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The pathogenic bacteria that isolation from wastewater from different regions in Nasseria city

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Abstract
Samples collected from different regions in Nasseria city from 15\4\2013 to 20\3\2014 , such as Altathihia, Alfida ,Alsikak , Aredo , Althwara ,Alsedenawia from the wastewater that exceration from houses to the surfece river near the houses at the different regions ,the effluents were polluted with pathogenic bacteria including , *Escherichia coli* , *Citrobacter freundii, Citrobacter aerogenes*, *Citrobacter aerogenes*, *Salmonnella enteritidis*, *Salmonella tyhmurium* , *Proteus vulgaris*, *Staphylococcus aureus* , *Vibrio vulnificus* ,*Serratia marcescens* , *Vibrio cholera* ,*Klebsiella pneumonia* , *Legionella pneumophila* ,*Shigella flexneri* , *Shigella sonnei* , *Aeromonas hydrophia, Pseudomonas aerogenosa , Mycobaterium avium complex* . The total bacteria that isolation 17 species from 72 samples ,the total number for bacteria 97 We notice that the results not obtained showed the presence of significant differences ,isolation from the wastewater at the different regions in Nasseria city .The aim of study,isolation and Identification the pathogenic bacteria from sewage water that excreation from the houses **.**

Keywords: *Legionella pneumophila* **,** Aredo **,** wastewater **,**Sewage **,** *Proteus vulgaris*

INTRODUCTION

Sewage:-The term may be used to mean raw sewage, sewage sludge, or septic tank waste,raw sewage is mainly water containing excrement, industrial effluent and debris, such as sanitary towels, condoms, plastic etc, excrement is the major source of harmful micro-organisms, including bacteria, viruses and parasites,Sewage treament reduces the water content and removes debris, but does not kill or remove all the micro-organisms.(Okoh *et al.,* 2007).

Exposure to sewage or its products may result in a number of illnesses. These include:
gastroenteritis, characterised by cramping stomach pains, diarrhea and vomiting;
Weil's disease, a flu-like illness with persistent and severe headache, transmitted by rat urine, damage to liver, kidneys and blood may occur and the condition can be fatal;
hepatitis, characterised by inflammation of the liver, and jaundice;occupational asthma, resulting in attacks of breathlessness, chest tightness and wheezing, and produced by the inhalation of living or dead organisms; infection of skin or eyes; and/or rarely, allergic alveolitis (inflammation of the lung) with fever, breathlessness, dry cough, and aching muscles and joints.(Hamner *et al.,* 2006).
The most common way is by hand-to-mouth contact during eating, drinking and smoking, or by wiping the face with contaminated hands or gloves, or by licking splashes from the skin, by skin contact, through cuts, scratches, or penetrating wounds, from discarded hypodermic needles. Certain organisms can enter the body through the surfaces of the eyes, nose and mouth, by breathing them in, as either dust, aerosol or mist. Shuval, 2003)

Protecting Humans from sewage risks

Since micro-organisms are an inherent part of sewage, the hazard cannot be eliminated.
However, a proper assessment of risk is required, but this should not include analysis of sewage for micro-organisms as they can constantly change , exposure to sewage should be eliminated or minimised by, for example, using remote-controlled robotic cameras for sewer inspection; drying sludge before disposal; incineration of sludge; injection of sewage into land rather than spreading; damming and bypass pumping of sewer sections prior to reconstruction(WHO, 1989).
The following measures can further reduce risk of infection and illness:
Ensure that employees and line management understand the risks through proper instruction, training and supervision, Provide suitable personal protective equipment, that may include waterproof abrasion-resistant gloves, footwear, eye and respiratory protection, face visors are particularly effective against splashes, Provide adequate welfare facilities, including clean water, soap, nailbrushes, disposable paper towels, and where heavy contamination is foreseeable, showers, for remote locations portable welfare facilities should be provided,areas for storage of clean and contaminated equipment should be segregated and separate from eating facilities, provide adequate first-aid equipment, including clean water or sterile wipes for cleansing wounds, and a supply of sterile, waterproof, adhesive dressings.(WHO, 1989).

Wastewater represents a major source of microbial pollution in water bodies receiving raw or even partially treated sewage (Okoh *et al.,* 2007). The microbes in wastewater include bacteria, viruses, protozoa, Helminthes and fungi, these microbes are mainly excreted in the faeces of humans, birds, and animals (Bitton, 2005). Waterborne pathogens pose health risk when wastewater is reused either as raw drinking water or for agricultural purposes (WHO, 1989).
In regions with water scarcity such as Altathihia, Alfida ,Alsikak , aredo , AlthwaRA ,Alsedenawia water bodies that receive wastewater pollution also serve as majoirr sources of domestic water to vast number of population (Sabae and Rabeh, 2007).

Wastewater microbes with increased incidences of waterborne diseases (Hamner *et al.,* 2006). The diseases are acquired through direct contact with wastewater (Habari *et al.,* 2000), inhaling aerosols generated in sprinkler irrigation (Shuval *et al* 1989), drinking contaminated water (CDC, 2004), and eating sea foods harvested from wastewater polluted sources (Shuval, 2003).The diversity and density of pathogens in wastewater vary depending on the diversity and prevalence of infections in the population producing the wastewater (Petterson and Ashbolt, 2003),and the time of estimation, this suggests that wastewater must not be discharged into natural environment without proper treatment, and that wastewater treatment must be reliable and subject to frequent monitoring in order to ensure public health safety ,in order to safeguard public health and protect environment from wastewater discharge, both international and local guidelines have been put in place(Kim *et al.,* 2009).
The international guideline developed by World Health Organization (WHO) is based on intended use of effluent.Microbiological quality of effluent used in irrigation of crops that are eaten uncooked, sports fields, and public parks in unrestricted regions should not exceed 103 faecal coliforms (FC) per 100 mL (WHO, 1989). In the US, the Environmental Protection Agency (EPA) has set 0 FC / 100 mL standard for effluent use in irrigation of any food crops not commercially processed including crops eaten raw (EPA, 1992).

The aim of study
Isolation and Identification the pathogenic bacteria from sewage water that excreation from the houses .

MATERIALS AND METHODS
Study area
In Nassiria city with sewage water in diffrent regions such as Altathihia, Alfida ,Alsikak , aredo , Althwira ,Alsedenawia water bodies that receive wastewater pollution also serve as major sources of domestic water to vast number of population .
Study design
In order to include both dry and wet seasons in the sampling frame, 12 water samples were taken monthly during the summer seasen and a similar number taken during the winter season .To evaluate the microbial variation, from wastewater samples were collected in that peroid from 15\4\2013 to 20\3\2014
Wastewater sampling procedures
One samples were taken monthly from 15\4\2013 to 20\3\2014 A total of 72 bacteriological samples were collected in clean sterile screw capped 250 millilitres (ml) polypropylene bottles.The sampled wastewater volumes and depth of sampling were done in accordance with standard methods for water and wastewater examination .
Isolation and characterization of bacterial isolates
Bacterial diversity and loads were determined by serial dilution and plating of water samples on differential culture media. The isolates were then identified byAPI 20 and Biochemically characterized following the methods described in Bergey's Manual of Systematic Bacteriology (Kreig and Holt, 1984)

Culture media

Culture media , MIS medium . , Methyl red Voges proskauer broth , Simmon s citrate agar , Triple Sugar Iron agar , Lactose fermentation medium , Urea agar , Nitrate broth medium,

MacConkey agar , Nutrient agar , Nutrient broth +7%NaCL ,Lowenstien - Genson agar

Data analysis
Kia squre test used for data statistical analysis.Groups tests were performed using student (analsis of variance) between summer and winter seasons for collecte the pathogenic bacteria at 5%significance level and Pvalue of < 0.05 was considered not significant.The differicant between winter and summer
seasons at propility ($p \leq 0.05$) for bacteria in drinking water in different regions in Nasseria city .

Results

Table (1) the total bacteria that isolation from different regions at Nasseria city from 15\4\2013 to 20\3\2014

No.		Number of Bacteria isolated in summer	Number of Bacteria isolated in Winter
1	*Escherichia coli*	11	12
2	*Citrobacter freundii*	2	3
3	*Citrobacter aerogenes*	3	2
4	*Salmonnella enteritidis*	3	3
5	*Salmonella tyhmurium*	4	2
6	*Proteus vulgaris*	4	2
7	*Staphylococcus aureus*	5	4
8	*Vibrio vulnificus*	3	1
9	*Serratia marcescens*	3	12
10	*Vibrio cholera*	2	2
11	*Klebsiella pneumonia*	5	3
12	*Legionella pneumophila*	2	1
13	*Shigella flexneri*	1	3
14	*Shigella sonnei*	1	3
15	*Aeromonas hydrophia*	1	3
16	*Pseudomonas aerogenosa*	0	1
17	*Mycobaterium avium complex*	0	1
$X2 = 8.54$, df=16, $P \geq 0.05$			

This table explain the species that isolation from sewage (17 species from 72 samples)from different regions in Nasseria city from 15\4\2013 to 20\3\2014 .

Kia square that use to determinate the significant differences ($P \leq 0.05$) between summer and winter seasens for the different species of bacteria that isolatin from wastewater.

It is not significant differences ($P \leq 0.05$) between summer and winter seasens for the different species of bacteria that isolatin from wastewater.

Table (2)The pathogenic bacteria that isolated from sewage water from Aredo region

Summer			Winter		
NO.	Name of organism	Date collection	No.	Name of organism	Date collection
1	*Escherichia coli* *Citrobacter freundii* *Salmonnella enteritidis*	15\4\2013	1	*Vibrio cholera* *Shigella flexneri*	20\10\2013
2	*Proteus vulgaris* *Escherichia coli*	14\5\2013	2	*Escherichia coli* *Salmonnella enteritidis*	19\11\2013
3	*Salmonella tyhmurium*	15\6\2013	3	*Escherichia coli*	20\12\2013
4	*Staphylococcus aureus*	13\7\2013	4	*Klebsiella pneumonia*	18\1\2014
5	*Vibrio vulnificus*	14\8\2013	5	*Escherichia coli*	19\2\2014
6	*Klebsiella pneumonia* *Escherichia coli*	14\9\2013	6	*Citrobacter freundii*	20\3\2014

Table (3) The pathogenic bacteria that isolated from sewage water from Alsedenawia region

Summer			Winter		
NO.	Name of organism	Date collection	No.	Name of organism	Date collection
7	*Serratia marcescens* *Staphylococcus aureus*	15\4\2013	1	*Salmonella tyhmurium*	20\10\2013
8	*Shigella flexneri*	14\5\2013	2	*Klebsiella pneumonia*	19\11\2013
9	*Citrobacter aerogenes*	15\6\2013	3	*Staphylococcus aureus*	20\12\2013
10	*Escherichia coli* *Citrobacter freundii* *Salmonnella enteritidis*	13\7\2013	4	*Mycobaterium avium complex*	18\1\2014
11	*Escherichia coli*	14\8\2013	5	*Proteus vulgaris*	19\2\2014
12	*Legionella pneumophila*	14\9\2013	6	*Citrobacter freundii*	20\3\2014

Table (4) The pathogenic bacteria that isolated from sewage water from Altathihia region

Summer			Winter		
NO.	Name of organism	Date collection	No.	Name of organism	Date collection
13	*Virio vulnificus*	15\4\2013	1	*Pseudomonas aerogenosa*	20\10\2013
14	*Escherichia coli*	14\5\2013	2	*Salmonnella enteritidis*	19\11\2013
15	*Proteus vulgaris*	15\6\2013	3	*Vibrio cholera*	20\12\2013
16	*Salmonella tyhmurium*	13\7\2013	4	*Shigella sonnei* *Vibrio vulnificus*	18\1\2014
17	*Serratia marcescens* *Escherichia coli*	14\8\2013	5	*Aeromonas hydrophia* *Escherichia coli*	19\2\2014
18	*Klebsiella pneumonia*	14\9\2013	6	*Shigella flexneri* *Staphylococcus aureus*	20\3\2014

Table (5) The pathogenic bacteria that isolated from sewage water from Alfida region

Summer			Winter		
NO.	Name of organism	Date collection	No.	Name of organism	Date collection
19	*Escherichia coli*	15\4\2013	1	*Escherichia coli*	20\10\2013
20	*Aeromonas hydrophia* *Escherichia coli*	14\5\2013	2	*Proteus vulgaris*	19\11\2013
21	*Klebsiella pneumonia*	15\6\2013	3	*Shigella sonnei*	20\12\2013
22	*Citrobacter aerogenes* *Staphylococcus aureus*	13\7\2013	4	*Escherichia coli* *Citrobacter freundii* *Salmonnella enteritidis*	18\1\2014
23	*Vibrio cholera*	14\8\2013	5	*Shigella flexneri*	19\2\2014
24	*Proteus vulgaris*	14\9\2013	6	*Escherichia coli*	20\3\2014

Table (6) The pathogenic bacteria that isolated from sewage water from Althwira

Summer			Winter		
NO.	Name of organism	Date collection	No.	Name of organism	Date collection
25	*Salmonella tyhmurium*	15\4\2013	1	*Citrobacter aerogenes*	20\10\2013
26	*Shigella sonnei*	14\5\2013	2	*Aeromonas hydrophia* *Escherichia coli*	19\11\2013
27	*Staphylococcus aureus* *Klebsiella pneumonia*	15\6\2013	3	*Legionella pneumophila*	20\12\2013
28	*Staphylococcus aureus*	13\7\2013	4	*Klebsiella pneumonia*	18\1\2014
29	*Citrobacter aerogenes* *Proteus vulgaris*	14\8\2013	5	*Escherichia coli* *Staphylococcus aureus*	19\2\2014
30	*Escherichia coli*	14\9\2013	6	*Escherichia coli* *Serratia marcescens*	20\3\2014

Table (7) The pathogenic bacteria that isolated from sewage water from Alsikak region

Summer			Winter		
NO.	Name of organism	Date collection	No.	Name of organism	Date collection
31	*Virio vulnificus*	15\4\2013	1	*Escherichia coli*	20\10\2013
32	*Vibrio cholera* *Serratia marcescens*	14\5\2013	2	*Salmonella tyhmurium*	19\11\2013
33	*Klebsiella pneumonia*	15\6\2013	3	*Staphylococcus aureus*	20\12\2013
34	*Escherichia coli* *Salmonella tyhmurium*	13\7\2013	4	*Aeromonas hydrophia* *Escherichia coli*	18\1\2014
35	*Salmonnella enteritidis*	14\8\2013	5	*Shigella sonnei*	19\2\2014
36	*Legionella pneumophila*	14\9\2013	6	*Citrobacter aerogenes*	20\3\2014

DISCUSSIONS

The aim of this study was to assess the diurnal and seasonal patterns in the occurrence of pathogenic bacteria in Sewage,. this was achieved by sampling influent wastewater before physical screens, and effluent before discharge into the Nasseria river the types and concentrations of bacteria isolated from sewage before leave the life houses and the diversity and density of wastewater microbes depends on the health status (Petterson and Ashbolt, 2003), as well as the defecation patterns of the sewered population (Horan, 2005).

Table(1) explain the species that isolation from sewage (17 species from 72 samples)from different regions in Nasseria city from 15\4\2013 to 20\3\2014 ,Kia square that use to determinate the significant differences ($P \leq 0.05$) between summer and winter seasens for the different species of bacteria that isolatin from wastewater,It is not significant differences ($P \leq 0.05$) between summer and winter seasens for the different species of bacteria that isolatin from wastewater.

The diversity of microbes,prevalence of infections, and defecation patterns among Nasseria city .*E. coli* was the most dominant bacteria and the least dominant was *Staphylococcus aureus and Klebsella pneumonia* regardless of the time of month, the level of a particular pathogen, secreted infaeces or urine of infected person into wastewater depends on the prevalence of infections in the community producing the wastewater (Mara, 2004).

This suggests that infections associated with *E. coli* are higher than any other among Nairobi city residence, *E. coli* causes a wide range of infections, including urinary tract infections (UTI) and diarrhoea diseases in all age groups (Chesbrough,2006).

Similar to the finding at the DSTP intake wastewater, there was no bacterial variation between the morning and the afternoon sessions at the effluent. Variation in bacterial concentrations was observed with higher 40 J. Res. Environ. Sci. Toxicol.pollution in the morning than in the afternoon. This finding differs from that of Machibya and Mwanuzi (2006) at Kilombero Sugar Wastewater Stabilization Ponds in Tanzania. Machibya and Mwanuzi (2006) observed one log increase of *Escherichia coli* levels during the afternoon hours; bacterial die-off is expected to be higher during the day due to the influence of light-mediated factors (Kim *et al.,* 2009). Machibya and Mwanuzi (2006) attributed their finding to poor design of waste stabilization ponds.

Seasonal changes in the prevalence of bacterial diseases are common and the concentration of bacteria in wastewater may be related to the number of people with a disease in any given day (Horan, 2005). Additionally, in combined sewer system, like the case of DSTP, wastewater quality is subject to dilution by rain water ,effluent bacterial densities showed seasonal variation with higher counts being observed during dry season than rainy season, the low bacterial levels in wastewater during the rainy season can be attributed to dilution of wastewater microbial quality in stabilization ponds (; Rhee *et al.,* 2009).

The current study finding corroborated with those of Hodgson (2007) who observed low bacterial counts in the effluent of Akosombo Waste Stabilization Ponds, Ghana due to rain water dilution.DSTP failed to meet local and international requirements for discharge of effluents irrespective of day or seasonal changes. The international guidelines have been set by World Health Organization (WHO) dictate that, effluent used for irrigation of crops likely to be eaten raw should not exceed 103 faecal coliform per 100 mL of wastewater (WHO, 1989). When the WHO guideline is met, no pathogen should be detectable in the wastewater effluents, but this was not the case for DSTP effluent, containing pathogens such as *E. coli, P. aeruginosa,*,the local standard for discharge of effluents into natural environment has been published by National Environmental Management Authority (NEMA). NEMA standard states that no E. coli should be detectable per 100 mL of wastewater discharged into environment ,Consequently, waterborne diseases have increased considerably among populations relying on natural water bodies as a primary source of domestic water (Hamner *etal.,* 2006). Wastewater must not be discharged into natural environment without proper treatment, and that the treatment must be reliable and subject to frequent monitoring in order to ensure public health safety within the Millennium Development Goals (MDGs) adopted by the United Nations General Assembly in the year 2000.

CONCLUSIONS

1- The variation of bacteria did not occurred in seasens summer and winter ,it is different in species of- microorganisms .
2-Summer seasen equel with winter seasen for the stay the pathogenic bacteria ,
3The pathogenic bacteria isolation from all regions by different species .
4-The Humans are pollution by sewage that exceration from the houses .
5-The pathogenic bacteria translation from person to person throw the pollution .

Recommendations

1-Did not near the wastewater of the treatment.
2-Know that pathogenic bacteria at summer and winter seasens .
3-Keep the pipe line of drinking water from pollution throw the break down pipe line.
4-Put the wastewater in drain to sabity tank .
5-Prevent pollution by wastewater every thing that use in homes .

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