regular operation of each & every unit is required. As compared to cost the use of alum as a coagulant in conventional water treatment plant has much lower than ferric chloride that is ferric chloride is 1.44 % costly than alum. Cloudy weather is not possible for use of solar water disinfection. The batch process uses up manpower for the operation. The results vary with the varying intensity of light as the day progresses.

V. CONCLUSIONS

The study aims to establish slightly modification of conventional water treatment plant as a better, economical, and sustainable method of water for drinking and domestic use. The study has conclusively led to a development of an economical modification of conventional water treatment plant. Based on the studies carried out and results obtained following conclusions are drawn

The study shows that the solar radiation for the disinfection of water is efficient in destroying the pathogens completely.

The time required for the water treatment at different process is less as compared to conventional water treatment plant process.

This modification gives removal of 99% of the pathogens causing diseases to the human health as compared to conventional water treatment plant.

The use of ferric chloride proves an excellent coagulant material among the other conventional coagulants.

Increasing TDS & TSS of the water used for the disinfection has negative impact on the efficiency of the results given by the solar water disinfection.

The slightly modification is simple & low maintenance as compared to conventional water treatment plant.

The result of water purified by slightly modification is greater than conventional water treatment plant.

This disinfection treatment is more efficient than chlorination, ozonation, ultra violet, etc.

Weather conditions & availability of materials play a major role in the functioning of this slightly modification.

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