RO (REVERSE OSMOSIS) REJECTED WASTE WATER TREATMENT PLANT FOR AGRICULTURE APPLICATIONS

A Project Work submitted in partial fulfillment of the requirement for the award of the degree of

Bachelor of Technology
In
Mechanical Engineering
By

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S.VEERABHADRUDU	(16091A03F6)
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CERTIFICATE

This is to certify that the Project Work entitled **"RO (REVERSE OSMOSIS) REJECTED WASTE WATER TREATMENT PLANT FOR AGRICULTURE APPLICATION"** that is being submitted by **P.VAMSEE KRISHNA (16091A03F5), S.VEERABHADRUDU (16091A03F6), V.VEERESH (16091A03F8), J.VENKATA PRASAD (16091A03F9), K.VENKATA SAINATH REDDY (16091A03G0)** in partial fulfillment for the award of **Bachelor of Technology in Mechanical Engineering** to the **RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS), NANDYAL -518501** (Affiliated to J.N.T.University, Anantapur) is a record of bonafide work carried out by them under our guidance and supervision).

The results embodied in this Project Work have been not submitted to any other University or Institute for the award of any degree.

Signature of Guide

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

During the 20th century the world population tripled while water use for human purposes multiplied six-fold. The most obvious uses of water for people are drinking, cooking, bathing, cleaning and for some watering family food plots. This domestic water use though crucial is only a small part of the total. Worldwide, industry uses about twice as much water as households, mostly for cooling in the production of electricity. Far more water is needed to produce food and fiber (cereals, fruits, meat, and cotton) and maintain the natural environment. Providing six times more water now than a hundred years ago, an enormous task has significant impacts on people and the environment.

A major investment drive, the International Drinking Water Supply and Sanitation Decade (1981–90) and its follow-up led by national governments and supported through international organization's ended with safe and affordable drinking water for 80% of the exploding world population and sanitation facilities for 50%.

Major investments in wastewater treatment over the past 30 years have halted the decline in or actually improved the quality of surface water in many developed countries.

Food production in developing countries has kept pace with population growth, with both more than doubling in the past 40 years. A successful international research program in agriculture funded through the

concentration would begin to migrate towards the water container with the higher salt concentration.

1.7 REVERSE OSMOSIS WORKING AS FOLLOWS:

Reverse osmosis works by using a high-pressure pump to increase the pressure on the salt side of the RO and force the water across the semipermeable RO membrane, leaving almost all (around 95% to 99%) of dissolved salts behind in the reject stream. The amount of pressure required depends on the salt concentration of the feed water. The more concentrated the feed water, the more pressure is required to overcome the osmotic pressure.

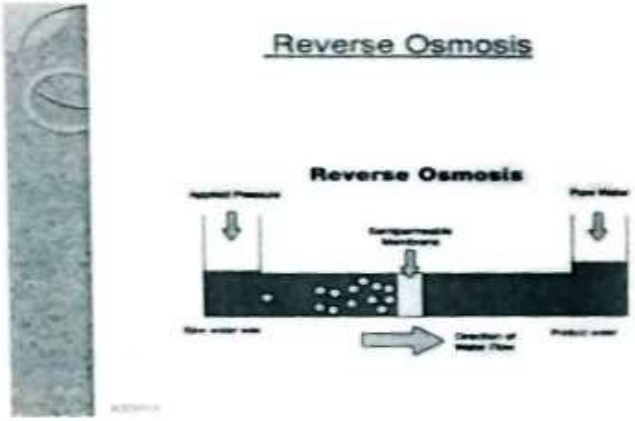

Figure-1.1 Reverse Osmosis

In very simple terms, feed water is pumped into a Reverse Osmosis (RO) system and you end up with two types of water coming out of the RO system: good water and bad water. The good water that comes out of a RO system has the majority of contaminants removed and is called permeate. Another term for permeate water is product water they mean

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CHAPTER 2

2.1 LITERATURE REVIEW:

1. Yong Yang, Hyoungsup gives the effect of underwater pulsed spark discharge on the precipitation of dissolved calcium ions was investigated in the present study. Water samples with different calcium hardness were prepared by continuous evaporation of tap water using a laboratory cooling tower. It was shown that the concentration of calcium ions dropped by 20–26% after 10-min plasma treatment, comparing with no drop for untreated cases. A laser particle counting method demonstrated that the total number of solid particles suspended in water increased by over 100% after the plasma treatment. The morphology and the crystal form of the particles were identified by both scanning electron microscopy and X-ray diffraction. Calcite with rhombohedrum morphology was observed for plasma treated cases, comparing with the round structure observed for no-treatment cases. It was hypothesized that the main mechanisms for the plasma-assisted calcium carbonate precipitation might include electrolysis, local heating in the vicinity of plasma channel and a high electric field at the tip of plasma streamers, inducing structural changes in the electric double layer of hydrated ions.

2. H. Banejad and E. Abdosalehi in this study magnetic field intensities of zero Tesla (as a witness), 0.05 Tesla, 0.075Tesla, and 0.1 Tesla, were examined. Also, it has chosen amounts of water influent 4lit/h and 30lit/h. With doing examination by 3 times and analyses the results with SAS software, have shown that changing magnetic field intensity,

The pipe line can be produced by the pvc pipes as well as hose pipes the pvc pipes are first joined from the inlet tank to the inlet of the vibrating section. In which the cross section of the pipe line can be increased from ¾ inch pipe to the 3-inch pipe which is mounted on the vibrating section.

The pipe line arrangement can be increased as follows:

First of all, the inlet of the tank can be fitted with the regulating valve, again the regulating valve will be expanding through ¾ inch pvc pipe. Again, one clamp is attached to the ¾ inch pipe, which is increased to 1inch pipe. After that the 1 inch to 2-inch clamp will be fitted to the 1inch pipe. Again, the end of the 2-inch pipe will be fitted with 3-inch clamp in order to increase cross section of the pipe line. Finally, the hose pipe will be fitted to the 3-inch clamp to another 3-inch clamp, which is attached to the mounted pipe on the vibrating section.

Here, the reason for selecting these hose pipes means, because of its flexibility. Due to which the entire pipe line can be protected from the vibrating section. While vibrating the entire set up. These hose pipes also move or vibrates flexibility in order to prevent the any damage.

Figure-4.1 Storage tank with Pipeline

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CHAPTER 5

ETHYLENEDIAMINETETRAACETIC ACID METHOD

(EDTA METHOD)

5.1 PREPARATION OF STANDARD HARD WATER:

1 gm of $CACO_3$ is accurately weighed and transferred into a beaker. Dilute HCL is added drop wise until the effervescence ceases. It is further heated on a water bath until the excess of HCL and CO_2 expels out. The solution is cooled and transferred into 1 litter standard flask and make up to the mark with distilled water. The standard hard water contains 1 gm/lit or 1 mg/ml Ca^{2+} hardness.

5.2 STANDARDIZATION OF EDTA:

The burette is first washed with distilled water and rinsed with the given EDTA solution. It is then filled with EDTA and fixed to burette stand. The initial reading is noted. 20 ml of prepared standard hard water is transferred into conical flask. 5 ml of P^{H}=10 buffer is added. 2 or 3 drops of EBT indicator is added. On titration color is changed from wine-red to blue. It is confirmed as the end-point.

CHAPTER 6

RESULT

In this process due to chemical effect we reduce the hardness of Ro outlet water. Depend upon flow rates the hardness will be decreased.

- In this process hardness value is decreased.
- By using this chemical, we can reduce the hardness of RO rejected water up to some extent.
- The water is used for irrigation applications.
- By this process we obtained the hardness of water to 112ppm.
- The only disadvantage by using this treated water is, by using Na_2CO_3 chemical compound the water becomes so what basis.

TABLE-5

S.NO	Quantity of Na2CO3 (in gms)	Initial hardness (ppm)	Reduced hardness of RO water (ppm)
1	2	568	112

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CHAPTER-8

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