المؤتمر العلمي الدولي الأول للهندسة و العلوم
The First Scientific International Conference in Engineering & Science

http://bwu.edu.ly/icse2022
Received 30/07/2022 Revised 30/12/2022 Published 05/01/2023

An overview: Environmental influence of wastewater

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Abstract
Nowadays, environmental law has become strict on health such as a decrease in pollution and the economy. Thus, the pollution is a result of the emptying of different organic and inorganic substances into the environment traditional methods such as chemical sedimentation, carbon adsorption, ion exchange, evaporations, and membrane processes are found to be influential in wastewater treatment. Currently, biological treatments have acquired popularity to remove toxic and other harmful materials. The aim of this search is to make an overview including the performance of each technique in the treatment of wastewater. Moreover, this research aims to study the possibility of using treated wastewater sewage water station for irrigation. Also, this paper concentrated on the currently developed and newly applicable different treatments operated for the disposal of heavy metals from industrial wastewater.

Keywords: Volumatic Properties, Superpave Mix Design, Stiffness, Soft Clay, Aging Method

1. INTRODUCTION

Actually, the world's chemical industries face massive Environmental regulatory demanding situations in handling their wastewater effluents [1]. Crini, G & Lichtfouse found that [2], during the last 30 years, environmental problems about the biological contaminations and chemicals of water have become the main worry for society, public authorities, and the industry. Even though it appears to be that, the present knowledge about the environmental effect and public health risks connected with wastewater irrigation over the world [3]. On the other hand, the systematic processing of wastewaters started in the late 1800s and early 1900s. Also, for the last two centuries, wastewater treatment has continuously been progressing to meet strict disposal standards [4]. Newly, wastewater is increasingly used and confirmed as a strategy for preservation. However, there is a directory of increased spread of parasitic infections among agriculture workers exposed to irrigate with raw wastewater Negativity Environmental impact might outcome from long-term wastewater implementation. Moreover, emphasis is placed on future research priorities and procedure that must be taken for reducing public health risks and environmental pollution. Based on the study of Siebe C & Cifuentes, urban sewage and wastewater disposal is the main concern in our society [5]. In many countries, land clearing is an increasing practice, since river pollution is prevented. Wastewater represent also an importance irrigation resource and nutrient supply in agricultural production. Furthermore, Abou-Seeda et,l [6] found that, the requirement to identify their contents prior utilizing them in irrigation process due to some have high concentrations of some elements beyond its natural limits in some cases they cause pollution. In terms of wastewater treatment, the increasing volumes of waste being created would not be an issue if waste was looked as a managed properly and resource [7]. In recent years, domestic solid waste is the most complex solid waste stream [8], as opposed to more homogeneous waste streams resulting from agricultural activities. Otherwise, environmental laws have become strict toward the economy, health, and decreased pollution [9]. Therefore, the pollution is an outcome of the discharge of different organic and inorganic materials into the environment. Nonetheless, Ye, Xin, et al. found that, the ways of wastewater treatment were first developed in response to the different circumstances used by the evacuation of wastewater to the environment and concern for public health [10]. According to the study of Alshammari, M. S [11], reported that, the population of the world has been grown and it has never been more primary to maintain water supplies to our maximum range capacity and to make sure that the water at our removal is clean and free from pollutants. The disposal of such contaminants in wastewater is one of the major targets in waste management. However, El-Khateeb, Mohamed A., et al, reported that, the extent of methods applied for the treatment of different sorts of waste treatment technologies is expensive [12]. Meanwhile, wastewater treatment could be utilized to irrigate the trees, which applies to save soils from corrosion and sand dunes settlement [13]. In general, through the operation of wastewater treatment, main specific and quantitative changes happen in the allocation of the bacterial population. It is commonly supposed that treatment determines a marked decrease in the bacterial numbers, inclusive the overall numbers of resistant bacteria [14]. Based on the study of Wang, Y., Fenner, K., & Helbling, D. E [15], the wastewater has been specified as a key source of micropollutants and their disposal residues a key challenge for treatment operation.

2. USING WASTEWATER TREATMENT IN IRRIGATION

Water is one of the most important materials on the earth. Therefore, all plants and animals have to get water to survive [16]. Also, the water covers about 71% of the Earth's Surface, and only 2.5% of the Earth's Water is fresh water. On the other hand, the important of water for life cannot be denied [17]. Thus, one of the most public ways for that is the reuse of treated sewage and agricultural drains. Moreover, processing procedures to fulfil the desired quality of sewage effluent for irrigation contain primary treatment, secondary treatment, oxidation, denitrification, phosphate precipitation, filtration, lime precipitation, ammonia volatilization, disinfection, and soil-aquifer treatment [18]. Therefore, most of the researchers emphasize its different nature and content rely on their sources. On the other hand, poor quality water is applying for irrigation purposes in the dry and semi-dry areas [19]. Also, sewage water is a very high proportion of this poor-quality water and may be an importance source of water that might be utilized for irrigating agricultural crops. For instance, the content of salts is an importance index to be considered when utilizing this water for irrigation [20]. In addition, sewage irrigation has possible benefits of meeting the water requirements, the sewage irrigation can be messed up to harm the soil health [21]. According to Fejgin A & Shalhevet, the use of sewage effluents for irrigating agricultural land is a worldwide practice [22]. Rattan, R. K., et al, stated that the particularly common in developing countries, where water treatment cost is high. However, there is a gradual rejection vailability of fresh water for irrigation in India [23]. Friedel, J. K., et al, stated that there is a powerful possibility of agriculture and economic benefits of wastewater irrigation [24]. Therefore, in the long-term pollutants can be slowly introduced and accumulated in the soils and cause a potential risk to soil quality and productivity. Masto, Reginald Ebhin, et al,[25] reported that the impacts of sewage water irrigation on soil physical and chemical parameters have been studied in more detail. Furthermore, the irrigation fields of some countries have been used for 100 years. Thus, their soils fundamentally contain heavy metals in the topmost layer [26]. Nowadays, because of the constraint in the availability of fresh water for irrigation, wastewater particularly sewage water is being utilized for irrigation of cultivation fields [27]. Moreover, Gregory, [28]. A reported that the reuse of wastewater for agriculture irrigation purposes decreases the amount of water that requirements to be removed from water resources. Also, it might be the potential solution to decrease the freshwater demand for zero water to avoided the pollution load in the receiving sources.

3. HEAVY METALS

Heavy metals present in wastewater do not appear to affect soil so far, because of their low availability. Due to the accumulation of heavy metals in soils, increasing the quantities of mobile metal fractions instantly can be easy to transport [29]. On the other hand, ways of treating industrial wastewater containing heavy metals often include technologies for a decrease of toxicity for meeting technology-based treatment standards. Moreover, heavy metals have contaminated many sites in industrial countries and affect risks to ecosystems [30]. Following techniques have been applied by different researchers for the disposal of heavy metals. In the same way, physical separation techniques are firstly applicable to particulate forms of metals, discrete particles. Meanwhile, heavy metal pollution has become today the most serious environmental problems. Hence, the treatment of heavy metals is of special concern because of their insistence in environmental. Recently, different ways for heavy metal disposal from wastewater have been widely found. Consequently, the traditional chemical operates for removing heavy metals from wastewater include processes such as, flotation, chemical precipitation, ion exchange, and adsorption [31].

4. SEWAGE TREATMENT

The important of sewage water treatment plant to provide a certain degree of treatment for wastewater before it is used in agriculture or landscape irrigation or aquaculture [32]. Therefore, the main objective of wastewater treatment is generally to allow human effluents to be disposed of without endangering human health or causing unacceptable harm to the natural environment. Moreover, there are some sources of wastewater such as human waste, washing water, rainfall collected on roofs, and highway drainage [33]. Generally, sewage contains all the water used from a household that is utilized for washing and toilet wastes [34]. Hence, wastewater is especially water and contains little particle matter, probably only 0.03%. Thus, in big cities, the solid fraction of wastewater can overall more than 1000 tons of solid material per day. Nevertheless, water is considered the most important for every human being but nowadays, it is becoming polluted because of the increased level of pollution. The waste treatment plant is known as the best alternative that cleans the water in an effective way [35]. Likewise, the best portion of applying this wastewater is that has the capability to remove the harmful contaminants and smells from the water [36]. However, wastewater treatment is the operation of removing contaminants from wastewater and household sewage [37]. Also, it includes physical-chemical, and biological processes to remove chemical and biological contaminants. Naidoo, S., & Olaniran, A. O. [38] reported that the topical of wastewater treatment is to make a disposable effluent without causing harm to the surrounding environment and prevent pollution. Wastewater contains more than 99% of water and is a mixture of domestic and industrial waste. Sewage is produced by residential, institutional, commercial, and industrial enterprises. Sewage treatment is the process of removing contaminants from sewage, mainly from domestic sewage [39]. It includes physical, chemical, and biological processes to remove these pollutants and produce environmentally treated wastewater. Figure 1 present simple flow diagram of sewage treatment.

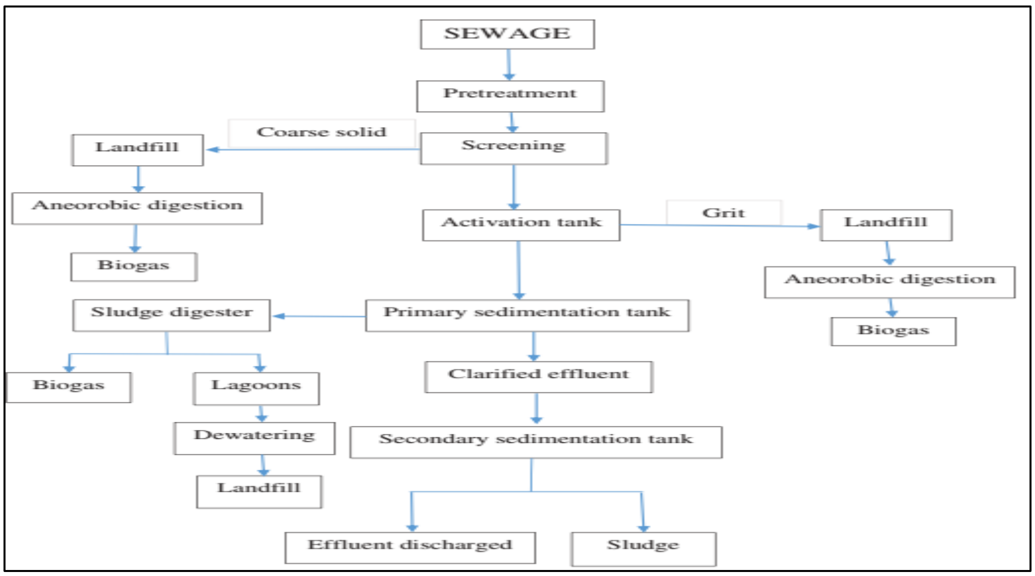

Fig 1: Simple flow diagram of sewage treatment

The primary treatment might include sand, which the velocity of the coming wastewater is modified to allow the adjustment of sand, grit, stones, and broken glass. Thus, these coarse solids are removed because they might harm the pumps and other equipment. The influent in sewage water passes during a bar screen to remove all large objects such as rags, cans, sticks, and plastic packets carried in the sewage stream. After that, bar screens of varying sizes might be utilized to improved solids disposal as shown in Figure 1. The main purpose of treatment is to dispose of contaminants from waste water [40]. It also contains chemical, and biological processes to remove the pollutants. Accordingly, the wastewater treatment is divided into three stages: pretreatment, primary, secondary and tertiary treatment. The term sewage treatment plant is often replaced nowadays by the term sewage treatment plant. Sewage treatment is mainly divided into three stages: preliminary treatment or pretreatment, primary treatment, and secondary treatment [41]. Sewage water treatment generally includes three stages, as described below:

5. PRIMARY SEWAGE TREATMENT

Pretreatment removes materials that can be easily collected from raw sewage before they damage or clog the pumps and sewage lines to pretreatment filters litters, tree limbs, leaves, and branches [42]. It includes the physical processes of sifting, cutting, degeneration, and sedimentation [43]. The settled and floating material is removed and the remaining liquid may be discharged or subjected to secondary treatment. Figure 2 shows the steps of primary sewage treatment.

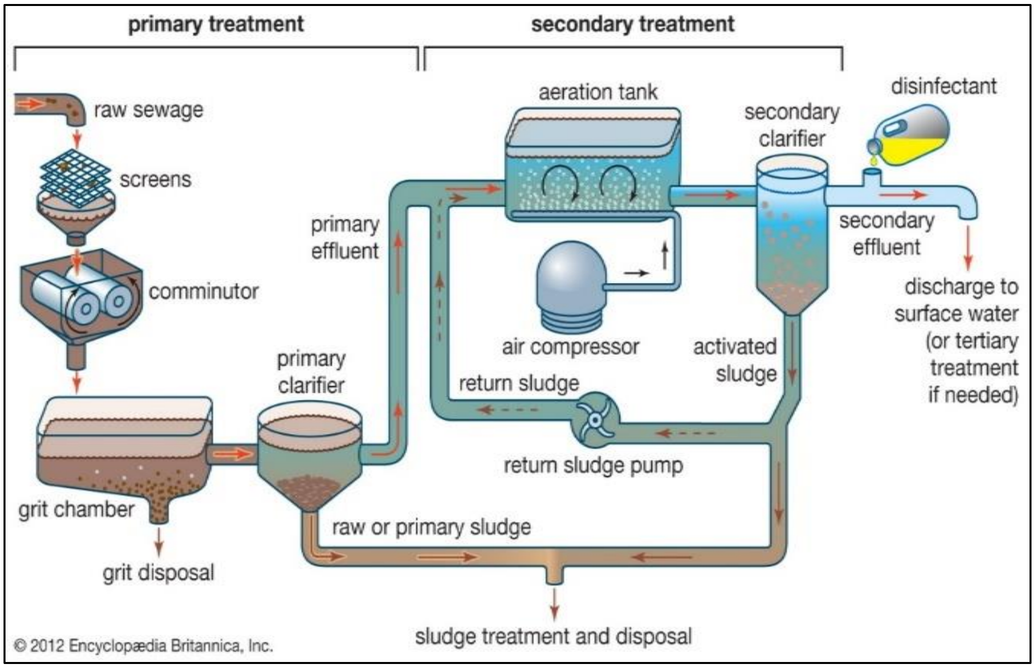

Fig 2: The steps of primary sewage treatment

5.1 Bar Screening

The influent sewage passes through a strip screen to remove all large objects such as, can, chafing, sticks, and plastic bags as shown in Table 1 [44]. This is most commonly used with a mechanically automated strip screen in modern plants serving large populations, while in smaller or less modern plants, a manual screen may be used [45].

Table 1: Types of the treatment process

No	Type of treatment	Type of treatment unit	Name of the unit	Type of impurities removed
1	Physical treatment	Physical	Screen	Large suspended and floating matter
		Physical	Grit chamber	Grit
		Physical	Clarifiers	Silt, sand and other heavier matter
2	Chemical treatment	Chemical	Chemical reactors	Dissolved chemicals
3	Biological treatment	Biological	Trickling filters Activated sludge plant Rotating Biological contactors Digesters	Dissolved organic chemical

5.2 Secondary Treatment

This method removes the soluble organic matter that escapes from primary treatment [46]. It also removes more suspended solids and suspended biological materials. Likewise, it may also require a separation process to remove the microorganisms from the treated water before it is discharge [47]. Secondary sewage treatment, which is mostly biological, is designed to remove most of this organic matter and reduce the biochemical oxygen demand as shown in Figure 3. In this process, the wastewater undergoes vigorous aeration to encourage the growth of aerobic bacteria and other microorganisms that oxidize the dissolved organic matter into carbon dioxide and water [48]. Two common secondary treatments are active sludge systems and drip filters as displayed in Figure 3.

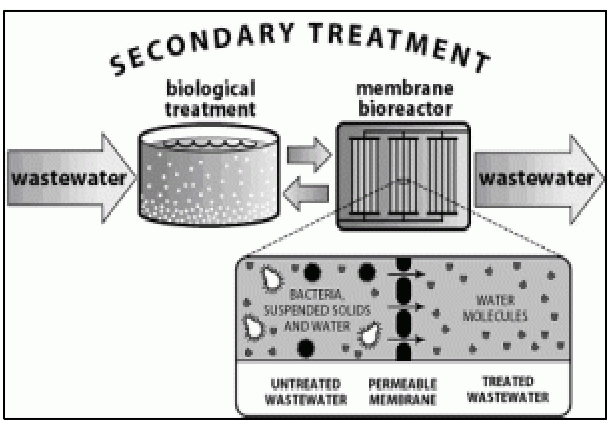

Fig 3: Secondary wastewater treatment

5.3 Tertiary Sewage Treatment

The objective of this operation is to provide a final treatment stage to raise the effluent quality prior it is discharged to the receiving environmental such as: sea, river, lake, ground. More than one tertiary treatment process may be used at any treatment plan as exhibited in Figure 4 [49].

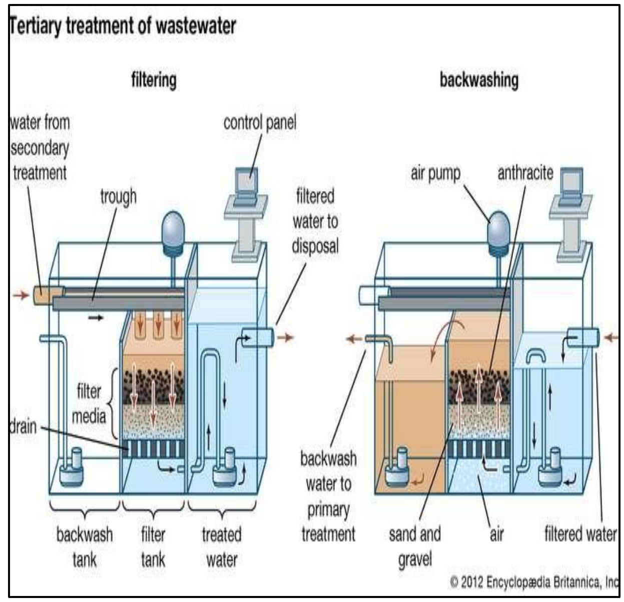

Fig 4: Tertiary Process of wastewater Treatment

6. Conclusion

Organic and inorganic substances released into the environmental as a result of household, agricultural and industrial aquatic activities lead to organic and inorganic pollution. Regular primary and secondary treatment of this wastewaters has been introduced in an increasing number of places, in order to get rid of easily sedimentary matter and oxidize the organic matter available in wastewater. Pollution is caused by different organic and inorganic substances into the environmental. Furthermore, pollution sources include household, agricultural and industrial waters. Traditional techniques such as chemical precipitation, carbon adsorption, ion exchange, evaporations and membrane operate have been found to be effective in treatment of waste and wastewater. From the literature, it is showed that the new ways of wastewater treatment are due to microalgae and they are prone to be efficient in decreasing toxic components. It is noted that the traditional techniques are not efficient in decreasing toxic, heavy metals, nitrogen, phosphorous.

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