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## Method Article

# Investigating the quality and quantity of effluent in wastewater treatment plants of Iran: A case study of Tehran



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## A B S T R A C T

Control and monitoring of water sources from different types of contaminants especially collection and proper wastewater discharge is very important, in Iran which is considered as one of the dry regions in the world. Undesired quality of wastewater treatment plant's (WWTPs) effluent causes many environmental problems.

In this research the parameters of Biochemical oxygen demand, Chemical oxygen demand, Total solids, Total suspended solids, Total dissolved solids, Potential of Hydrogen, Mixed liquor suspended solids, Mixed liquor volatile suspended solids, Sludge volume index, and temperature are examined based on the book of Standard Methods. The results of analyzing the above parameters which are related to eight WWTPs effluent out flow in Tehran, were analyzed by SPSS and Excel soft wares. The achieved data were compared to the standards of Iran's Environmental protection agency. The results has shown that the parameters of Potential of Hydrogen, Chemical oxygen demand, Biochemical oxygen demand, and Total suspended solids of WWTPs effluent in Tehran are in accordance with standards of Environmental protection agency which are respectively 97.5%, 95.8%, 96.1%, 68.8%.

WWTPs of C has also the best operation among other WWTPs. In this study, due to ethical considerations, the name of the WWTPs is not mentioned. The names of the WWTPs are marked with **A–H**.

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## A R T I C L E I N F O

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## Introduction

Protection of water sources from different types of contaminants and using the best methods of water treatment and water reuse should be considered more in Iran which is one of the dry regions in the world [1,2]. Untreated wastewater or wrong treatment will transfer the pathogens as well as polluting the sources of freshwater and will cause new limitations for the societies. Although fresh water is a revival source but can be severely polluted by human activities and became unusable for a long period of time. Increasing growth of the population has added the volume of the wastewater and the problems of discharging them in the environment will enter a more critical stage. This matter has caused problems for the existing wastewater treatment plants. We can refer to the overload that decrease the operation of the wastewater treatment plants and decline the quality of effluent outflow [2–4]. Above all mentioned cases, the important thing is its effect on human's health which is as a result of dispersed bacteria and pathogenic viruses. Some of the wastes will create turbidity and color of water in receiving waters and display an obscene and indecent manifestation [3–5]. However in case of wastewater treatment, the problems of environmental pollutions such as sudden decrease of oxygen at the discharge point of wastewater treatment, Eutrophication, foam creation and death of hydras will be controllable [5,6].

This research is willing to study the quality and quantity of the effluent of wastewater treatment plants, according to chemical and physical parameters of effluents in different parts of Tehran and wants to compare it with discharge standards of the environmental protection agency of Iran.

## Materials and methods

There are eight wastewater treatment plants (WWTPs) in Tehran that their specifications are shown in Table 1. In order to assess the quality of discharged wastewater treatment plants to the environment, there are standards compiled in Iran and in the world. In these standards, the risks of different usage of effluent are taken into consideration. In this research the standards of Iran's environmental protection agency is used. The most important chemical and physical parameters to study the WWTPs of A–H were as follows: Biochemical oxygen demand (BOD), Chemical oxygen demand (COD), Total solids (TS), Total suspended solids (TSS), Total dissolved solids (TDS), pH, Mixed liquor suspended solids (MLSS), Mixed liquor volatile suspended solids (MLVSS), Sludge volume index (SVI), and temperature. Spot sampling in the mentioned WWTPs were taken between 9 until 11 a.m., when the inputs to the WWTPs were in maximum amount. The special manner of sampling and the

**Table 1**  
Tehran's wastewater treatment plants with activated sludge process.

NO.	Specification	H	G	F	E	D	C	B	A
1	Type of process	Extended aeration	Contact stabilization	Extended aeration	Deep aeration	Extended aeration	Extended aeration	Surface aeration	Extended aeration
2	Design population (Capital)	2000	60000	30000	12000	100000	85000	40000	80000
3	Entrance average discharge (design) m <sup>3</sup> /h	12	200	200	62.5	1000	1260	170	330
4	Entrance maximum discharge (design) m <sup>3</sup> /h	36	378	450	187.5	1875	2520	340	500
5	Entrance average discharge (present) m <sup>3</sup> /h	50	290	130	155	1250	720	425	560
6	Entrance maximum discharge (present) m <sup>3</sup> /h	100	350	270	380	1875	1440	625	600

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