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REVIEW ON PHYTROID SYSTEM COMPRISING OF MORINGA OLIEFERA (NATURAL COAGULANT) FOR THE TREATMENT OF WASTEWATER

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1. ABSTRACT

The technology has been found to be very effective in water pollution control as it function as water 'pollutant sink' for sediment, nutrients, and metals. Conventional phytroid system consists of components such as Influent collection tank, screen, phytroid bed and treated water storage tank. This work represents treatment of industrial wastewater using phytroid bed which replaces screen with Moringa Oleifera known to be one of the best natural coagulant thereby removing remove dangerous heavy metals from wastewater such as Pb, Zn, Ni, Cu, Cd etc. The treated effluent is useful for municipal gardens, fountains, irrigation, in manufacturing process in industries and when disposed in oceans, seas and rivers will be beneficial to aquatic life. water availability is bound to decrease for agriculture. [1]

2. INTRODUCTION

Water requirement in India in the year 2025 is assessed at 1027 Billion Cubic Meters as against the requirement of 525 BCM in the year 1990 showing an increase of 86 percent. Besides, India need to produce 380 MT of food grain per annum in 2025, against the present 242 MT, to feed 1.4 billion expected population under resource constraints. The scope for increase in production through horizontal expansion of area is negligible and due to competition from other mere paying sectors of economy, the fresh Therefore need arises to treat wastewater so that treated wastewater can be used in place of water for all the purposes. According to the estimates, wastewater generated from irrigation, water supply, industry and energy sectors is expected likely to be 556 BCM by 2025 in India.[2] The presence of heavy metals in aqueous streams, air, soil and food have become a problem due to their harmful effects on human health even at low concentration in the environment. Heavy metal pollutants in wastewater is one of the problems facing human beings. According to the world health organization, the metals of most immediate concern found in waste water are aluminium, chromium, manganese, iron, cobalt, copper, zinc, cadmium, mercury and lead (WHO, 1984)[3].It has been investigated that heavy metals are found in treated water also which leads to damage to aquatic life and human health. So, in order to solve this critical damage done to aquatic life and human health, Phytroid wastewater treatment technology involves constructed wetland exclusive design for the treatment of municipal, urban, agriculture and industrial wastewater. Phytroid Technology is a self-sustainable technology for wastewater treatment that works on the principals of natural wetland. The technology is a complex ecosystem acts as a nutrient sinker and remover. The technology is design to treat wastewater from small houses, residential societies, hotels, commercial complexes and municipal sewage and pre-treated industrial effluent. Phytroid bed system is basically used for industrial wastewater treatment normally consisting screens as a filter which is replaced in the present work by Moringa Oleifera thereby acting as a natural coagulant which will perform the role of screen.

3. MATERIALS AND METHODS

Description of constructed wetland in A. N. College, Patna premises: The system comprises of a sequence of three independent chambers (cells). They are

- Primary Settling Chamber: In this chamber municipal wastewater collected from nearby sewer is stored and sedimentation process is allowed to take place.

- Secondary Advanced Filter Chamber: It consists of pebbles of different sizes arranged in the form of layers through which municipal wastewater is allowed to pass. This acts like a natural filter. It consists of pebbles that allow the passage of water through it.

- Tertiary Biological Wetland Chambers: It has a series of two interconnected small chambers consisting of layer of pebbles and planted respectively with Canna indicain the first chamber and Colacasiain the second chamber.

- Collection Chamber: In this chamber treated wastewater is collected. Treated water is re-used for watering the gardens located nearer to the constructed wetland system in the college premises. The removal of pollutants are through a combination of physical, chemical and biological process including sedimentation, precipitation, adsorption to gravels, assimilation by the plant tissue and microbial transformations.[2]

- In the present study the municipal wastewater was allowed to enter the constructed wetland system at the flow rate of 80 litre per day. The growth of the plants was observed by measuring the increase in length of shoots at specified time interval. The water samples (i) at the inlet point (ii) at the outlet point of Canna chamber and at the final outlet point were analysed by standard methods recommended by APHA to determine different physico-chemical parameters[3]

Now to discuss about Moringa Oleifera,which is natural coagulant and help to reduce a level of heavy metals. Methodology of Moringa oleifera having a two steps

1) Preparation of MO Seed Powder

Dry MO pods were collected from Varkala, Trivandrum. Pod shells were removed manually; kernels were grounded in a domestic blender and sieved through 600micro meter stainless steel sieve.

2) Aqueous Extract

Aqueous extract was prepared by using 200ml of distilled water and 25 g of MO seed powder, mixed by a magnetic stirrer for 60 minutes and settled for 20 minutes. Moringaoleiferaaqueous extract is finally filtered through 20µm paper filter.[4]

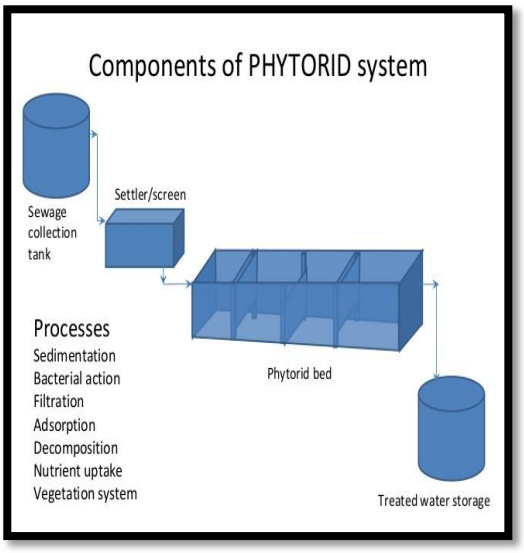

FIG 1: COMPONENT OF PHYTROID TECHNOLOGY

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