

Determination of oil and grease present in the Hussain Sagarlake, Hyderabad, Telangana, India

Anitha and S. Kedarini

ST. Ann's College for Women, Mehdiapatnam, Hyderabad, Telangana, India

(Received 5 April, 2020; Accepted 27 May, 2020)

ABSTRACT

Oil and grease includes fats, oils, waxes, and other related constituents generally found in wastewater. If these compounds are not removed before discharge of treated wastewater, oil and grease show impact on biological life in surface waters and can cause thick films. The aim of the present study is to estimate the amount of oil and grease present in the Hussain Sagar Lake, tank bund, Hyderabad, Telangana. Samples were collected early in the morning. For this study chemicals like Petroleum ether, Sulfuric acid and Ethyl alcohol were used. Presence of oil and grease was taken as an important criteria to check the quality of water. According to the General standards for discharge of environmental pollutants and ENVIS, CPCB the oil and grease concentration should not exceed 10 mg/L max.

Key words: Oil and grease, Petroleum ether, Sulfuric acid, Ethyl alcohol

Introduction

Oil and grease means mixture of substances which are commonly used in anthropogenic activities. Industry and daily activities, vehicles, illegal dumping, spills, and disposal of cooking oils are some of the most common sources of oil and grease. Oil and grease can reduce oxygen levels in water which can cause serious threat to aquatic animals. Compounds like petroleum hydrocarbons found in oil and grease can affect human kidneys, livers, and blood and increase the risk of cancer.

The presence of oil and grease is an important parameter for water quality. In water surface films and shoreline deposits are the result of oil and grease which leads to environmental degradation, and also shows impact on human health.

Depth is 32 feet. It is one of the tourist spot in the Hyderabad. This raised interest to check its water quality by taking a parameter like oil and grease.

There are three methods for estimation of grease

and oil in the water they are (i) the partition-gravimetric method (ii) partition infrared method, and (iii) the solvent extraction method. In Partition-Gravimetric method, dissolved oil and grease is extracted from water by intimate contact with trichlorotrifluoroethane; petroleum ether (40/60) or hexane.

High initial viscosity is the characteristic feature of grease. Srilankan standard Institute is recommending 0.2 mg/L as a maximum allowable limit for Oil and Grease contamination (petroleum product) in Drinking water (SLS 614, 2013). But in 2014, Ministry of health gazetted a standard for Bottled water and they recommending 2.0 mg/L as a maximum permissible limit.

Materials and Methods

Water sample was collected from the Hussainsagar lake, Tankbund, Hyderabad, Telangana. 250 mL of water sample was taken in volumetric flask which

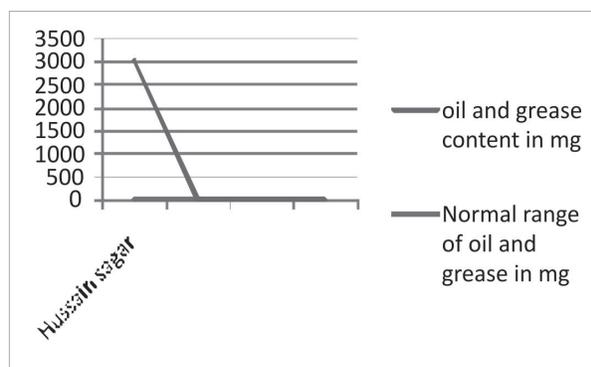


Fig. 1.

capacity is 500 mL. 10 mL of concentrate sulphuric acid and 50 mL of petroleum ether was added to it. Shake the solution properly and then transfer it to the separatory funnel. Allow the funnel to stand for 30 minutes without any disturbance. After 30 minutes 2 distinct layers are formed, the upper layer is petroleum ether layer and lower is water layer. Filter it and collect petroleum ether in pre weighed glass beaker (W_1). Place the whole content in the water bath until the petroleum ether gets evaporated. Allow it to cool and note down the (weight W_2).

Results and Discussion

The oil and grease content in the sample can be calculated as, Oil and Grease (mg/L) = $(W_2 - W_1) / 1000 / \text{volume of the sample}$

where,

W_1 = Internal weight of the beaker (g)

W_2 = Final weight of the beaker (g)

The amount of oil and grease present in the water sample is calculated by using the above formula

Approximately 10% of Oil and grease are present in wastewater oils of animal or vegetable produce

similar effects to oils spills (Fondriest Environmental Inc). Presence of oil and grease in water in high content shows toxic effect on aquatic life, mainly in seawaters. From the above study it was observed that the amount of grease and oil present in the lake is very high and it was shown in the Fig. 1. According to the General standards for discharge of environmental pollutants and ENVIS, CPCB, India the oil and grease concentration should not exceed 10 mg/L max.

Conclusion

The presence of oil and grease is an important parameter for water quality. In water surface films and shoreline deposits are the result of oil and grease which leads to environmental degradation, and also shows impact on human health. In this study it was observed that the amount of grease and oil present in the lake is very high it exceeded the limit.

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