

A Brief Review on Wastewater Treatment

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ABSTRACT: Wastewater is defined as the water which isn't cleaned or unfavorably affected in the quality from human induced activity. Wastewater originates from combinations of the, industrial domestic, agricultural or commercial, activity. Wastewater treatment is defined as a process that is used to convert the wastewater into the effluents which can either return to water cycles with small environmental effect or may be reused. This paper consists of the waste water and their treatments. This paper focuses on various waste water methods which are divided into different types of techniques. Furthermore, it also provides the data which is related to the cities selected for wastewater samples in the 14 articles which were published between 2014 and 2018. It will show various cities of Iran as well as the numerous sources which are responsible for the water pollution. These are provided in this review paper. Water treatment is very significant in the future worldwide as well as in India since the excellence of water in ground level is decreasing day by day and this is due to the industrial waste and pollution which causes dangerous diseases. So, developing countries are now working on waste water and drinking water treatment especially in Asia, United Arab Emirates and various countries.

KEYWORDS: Environment, Management, Treatment, Waste, Water.

INTRODUCTION

Wastewater is defined as the water which is polluted by the human usage or not used properly for the particular purpose. The water is waste because it is the combination of the domestic industrial, commercial or agricultural activities, storm water or the surface runoff, as well as inflow infiltration [1]. Because of the harmful effects of public, hospital, and industrial wastewater on soil, air, water, as well as agricultural products, wastewater treatments and the proper sludge disposal are needed for environmental protection.

Successful wastewater treatment has significant economic benefits in terms of water conservation and avoiding excessive water shortages. Water demand has risen in arid and semiarid countries like Iran, as well as annual rainfall is poor in regions of Southern Europe, and big countries like the United States and Australia.

As a result, sewage reuse is the most long term and viable solution to the issue of water shortage. The world population is expected to be greater than double in the next thirty years. Water availability was 3400 cubic meters in 1960 due to population growth, and 1350 cubic meters in 1995 due to population growth. These trends are projected to decrease to 650 cubic meters internationally by the year 2025.

Due to the current water scarcity, wastewater treatment water would need to be reused more often in the immediate future. Wastewater reuse necessitates the disposal of wastewater and the use of suitable wastewater treatment facilities. Water scarcity as a result of population and economic growth is regarded as one of humanity's greatest fears and a stumbling block to long-term development. There are only a few choices for dealing with the problems of fresh water scarcity. These options include:

- Water preservation efforts
- Desalination
- Rainfall substructure projects
- Reuse and Recycling of the waste water and process

Dam construction, groundwater recharges, clouds seeding in desalinations, wastewater reuses, and the creation of major water transfer projects have all been tried in the past to solve the problem of water scarcity. However, population growth is not the only factor that influences water use. The world population tripled during the 20th century, but water consumption grew 6 fold. Water pollution is caused by a variety of factors in addition to the well-known water contaminants as shown in Figure 1.

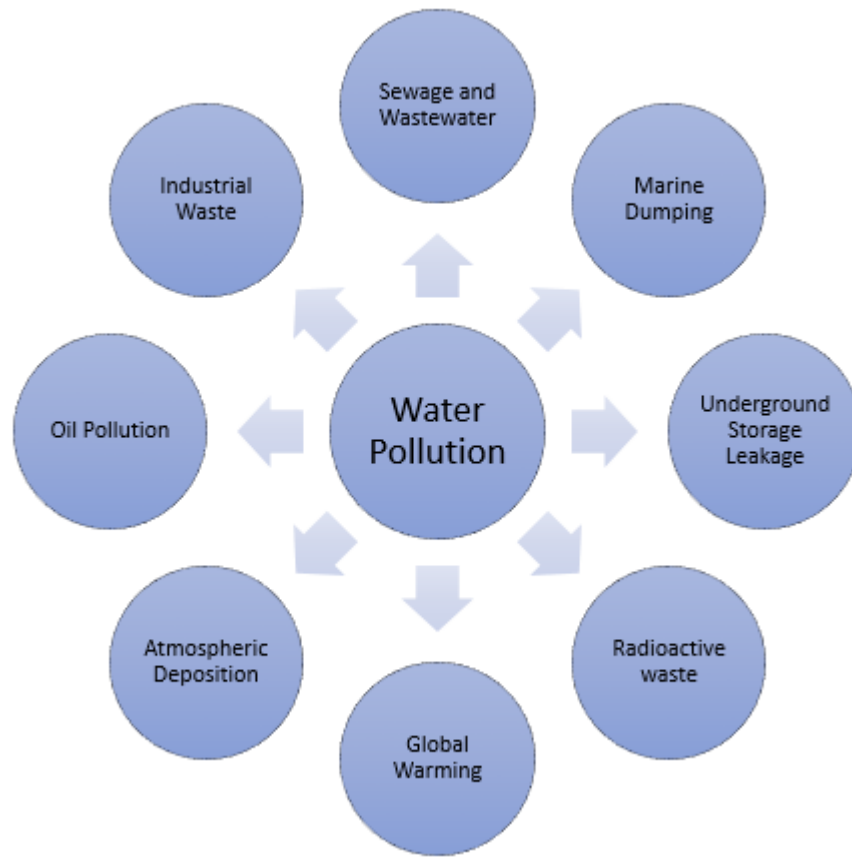


Figure 1: The Numerous Sources which is Responsible for Water Pollution.

There are different of countries which uses different waste water treatment technology like Activated Sludge’s, Bio filtrations, Stabilization ponds, Extended aerations, Trickling filter etc. which is selected in Jordan, turkey, Lebanon and Palestine. The Table 1 shows the wastewater treatments technology type in designated countries.

Table 1: The Wastewater Treatments Technology Type in Designated Countries.

Country	Treatment type
Jordan’s	Bio filtration
	Activate Sludge
	Extend aeration
	Stabilizations ponds
Turkey’s	Trickling filters
	Stabilization pond
	Activate Sludge
Lebanon’s	Scum and grid removal
Palestine’s	Stabilization pond
	Extended aerations
	Anaerobic Rocks filter
	Oxidations ditches
	Sludge stabilizations
	Imh off tank as well as trickling filters Anaerobic

WASTEWATER TREATMENT METHODS

Wastewater treatment is define as process that is used to remove from the sewage or waste water rand change into effluents which can return to water cycles with the acceptable effect on environment or reuse for the various purpose (known as water reclamation)[2]. There are four method for waste water treatment are given below as shown in Figure 2:

- Physical Methods
- Mechanical Methods
- Chemical Methods
- Biological Methods

1. *Physical Method:*

They involve all the physical force which apply for the removes contaminant. They quiet figures on foundation of the most processes flow the system use for the wastewaters treatments. There are of 3 physical methods for waste water treatment are given below:

1.1. *Flow equalizations:*

This method is used to increase the efficacy of the secondary as well as basics waste water treatments process by adjusting activity parameters like flow, pollutant level, and temperatures over time.

1.2. *Sedimentation:*

Sedimentation is the mechanical settlings of the heavy particle suspend in the mixture, and it is a basic and commonly used unit procedure in wastewater treatment. When chemical coagulations process used, this process is used to removes grit and particulates matters in primary settling basins, biological flocks in activate sludge's settle basins, and the chemical flows.

1.3. *Flotation:*

Air bubble is used in this process to eject liquid solid or particle from liquids. The gases bubble either cling to liquids or become entangled in suspended solid particles structure, increasing combined particle and gas bubble buoyancy.

2. *Mechanical Methods*

They involve all mechanical force that apply for remove contaminant. There are of two type of mechanical methods for waste water treatment are given below:

2.1. *Screenings:*

This's one of old types of treatment. They eliminates gross contaminants from waste stream to avoid causing harm to downstream facilities, avoid interfering with the plant operation, and keep noxious suspended materials out of the main settling tank.

2.2. *Filters:*

Biological processes, relatively than the mechanical method, are used to create the filters. It's the most popular aerobics attached growth biologicals treatment method for removing organic matters from the wastewater.

3. *Biological Methods:*

The excellently dissolved and divided organic matters in the wastewaters are converted to flocculent organics matter using biological unit processes. There are two biological method for water waste management are given below:

3.1. Disinfection:

It may be described as process that aim to kills or prevents the microbes from growing. Chemical, biological, or physical processes can be used to inactivate microbes. That inactivation is accomplished by modifying or removing the microbe's basic structures or the functions. The following are the most widely used disinfection methods:

- Mechanical mean like sedimentation, filtration, and screening,
- Physical agent like light and heat.
- Chemical agent.
- Radiation, mostly gamma ray.

3.2. Dechlorination:

The removals of the free and complete combine chlorine residues from chlorinate waste waters effluents before discharge or reuse for receiving water is known as dechlorination. Activated carbon is used to dechlorinate water, or a reducing agents like sodium sulfite, or the sodium met bisulfite, Sulphur-dioxide are added.

4. Chemical Methods:

There are lots of chemical method for water waste management but the mains chemical units process, including the chemicals precipitation, adsorption as well as other application description are given below:

4.1. Chemical Precipitation:

Heavy metals precipitate as insoluble precipitates as a result of reactions with some chemicals. Filtration or sedimentation may be used to remove the precipitates from the water. The treat water is then decanted as well as discharged or reused as required.

4.2. Adsorptions with Activate Carbon:

The method of the collect soluble substance inside solutions on suitable surfaces is known as adsorption. Adsorption with activated carbons at solid interface is commonly used after biological treatments to remove some of the residual dissolve organic matters in wastewater.

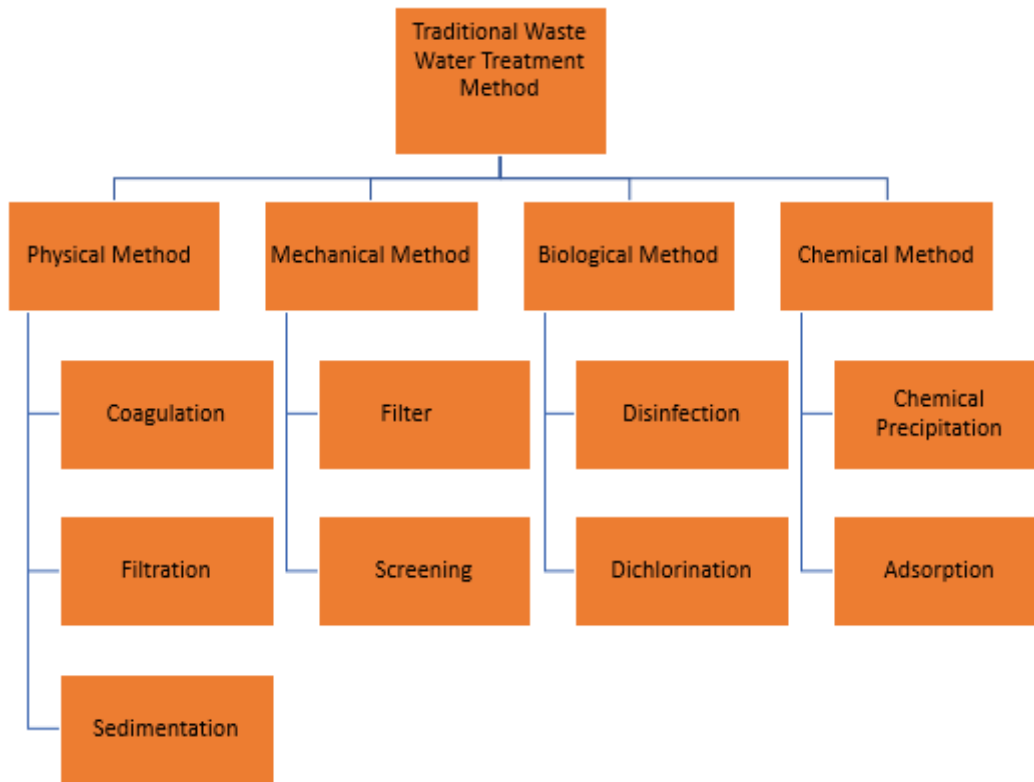


Figure 2: The Various Traditional Waste Water Management Method.

The 14 articles reviewed, the largest number of articles were published between 2014 and 2018. The Table 2 shows the different 10 cities of Iran (such as Yazd, Tehran, Shiraz, Ahvaz, Behshahr etc.) and the water sampling.

Table 2: The Different 10 Cities of Iran and Values of Water Sampling.

City	Wastewater Sampling
Tehran	28.58
Yazd	7.15
Ahvaz	7.15
Shiraz	7.15
Behshahr	7.15
Torbat-heydarich	7.15
Kermanshah	7.15
Azerbaijan	7.15
Hamedan	7.15
Esfahan	14.4

Of the Fourteen article review, the large numbers of articles were publish between years 2014-2018. Most of experiment was carry out on wastewater sample in the Tehran. In total, studies were conduct in the ten city of the Iran (such as Yazd, Tehran, Shiraz, Ahvaz, Behshahr etc.) as shown in Figure 3.



Figure 3: Cities Select for the Wastewater Sample in fourteen Articles.

NEED OF WATER TREATMENT

It is a question of environmental stewardship as well as personal wellbeing. According to the United State Geological Survey, if wastewater is not properly handled, it can damage both the atmosphere and humans health. Fish as well as wildlife habitats will be harmed, oxygen levels will be depleted, beaches will be closed, and other recreational water use restrictions will be implemented[3]. There are many reasons why keeping our water safe should be a top importance [4]:

1. Fisheries:

Fresh water is important for aquatic plants and animals. This's important for fishing industries, recreational anglers, and future generation.

2. Wild life Habitat:

Our oceans and rivers are teeming with the life that relies on the beaches, shorelines, and the marshes for survival. Hundreds of the classes of fish as well as other marine life depend on them for survival. The areas are used by migrating water birds for feeding and resting.

3. Quality and Recreation of the Life:

Water is a fantastic playground for all of us. Many people want to live where they do because of the scenic and recreational beauty of our waters. Fishing, Swimming, picnicking, and boating are common water activity for visitors.

4. Health Concern:

Water may carry diseases if it's not properly washed. Since work, live, and plays near the water, harmful bacteria's must be eliminated in order for water to be clean.

5. Waste Reductions:

The amounts of the waste i.e. normally released into atmosphere is decrease as results of thw wastewater treatments, thereby enhance environment health. As result, governments eliminate health risk associate with the air emissions, as well as the water depletion cause by the pollution. Wastewater treatments also decreases amounts of the money invested by nation on pollution-fighting environmental recovery programs.

6. Building Purposes:

Treated wastewater, including precipitation, can be used in buildings for the low grade purpose. Reservoirs or ponds may be used to store the treated water. Since the inflow of treated water (as well as inflow of the wastewater) is relatively constant, less buffering volume in the reservoir is needed[5].

LITERATURE REVIEW

The different studies and researcher on topic water waste management in brief are given below: Manar Elsayed Abdel-Raouetal studies Problem of the fresh water scarcity affects people all over the world. Increase population, combined with numerous human activities, has resulted in a severe and ongoing scarcity of freshwater resources. This conundrum prompted scientists to seek out radical and low-cost solution. One of possible solution for this issue is for purify industrials wastewaters so that it can be used in agriculture by eliminating harmful contaminants. Their review examines both conventional and modern approaches for accomplishing this goal, with a particular emphasis on the use of natural resources as renewable and environmentally friendly sources for developing new materials Furthermore, review concentrate on utilization of the polymer nano composite in the water treatments as comparatively modest trends.

Jayashree Dhoteetal studies today numerous waters resources are pollute by the anthropogenic source including the agricultural and household waste as well as industrial process. Public concerns over environmental impacts of waste water pollution increased. To eliminate the pollutants, many traditional wastewater treatments strategies, such as activated sludge, chemical coagulation and adsorption, have used; however, there're still few limitations, particularly in terms of high operating costs. Because of its low operating and maintenance cost, aerobics waste water treatment as reductive medium is gaining popularity[6].

Suad Jaffer Al-Lawatiatal studies Wastewater treatments and sludge production occur in a variety of economic, social, and technological contexts, necessitating a variety of approaches and solutions. In the most cases, routine as well as environmentally friendly wastewater treatments and sludge management necessitate developments of the practical and enforceable legislation and treatment systems tailored to local conditions. Their paper's main goal is to provide valuable information about Oman's existing wastewater and sludge treatments, managements, legislation, and analysis[7].

Zahra Aghalarietal collected data according by the exclusion and inclusion criteria as well as by the searching the related keywords in papers publish during years (2008 to 2018) through focus on effectiveness of waste water treatment system in the eliminating bacterial agent. Qualitative figures was collect by using preferred reporting item for the systematic evaluations and Meta analyzes (PRISMA) standards checklists. After verifying papers' accuracy, information such as the first author's name and the year the report was published, types of analysis, numbers of the sample, purification method, types of the microbial agent, and rates of microbial agent removal was entered into the checklist. Also the removal rate of the microbial agent mention in study was compare with the united states environmental protections agencies (USEPA) standard.

DISCUSSION

This paper comprises the discussion about the waste water and their treatments which start from the basic definition of waste water or what is water treatment and end at the usage of waste water treatment. Mainly this paper focuses on various waste water methods which provides different types of techniques from different methods (physical methods, chemical methods and Biological methods). Furthermore this will also provide the data related to cities select for the wastewater samples in the fourteen article published between 2014 and 2018 which shows the different 10 cities of Iran (such as such as Yazd, Tehran, Shiraz, Ahvaz, Behshahr etc.) and the water sampling which shows in table and also in bar graph for better canalization of the data. The need of water treatment Fisheries, Wildlife Habitats, Recreation And Quality Of Life, Health Concerns, Waste Reduction, Building Purpose) as well as the various sources which is responsible for water

pollution(industrial waste ,oil pollution, global warming ,radioactive waste etc.) also provide in this review paper.

CONCLUSION

After the studies or analysis the whole paper author conclude that the waste water treatment is very important because if the wastewaters are not treated, then the human and environment health may negatively impact that why the treatments of wastewater is necessary and after analysis of cities select for the wastewater sample in the fourteen article published between 2014 and 2018 which shows the different 10 cities of Iran. Most of experiment was carried on the wastewater sample in the Tehran. Water treatment is very significant in the future worldwide as well as for India since excellence of water in ground level decreasing day by day and this is due to the industrial waste and pollution which causes dangerous diseases so in the future the waste water technique will use more and more, so that there are minimum or no wastage of water and this water be save for future generation.

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