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MEASUREMENT AND EVALUATION OF TOTAL DISSOLVED SOLID (TDS) FROM DAIRY ETP AND IT'S COMPARISON WITH OTHER PLANTS AND POSSIBLE LOAD REDUCTION METHOD

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ABSTRACT

Total Dissolved Solids (TDS) are the total weight of all solids that are dissolved in a given volume of water, expressed in units of mg per unit volume of water (mg/L), also referred to as parts per million (ppm). This research was investigated to determine the TDS value of the Dairy effluent and provide plant wise comparison with respect to common effluent treatment plant of Amul Diary. For determination of which plants play crucial role for generating effluent having high load and how to reduce TDS load in common effluent treatment plant. Because In any dairy plant the quantity and characteristics of effluent is depending upon the extent of production activities, pasteurization to several milk products.

Key words: TDS, Effluent, Effluent Treatment Plant, Load characteristics.

INTRODUCTION

Water resources are most often affected by industrial pollution. Pollution caused by industrial and dairy effluents is a serious concern in throughout the world due to presence of total dissolved solid in water. Dairy effluent has high organic loads as milk is its basic constituent with high levels of chemical oxygen demand, biological oxygen demand, oil & grease and nitrogen and phosphorous and TDS content[1]. The TDS determination measures the amount of organic and inorganic matter present in water or wastewater. Aerobic bacteria and aquatic life such as fish must have DO to survive. Aerobic wastewater treatment processes use aerobic and facultative bacteria to break down the organic compounds found in wastewater into more stable products that will not harm the receiving waters. Wastewater treatment facilities such as lagoons or ponds, trickling filters and activated sludge plants depend on these aerobic bacteria to treat sewage. The same type of aerobic wastewater treatment process occurs naturally in streams and ponds if organic matter is present, turning these bodies of water into "aerobic wastewater treatment plants." If sufficient oxygen is not naturally supplied through wind and turbulence to replace the depleted oxygen, the body of water will develop a low DO and become anaerobic (or septic). The results of septic water bodies include fish kills and anaerobic odors[2]. If the amount of free or DO present in the wastewater process becomes too low, the aerobic bacteria that normally treat the sewage will die. The process will not operate efficiently and septic conditions will

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occur. The DO test is used to monitor the process to ensure that there is enough dissolved oxygen present to keep the process from becoming septic. Generally dairy effluent having TDS ranging from 1500-2000 ppm.[3]

EXPERIMENTAL

Methodology

Some dissolved solids come from organic sources such as leaves, silt, plankton, and industrial waste and sewage. Other sources come from runoff from urban areas, road salts used on street during the winter, and fertilizers and pesticides used on lawns and farms. Dissolved solids also come from inorganic materials such as rocks and air that may contain calcium bicarbonate, nitrogen, iron phosphorous, sulfur, and other minerals. Many of these materials form salts, which are compounds that contain both a metal and a nonmetal. Salts usually dissolve in water forming ions. Ions are particles that have a positive or negative charge. Water may also pick up metals such as lead or copper as they travel through pipes used to distribute water to consumers. Take 100 mL sample and filter it by simple filter paper, then transfer it into a pre-weighted evaporating dish, Then heat it until all water get evaporated. Then cool it to room temperature and weight it. The difference between two weight give the amount of TDS are in the sample in ppm.[4]

RESULTS AND DISCUSSION

The following tables shows a TDS value of common ETP, Powder Milk plant and Flavour Milk plant.

Table 1: Common ETP

S. No.	Common ETP sample	Date of sample taken	TDS (ppm)
1		14/10/11	1000
2		15/10/11	1200
3		16/10/11	1100
4	Effluent water	17/10/11	1200
5		18/10/11	1400
6		19/10/11	1300
7		20/10/11	1100

Table 2: Powder milk plant

S. No.	Powder milk plant sample	Date of sample taken	TDS (ppm)
1		14/10/11	1650
2		15/10/11	1825
3		16/10/11	1693
4	Effluent water	17/10/11	1734
5		18/10/11	1793
6		19/10/11	1865
7		20/10/11	1702

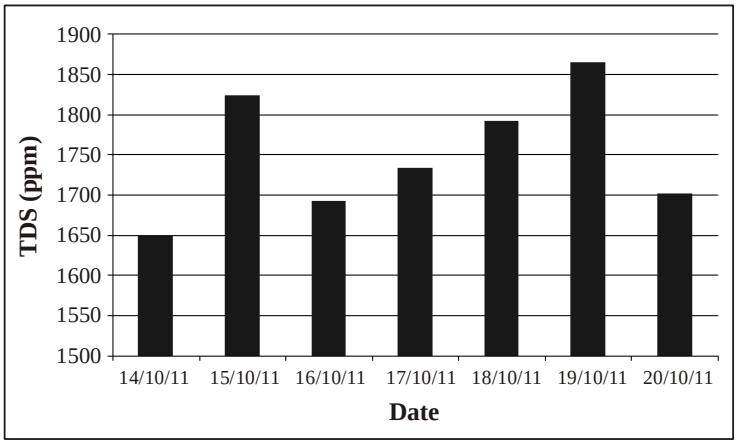

Fig. 1: Measurement of TDS (ppm) at different day from Powder milk plant

Table 3: Flavour milk plant

S. No.	Flavour milk plant sample	Date of sample taken	TDS (ppm)
1		14/10/11	1700
2		15/10/11	1684
3		16/10/11	1707
4	Effluent water	17/10/11	1715
5		18/10/11	1703
6		19/10/11	1717
7		20/10/11	1698

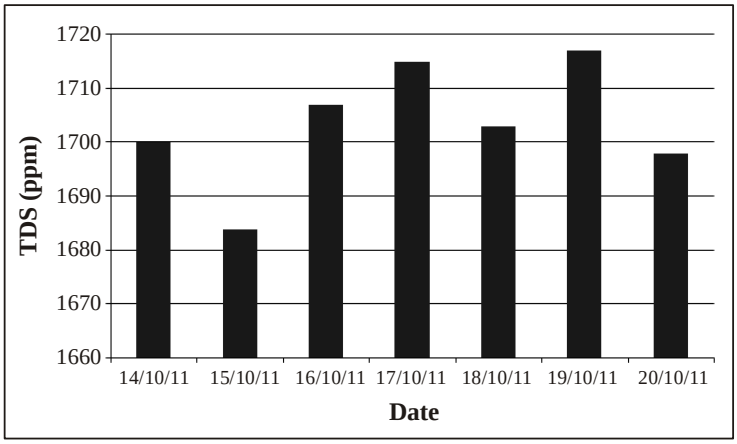

Fig. 2: Measurement of TDS (ppm) at different day from Flavour milk plant

Load reduction

It has been reported that Powder milk plant having high fat content in form of Powder and Flavour milk plant has utilise higher amount of natural as well as synthetic flavouring agent. So, during in cleaning

in place (CIP) separation of these agents from water is achieved By Water Evaporation and finally These Agents are collected and remaining water gets discharged in ETP.

CONCLUSION

The TDS load in the common effluent treatment plant is around 1185 ppm. It is because of Powder milk plant and Flavour milk plant. Because the TDS load in both of the plants is high compare to other plants. Powder milk plant having high fat content in form of Powder and Flavour milk plant has utilise higher amount of natural as well as synthetic flavouring and sweetening agents. So, both plants are playing crucial role in generating effluent having high TDS load.

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