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Treatment of Dairy Waste Water Using Stabilization Vessels

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***Abstract* - Dairy industry is one of the major industries causing water pollution. Considering the increased milk demand, the milk food industries in India is expected to grow rapidly and have waste generation and related environmental problems. Poorly treated wastewater with high levels of pollutants caused by poor design, operation or treatment system creates major environmental problems when discharged to surface water or land. Various pre-treatments methods are available to neutralize the effect. Waste sample from dairy has been experimented on daily basis to calculate "pH, Suspended Solids, Chemical Oxygen Demand, and Biochemical Oxygen Demand". Various types of locally available chemicals are used to study and analyze the treatment of dairy waste water.**

***Keywords*- pH, Suspended Solids, Chemical Oxygen Demand, Biochemical Oxygen Demand, Stabilization Vessel, MPCB, Influent, Effluent.**

I. INTRODUCTION

Waste water are mostly polluted by industrial and dairy effluents and has been matter of concern all-round the earth. The dairy waste water contains a lot of organic and inorganic matter leading to a high level of chemical oxygen demand, bio-chemical oxygen demand, suspended solids and not satisfactory pH. This untreated water when diposed into the water bodies causes decrease in the Dissolved oxygen of the water. This as a result poses a great threat on the aquatic life. The typical treatment plants are very large and expensive to treat the dairy waste water and sometimes don't produce the required results. In our work we mainly focused on the natural aerobic process and sedimentation.

Aerobic wastewater treatment processes use aerobic and facultative bacteria to break down the organic compounds found in the waste water and makes it more stable called "Stabilized water". Enough detention time was provided for the naturally occurring bacteria do their work. Locally available chemicals were also used for getting even more satisfactory results. Tests were conducted and monitored to ensure that the process was going according to plan and the water is not turning septic.

II. EXPERIMENTAL

1. Methodology

Dairy waste water was obtained from Mahanand Dairy (Goregaon Dairy Research Facility). The inlet water was poured into the stabilization vessel, 20lit/day. For the first 5 days, each of the vessels was filled and on the fifth day the outlet sample was obtained. Since the naturally treated wastewater was not satisfactory few chemicals were added into the third & fourth vessel. Initially alum was added to the third vessel 1 mg/lit and the sample was collected from the outlet. Further potassium permanganate was added to the fourth vessel (4 mg/L) and the outlet sample was collected. Potassium permanganate was added in order to disinfect the water. Aluminium Sulphate (2mg/L) was then added to the third and the fourth vessel for more clarity of water and to reduce the hardness. Each chemical dose (Optimum dose) was calculated according to Jar test.

III. CONCEPT ZIG-ZAG MOTION OF WATER

While performing zig-zag motion water flows continuously in each vessel. Thus circulation of water in every vessel occurs preventing the stagnation of water which invites odour. If every connections are made on the top of the vessels then the stale water in tanks S1, S2, S3, S4 (shown in the picture)will be circulating for 3-4 days and on the 5th day the influent waste water will directly be entering into the outlet tank which won't be treated.

Second, if every connections were made at the bottom then all the vessels would be filled at the same time thus not providing enough time for aerobic bacteria to do their work. So both processes were merged so that they cancel out each other's disadvantages and the water doesn't become septic.

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Fig.1 Zig-Zag Motion of water.

IV. RESULTS AND DISCUSSIONS

The following tables shows value of ph of Influent, Effluent and Standard MPCB norms.

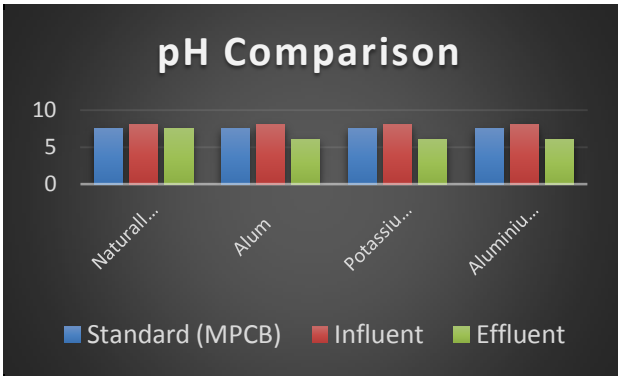

Fig.2 pH.

The following tables shows value of SS of Influent, Effluent and Standard MPCB norms.

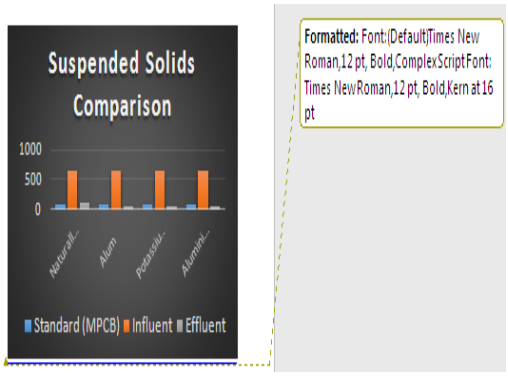

Fig.3 SS.

The following tables shows value of COD of In fluent, Effluent and Standard MPCB norms.

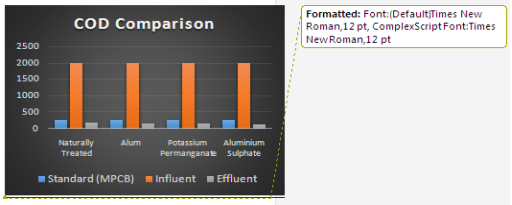

Fig.3 COD

The following table's shows value of BOD of Influent, Effluent and Standard MPCB norms.

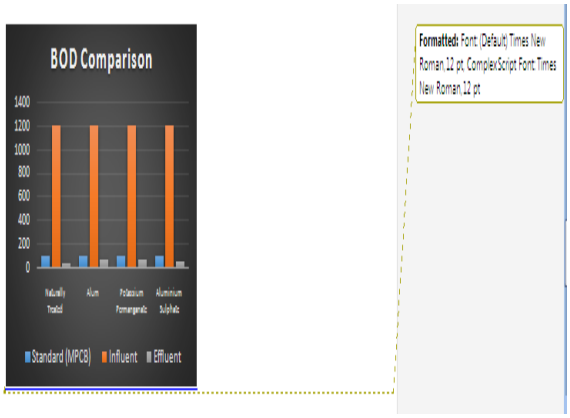

Fig.4 BOD

The treated water obtained can be safely used for gardening and construction purposes.

V. CONCLUSION

After performing the experiments and analyzing the results it is been concluded that use of potassium permanganate and aluminium sulphate will give satisfactory removal of organic and inorganic matters and better removal of SS and will also disinfect the water thus reducing the odour.

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