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Review on Economical Water Treatment Plant

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Abstract - India is a Developing Country. But many villages still in India are not yet developed. The main Problem is Water. The main sources of water in villages are river, ponds, wells, etc. In villages water is consumed directly from source without any treatment. Due to consumption of untreated water many diseases are spreading. Therefore, there is need of Economical Water Treatment Plant near villages. This Project involves design of Economical water treatment plants using natural coagulant. The natural coagulant used is POLYGLU. Polyglu is a coagulant which works by sticking to dirt and falling to the bottom. 1g of polyglu can purify 5liters of water. This process is faster than normal water treatment plant. The economical water treatment involves 3 basic steps:

1) Flocculation and Stirring
2) Filtration
3) Disinfection

These basic steps can lead to economical as well as natural way of water treatment. Polyglu is developed by a Japanese company and is previously been used in drought period of Somalia. By developing this economical water treatment plant villages will get well naturally purified water and would help reduce diseases.

Key Words: Natural Coagulant: Polyglu, Economical Water Treatment Plant, Flocculation, Filtration, Chlorination.

1. INTRODUCTION

India is a developing country located in South Asia. 7th largest country by area, 2nd most populous country, and the most populous democracy in the world is India. It is surrounded by the Indian Ocean on the south, the Arabian Sea on the southwest, and the Bay of Bengal on the southeast. One of the major problems in India is Drinking Water.

Almost 76 million people in India do not have supply of safe drinking water, as polluted rivers and poor storage infrastructure over the years has created a water deficit which may become unmanageable in the future.

Villages in India do not have access to safe drinking water as there is no water treatment plant in those areas due to lack of fund to government.

Water treatment is any process that improves the quality of water to make it more acceptable for a specific end-use. The end use may be drinking, industrial water supply, irrigation, river flow maintenance, water recreation or many other uses, including being safely returned to the environment. Water treatment removes contaminants and undesirable components, or reduces their concentration so that the water becomes fit for its desired end-use. This treatment is crucial to human health and allows humans to benefit from both drinking and irrigation use.

In India water treatment plant are setup in almost many cities. But villages in India still consume dirty and polluted water. Due to consumption of untreated water many diseases are spreading and it is not possible to setup Huge Water Treatment plant in every village. Therefore, there is need of Economical Water Treatment Plant.

2. REVIEW

a) Drinking Water Analysis of Pokhale Village and Engineering Solutions for its Upgradation.

Author - Miss. Sneha Jayawantrao Sankpal.

In this research paper study of water supply in Pokhale village in Kolhapur district of Maharashtra was done. Various station points were selected and water sample was collected from the same point. Physical as well as chemical test were conducted on the water sample such as temperature, pH, electrical conductance, turbidity, total dissolved solid, total hardness, total alkalinity, sulphate, nitrate, phosphate, potassium, chloride and total coliform. Analysis was done by using standard procedures (APHA/NEERI) and result values compared with the World Health Organisation (WHO) guideline values. Most of the test results were found within the acceptable limit of drinking water of WHO except that higher level of turbidity and minimum but exceeding MPN was recorded at all Station point water sample. Hence proper treatment must be done of drinking water supplied to villages to prevent problems to human health.

b) Study of Water Treatment Plant Jalgaon
Author – Mr. Gaurank Patil

In this research paper, review on optimisation of conventional drinking water treatment plant was done. The treatment plant was located at Jalgaon with capacity of

132MLD. Different laboratory tests are done after intake of water at Wagahur dam Which included turbidity test, Bacterial test, PH test, hardness test, etc. This gave an idea of amount of coagulant which was to be added in the water. After tests, oxygen level of water is increased at aeration unit. Aerator was cascade type aerator. Then Clariflocculation is done. After the particle settle down in the sedimentation zone, they are easily removed. Chlorine is then added to the water in acceptable limit. This step insurance to keep the water healthy. After the killing of disease-causing bacteria, filtration process is done. The filtration unit measures filtration rate by inflow rate (cub. Meter/hour) by divided by filtration area (metre square). The research concluded saying that the treatment plant needed some modifications like increase in manpower and updating of security officers etc. Implementing of SCADA system was also suggested. Operation of manhole by definite system automatically was also suggested along with upgradation and maintenance of components.

c) Drinking Water Treatment Plant Design Incorporating Variability and Uncertainty. Article in Journal of Environmental Engineering March 2007 DOI: 10.1061/(ASCE)0733-9372(2007)133:3(303). See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/228666007

Both inherent natural variability and model parameter uncertainty must be considered in the development of robust and reliable designs for drinking water treatment. This study presents an optimization framework for investigating the effects of five variable influent parameters and three uncertain model parameters on the least-cost treatment plant configuration contact, direct, or no sweep conventional filtration that reliably satisfies an effluent particulate matter concentration constraint. Incorporating variability and uncertainty within the decision-making framework generates information for investigating: 1impacts on total cost and treatment reliability; 2shifts on the least-cost treatment configuration for providing reliable treatment; and 3the importance of the individual variable and uncertain parameter distributions for reliably satisfying an effluent water quality constraint. Increasing the magnitude of influent variability and model parameter uncertainty results in a greater expected design cost due, generally, to increases in process sizing required to reliably satisfy the effluent concentration constraint. The inclusion of variability and uncertainty can also produce a shift in the locations of the least-cost configuration regions, which are dependent on the expected influent water quality and the magnitude of variability and uncertainty. The additional information provided by incorporating the variable and uncertain parameters illustrates that parameter distributions related to the primary removal mechanism are critical, and that contact and direct filtration are more sensitive to variability and uncertainty than conventional filtration.

d) Advanced Technique of Drinking Water Treatment Plant

Author - Mr. Perane Swapni

Today's water treatment plants are applied for water conservancy projects, emerged by the technology of automation control system to ensure safe, continuous, high quality water supply to municipal and for multi-purpose usage. Potable water treatment is one of the most challenging and complex system that municipalities need to deal with considering limited resources. This study developed a decision a decision support system in a water treatment system capable of supporting the operator to make informed decisions about the best course of action for using multiple water resources. One of the most important natural resource in the world is water, and life cannot exist and most industries could not operate without water. Most of the fresh water bodies all over the world are getting polluted due unplanned urbanization, industrialization and anthropogenic activities. As a result of that, the quality of surface waters has got a great awareness around the world and therefore, many researchers have studied to evaluate the performance of water treatment plants and how to improve the quality of drinking water. As already stated, drinking water quality in the world varies widely due to several factors, such as the heterogeneity of the countries characterizing this region, the different climate conditions, available natural, economic and water resources, among others. Strictly related to these factors' technologies applied for drinking water treatment vary country by country. Water is essential to sustain life and is satisfactory supply must be available to all. A properly designed plant is not only a requirement to guarantee safe drinking water, but also skillful and alert plant operation and attention to the sanitary requirements of the source of supply and the distribution system are equally important. The water quality of any water body is deteriorated due to domestic and industrial discharges without treatment. To analyses the condition of any water body, water quality index claimed suitable term to evaluate variations in quality of water.

6. Conclusion:

Population is growing day by day in India. Country with such population growth needs more water demand. In spite of increase in water demand still there is no supply of proper and clean or well treated water supply in many villages of country. Due to Consumption of untreated water diseases are spreading at large extent. Therefore, there is need of designing Economical water treatment plant which can be setup easily and economically by the government in these places.

7. References:

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