

Treatment of Water Using Vertical Water Treatment Plant & Natural Substance

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Abstract- As we know that water is most essential and precious resource for living. WHO report that whole some of water means absence of suspended solids inorganic solids & pathogens. water covers 71% of earth surface ,on earth 96.5% water is found in ocean ,1.7% in ground water ,1.7% in glaciers & icecaps. only 2.5% of water is fresh water & 98.8 of that water is in ice & ground water. Less then 0.3% of all fresh water is in river ,lake & atmosphere. Reports shows that 1.2 billion people in world have no access to safe drinkable water & most of them living in developing country. In developing country like India measure requirement is pure drinkable water. with the developing population need for water is increasing rapidly. Since naturally available water is not pure enough for drinking due to increase in pollution. so water treatment plant fulfills the requirement , but conventional water treatment plant(WTP) acquires very large area. 3 major units (aeration, sedimentation, filtration) requires huge land space. which is difficult to construct with in the city. other problems related to wtp are - huge amount of water looses(evaporation loose),chemicals like aluminium chloride (alum), polyaluminiumchloride, alum potash & iron salts are used, chlorine are used in coagulation & disinfection process. so to over come the above problems we have designed vertical water treatment plant (VWTP) which requires 1/3rd area of conventional WTP & instead of using chemicals naturally available substance like carica papaya seeds & moringaoleifera seeds are used in coagulation & disinfection process.

I. INTRODUCTION

All surface and some ground water required to be treated prior to consumption to ensure that they do not represent a health risk to the users. health risk to consumers from poor quality water can be due to microbiological, chemical, physical or radioactive contamination. As microbiological contamination is generally the most important to human health as this leads to infectious diseases which effect all populations groups. World health organization (WHO) estimates that 1.2 billion people are affected by polluted water worldwide .about 400 children below age 5 die per hour in the developing world from waterborne diarrheal diseases. The single most important requirement of drinking

water is that it should be free from any microorganisms that could transmit disease or illness to the consumers. As we know that water is most essential and precious resource for living. WHO report that whole some of water means absence of suspended solids inorganic solids & pathogens. water covers 71% of earth surface ,on earth 96.5% water is found in ocean ,1.7% in ground water,1.7% in glaciers & icecaps. only 2.5% of water is fresh water & 98.8 of that water is in ice & ground water. Less then 0.3% of all fresh water is in river ,lake & atmosphere. Reports shows that 1.2 billion people in world have no access to safe drinkable water & most of them living in developing country. In developing country like India measure requirement is pure drinkable water. with the developing population need for water is increasing rapidly. Since naturally available water is not pure enough for drinking due to increase in pollution. so water treatment plant fulfills the requirement , but conventional water treatment plant(WTP) acquires very large area. Water treatment plant include screening unit , aeration tank, coagulation & flocculation unit, sedimentation tank, filtration unit and last disinfection unit. Out of all units 3 major units (aeration, sedimentation, filtration) requires huge land space. which is difficult to construct with in the city. other problems related to water treatment plant are - huge amount of water looses(evaporation loose) because most of treatment unit are open to sky,chemicals like aluminium chloride (alum), polyaluminium chloride,alum potash & iron salts are used, chlorine are used in coagulation & disinfection process. so to over come the above problem we have designed vertical water treatment plant (VWTP) which requires 1/3rd area of conventional WTP & instead of using chemicals naturally available substance like carica papaya seeds & moringaoleifera seeds are used in coagulation & disinfection process.

II. METHODOLOGY

- (i) screening
- (ii) Pumping
- (iii) Aeration
- (iv) Coagulation& flocculation
- (v) Sedimentation
- (vi) Filtration(use of zeolites)

(vii) disinfection

- (i) screening- screening unit will be provided at base separate from other units. A combination of coarse and fine screener is to be used for better screening results. The screeners are placed at an angle of 45° to 60° so as to increase the opening area. Coarse screener with centre to centre distance of 2-10 cm is selected and spacing between fine screener is less than 1cm.
- (ii) pumping- centrifugal pump will be used to transfer water from screeners to aeration unit present on top of treatment plant.
- (iii) Aeration- Those forming drops or thin sheet of water exposed to the atmosphere e.g.-water is expressed to come in contact with ambient air and, Those forming small bubbles of air which rise in the water e.g.-air is brought in contact with the water.
- (iv) Coagulation & flocculation –instead of using chemical coagulants like aluminium sulfate (alum), polyaluminium chloride, sodium aluminate. Natural coagulant like carica papaya seeds is used. Papaya fruit contains large number of small black color seeds. The fruit as well as seeds contain large protein content and have medicinal values. Papaya seed has anti-inflammatory properties, wound healing properties, suitable for digestion, prevention of cancer and kidney disorders, provides heart health and its use increases immunity because it contains vitamin A & C.

Papaya seed is a rich source of proteins. Seed works as a coagulant due to the presence of positively charged proteins which bind with negatively charged particles (silt, clay, bacteria and toxins etc.), allowing the resulting flocks to settle and obtain clear water (adsorption & charge neutralization). Also papaya seed powder has ability to join with solids in water and settle to the bottom. Papain (Papaya proteinase) is the important protein present which contains 345 amino acid residues and consists of a single sequence of properties and mature peptide.

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