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Detection and effects of heavy metals in fish blood, water, sediment, food, and plants of different three farms in EL-Fayoum Governorate, Egypt

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ABSTRACT

The heavy metal contamination of Nile tilapia that were gathered from three fish farms is the focus of this investigation. This led to an investigation of the chemical and physical characteristics of farm water. Heavy metals (Zn, Cd, Pb, Fe, and Cu) were also measured in fish blood, water, sediment, food, and plants that were taken from the farms that were the subject of the investigation. The three farms, EL-Galini, EL-Locanda, and EL-Bats, had pH values of 7.95, 8.03, and 8.06, respectively, and dissolved oxygen values of 5.9, 7.2, and 6.0 (mg/l). In all three farms, the relative variation of heavy metal values in water was Fe>Zn>Cu>Pb>Cd. EL Galini farm had the highest result for sediment among all the heavy metals studied, followed by EL-Bats farm and Locanda farm; however, fordiet locanda farm recorded highest value for all the examined heavy metals followed by El-Bats then El Gilani farm.

Keywords; Nile Tilapia, Heavy metals, Sediments, Diet

1. Introduction

Fish depend on water, and pond management is around maintaining the water's quality until it affects fish production. According to Sandoval, *et al* (2017), "water quality" describes the qualities of the water that aquatic life needs in order to grow as best they can. The components of water quality—physical, chemical, and biological—affect how it is used for fish farming. Among these are temperature, electrical conductivity, pH, and dissolved oxygen. Since the 1990s, when it started to expand significantly in the Asia-Pacific area, Aquaculture has proven to be a viable operation in multi-used irrigation reservoirs and its important source of food security and employment in many countries (Salie, 2014). Nationwide, ponds are a common place to raise tilapia (*O. niloticus*); the physicochemical characteristics of the water body affect fish productivity. Aquaculture has been observed to have a number of negative environmental repercussions, including user conflicts, ecosystem changes, and water pollution. Water pollution of water resources is the most pervasive problem among these possible adverse impacts, and it has received the greatest attention globally (Cripps and Bergheim, 2000). The interaction of the physical, chemical, and biological components of the environment determines the water quality of every aquatic ecosystem. The aquatic biota that is present in any aquatic habitat directly affects the physicochemical characteristics of that ecosystem. Physicochemical features are essential to take into account when determining the trophic status of aquatic ecosystems (Sharma *et al*., 2009). Fish are thought to be the most important animals for pollution monitoring in aquatic environments since they are the only aquatic organisms that cannot escape the damaging effects of these contaminants **(**Beyer and Vermeulen, 2003). The main effects of long-term heavy metal pollution include biodiversity and habitat degradation. These pollutants can disrupt living organisms at the molecular, cellular, and physiological levels, resulting in adverse effects at the population and community levels (Lionetto et al., 2019). As heavy metal sinks, sediments are essential to the aquatic environment. These metals are not biodegradable and, if introduced into water bodies, can either accumulate in aquatic creatures or adsorb on soil particles. Heavy metal pollution may make aquatic animals more susceptible to a range of diseases by disrupting their immune, reproductive, and developmental systems, which can have an effect on the physiological health of aquatic species (EPA, 2010). Because of the tremendous effects that heavy metals have on the environment and all living beings; they are considered to be among the most hazardous contaminants. Trace metals like Zn, Cu, and Fe are instances that are necessary in trace levels in the aquatic environment because they play a biochemical function in the life processes of all aquatic plants and animals. According to Mason (2002), the main sources of Cu and Pb in the Egyptian irrigation system are industrial wastes and algaecides for Cu, whereas the main source of Cd is phosphatic fertilisers used in crop farms.

Therefore, the objective of this work was to identify various heavy metals in fish blood, water, and sediment that were taken from three distinct farms at El-Fayoum Government: EL Gilani, Locanda, and EL Bats farms. The investigation of heavy metal pollution in soil, food, and plants gathered from the three farms under examination is another aspect of the study. Shakshouk Fish Research Station, EL-Fayoum Governorate, National Institute of Oceanography and Fisheries, Egypt was the site of study.

2. Materials and Methods

Collection and analysis of water and fish samples

Three distinct commercial farms (EL Gilani, Locanda, and EL Bats farms, respectively) provided water samples for the study. According to APHA (1998), the physical, chemical, and heavy metal content of water samples was assessed. The sediment samples were dried in an oven at 800C and ground into small particles. Using the Kouadia and Trefry (1987) procedure, 1.0 g of the finely ground materials was digested. Atomic absorption (Perkin Elmer 3110 USA) with graphite atomizer HGA-600 was used to determine the presence of heavy metals (Fe, Pb, Zn, Cu, and Cd) in water and sediment samples. The same three commercial farms provided fish samples of Nile tilapia (*O. niloticus*), weighing 170-230 g and measuring 20–25 cm in length. According to Barley and She (2013), the Soil, Diet, Plant, and Water Laboratory at the Faculty of Agriculture, Fayoum University used inductively coupled plasma mass spectrometry (ICP-MS) to identify heavy metals in fish blood.

Analytical statistics Using the SPSS Statistical Package the data were subjected to one-way ANOVA analysis, and significant differences were identified at the 5% level by the Duncan Waller Multiple Range Test (2008).

3. Results

Water quality parameters in three different drainage water

The physical results of three substantially different water drainages are shown in Table (1). There was non-significant difference at the level of Mean value ± SD of PH and temperature of EL Wadi and EL-Bats drains when compared with Dyer-EL Berka drain. However, with P-values of (0.005 and 0.04, respectively), the Mean value S.D. of total dissolved solids in the EL Wadi and EL-Bats drains was significantly lower than that of the Dyer-EL Berka drainage. The drainages of EL Wadi, EL-Bats, and Dyer-EL Berka all displayed notable reductions in salinity, with P-values of 0.02, 0.03, and P*-value of 0.1 in comparison to EL Wadi drainage. The mean values of organic matter, ammonia, ammonia unionised, and total alkalinity showed nonsignificant variance. Furthermore, the mean value of nitrate and nitrite increased significantly in the El Bats drain (P-values of 0.4 and 0.2, respectively), and in the EL-Bats drain (P-values of 0.3, 0.07), in comparison to the Dyer EL Berka drainage and the EL Wadi drainage. Comparing EL-Wadi drainage to Dyer EL Berka drainage, however, did not reveal any appreciable differences. Conversely The dissolved oxygen value increased considerably when compared to the Dyer EL Berka drainage, with a mean value standard deviation and a P-value of 0.05; however, it did not significantly increase in the EL-Bats drainage, with a P-value of 0.39, table (2).

Table 1. Physical parameters in three different drainage water

Parameters			**Drainage**	
		Dier-EL Berka	**EL-Wadi**	**EL-Bats**
pH	Range Means ± SD	8.13-8.21 8.1 ± 0.49	8.11-8.18 8.14 ± 0.56 $^{\#\, p = 0.68}$	8.13-8.21 8.17 ± 0.49 $^{\#\, p = 0.93,\ *\, p = 0.61}$
Temperature (°C)	Range Means ± SD	33-34 33 ± 0.70	32-33 32 ± 0.70 $^{\#\, p = 0.24}$	31-33 32 ± 1.4 $^{\#\, p = 0.35,\ *\, p = 0.71}$
TDS (mg/l)	Range Means ± SD	36.00-36.55 36.26 ± 0.37	4.22-4.28 4.25 ± 0.4 $^{\#\, p = 0.005}$	4.22-8.24 6.23 ± 2.8 $^{\#\, p = 0.04,\ *\, p = 0.51}$

p > 0.05 is non-significant, p ≤ 0.05 is significant, #P-value: when different groups compared with Dier El-Berka drain, *P value:- when different groups compared with El-Wadi drain.

Table 2. Chemical parameters in three different drainage water

Parameters		**Drainage**		
		Dier-EL Berka	**EL-Wadi**	**EL-Bats**
Ammonia (mg/l)	Range Means ± SD	0.456-0.489 0.472 ± 0.02	0.214-0.262 0.238 ± 0.03 $^{\#\, p = 0.12}$	0.335-0.356 0.345 ± 0.01 $^{\#\, p = 0.1,\ *\, p = 0.1}$
Ammonia Unionized(mg/l)	Range Means ± SD	0.043-0.063 0.0530 ± 0.02	0.028-0.043 0.038 ± 0.02 $^{\#\, p = 0.40}$	0.044-0.047 0.050 ± 0.02 $^{\#\, p = 0.77,\ *\, p = 0.38}$
Total Alkalinity(mg/l)	Range Means ± SD	400-500 450 ± 70.1	160-170 165 ± 7.0 $^{\#\, p = 0.11}$	160-170 165 ± 7.07 $^{\#\, p = 0.11,\ *\, p = 1.0}$
Nitrite (mg/l)	Range Means ± SD	0.16-0.22 0.192 ± 0.04	0.24-0.70 0.467 ± 0.3 $^{\#\, p = 0.4}$	0.80-0.92 0.860 ± 0.0 $^{\#\, p = 0.02,\ *\, p = 0.3}$
Nitrate(mg/l)	Range Means ± SD	5.02-6.23 5.62 ± 0.8	6,23-7.45 6.84 ± 0.9 $^{\#\, p = 0.2}$	9.25-10.13 9.69 ± 0.6 $^{\#\, p = 0.04,\ *\, p = 0.07}$
Dissolved oxygen(mg/l)	Range Means ± SD	5.3-5.8 5.55 ± 0.3	7.4-8.2 7.80 ± 0.5 $^{\#\, p = 0.05}$	6.5-7,8 7.05 ± 0.8 $^{\#\, p = 0.18,\ *\, p = 0.39}$
Salinity (g/l)	Range Means ± SD	7-8 7.5 ± 0.7	1-1 0.75 ± 0.3 $^{\#\, p = 0.02}$	1-1 0.75 ± 0.0 $^{\#\, p = 0.03,\ *\, p = 1.0}$
Organic matter(mg/l)	Range Means ± SD	15.00-15.55 15.27 ± 0.4	7.01-7.14 7.07 ± 0.1 $^{\#\, p = 0.02}$	2.00-2.22 2.11 ± 0.2 $^{\#\, p = 0.01,\ *\, p = 0.002}$

P > 0.05 is non- significant p <0.05 is significant, #P-value; when different groups compared with Dier –El-Berka drain - *P-value; when different groups compared with EL Wadi drain.

Water quality parameters of three different farm water

The physical parameter findings of three significant diverse farms' water at Fig. (1) showed non-significant variance at the level of Mean value S.D of pH and temperature of Locanda and EL-Bats farms when compared with EL-Galini farm. EL-Bats and Locanda farms, on the other hand, had P*-values (0.006 and 0.005, respectively) than Locanda farm and significantly lower mean values and standard deviations of total dissolved solids than EL-Galini farm.

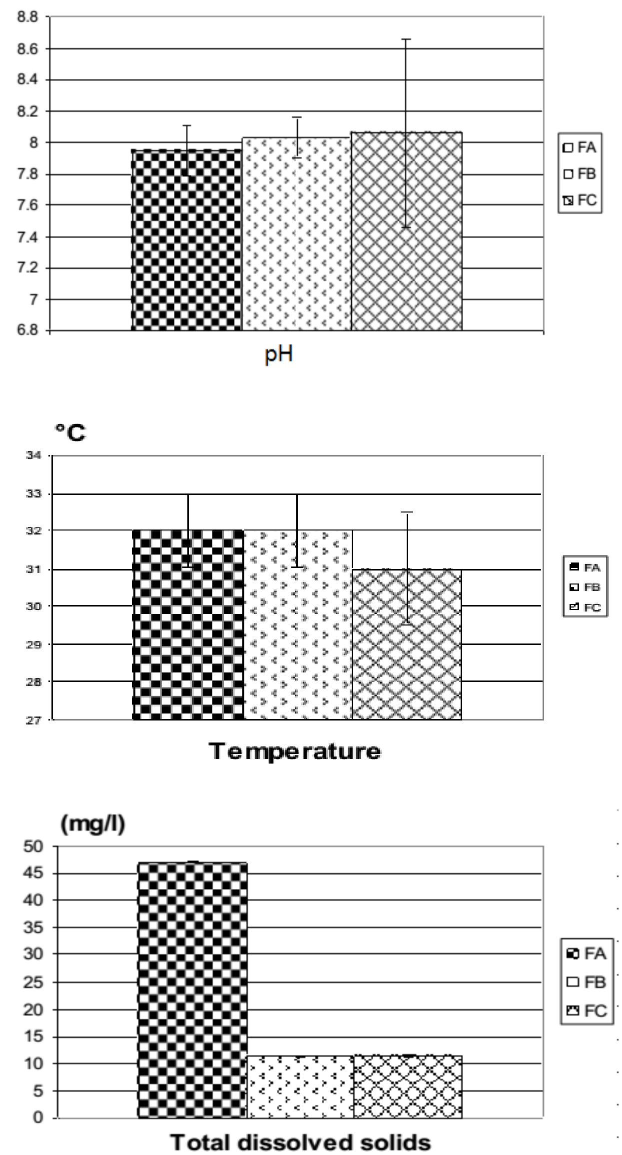
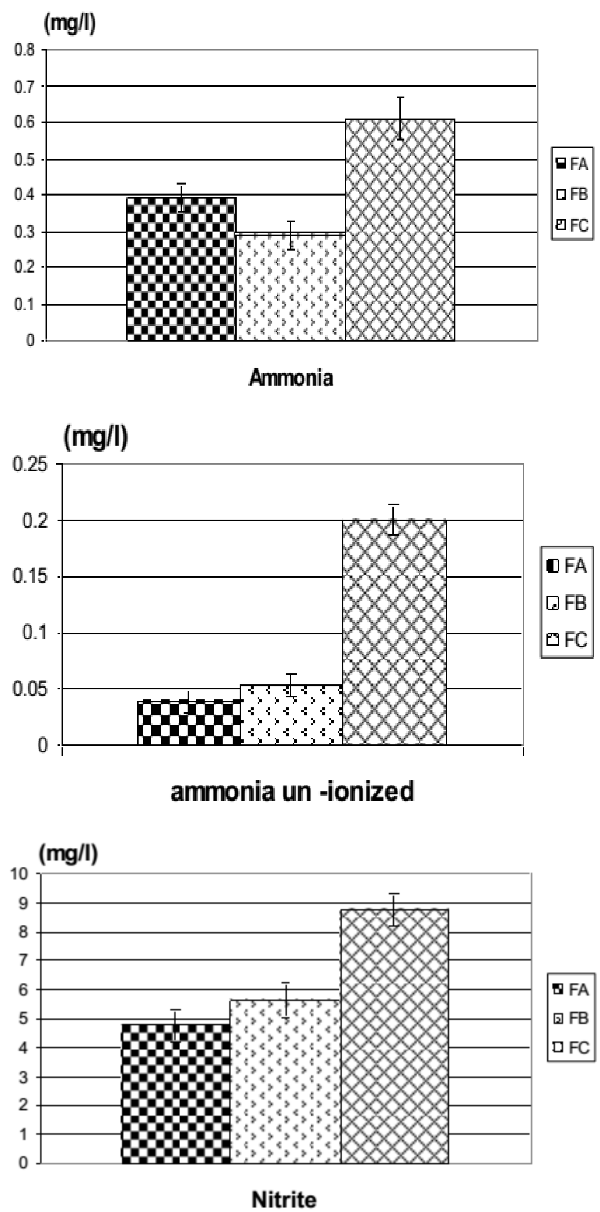
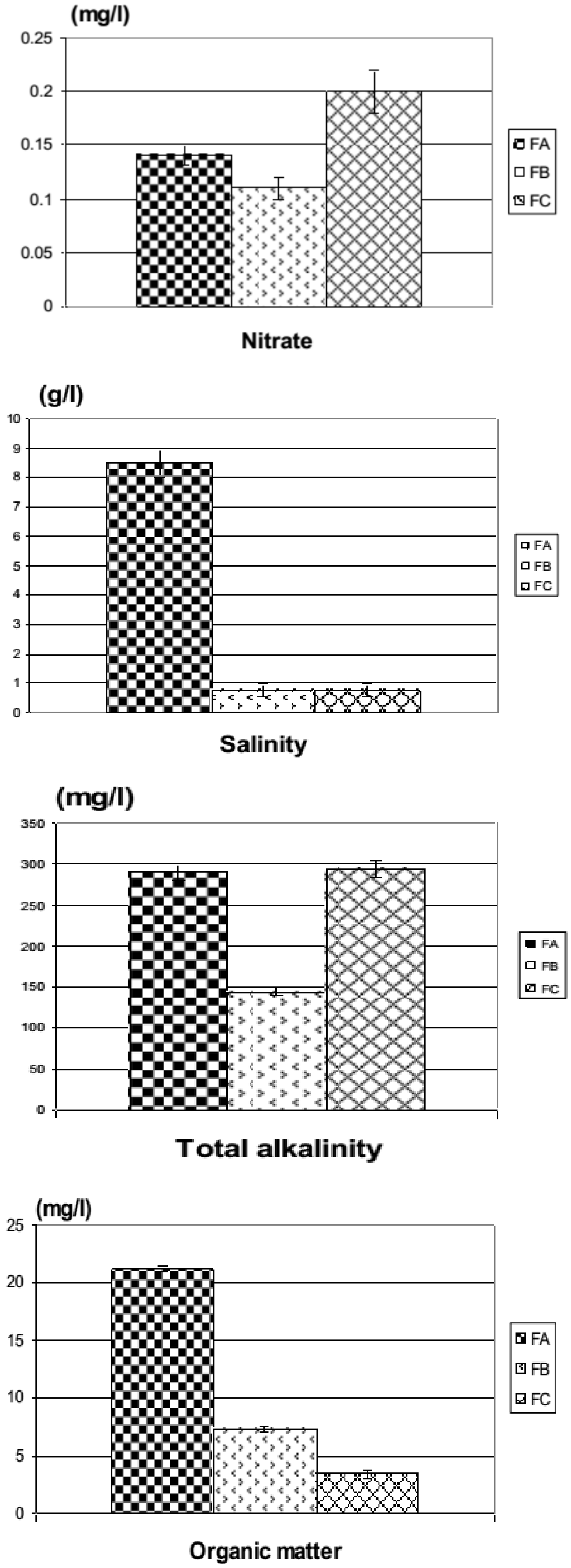


Fig. 1. Physical parameters of three different farm water. FA; El- Gilani farm, FB; Locanda farm, FC; EL-Bats farm

On the other hand, the results of the chemical parameters at Fig. (2) for dissolved oxygen, nitrate, nitrite, ammonia, and ammonia un-ionized were Mean value ± SD non-significant when EL-Galini farm was compared to Locanda and EL-Bats farms. In contrast to the EL-Galini farm, there was a significant drop in the salinity and organic matter levels at the S.D. Locanda and EL-Bats farms, with P-values of (0.01,0.02) and (0.01, respectively. Additionally, when comparing the Locanda farm to the EL-Galini farm, our results showed a significant increase in the mean value and standard deviation of total alkalinity; however, as Fig (2) illustrates, there was no significant change between the EL-Bats farm and the EL-Galini farm.





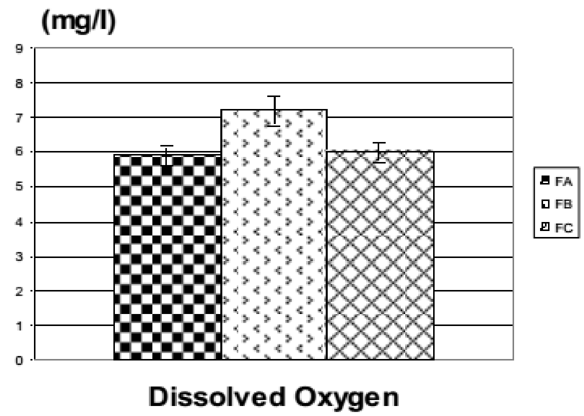


Fig. 2. Chemical parameters of water in three different farms. FA; El- Gilani farm, FB; Locanda farm, FC; EL-Bats farm

Heavy metals concentrations of Nile tilapia fish blood in three different farms.

According to Fig. 3, there was a substantial decline in Zn levels in both the Locanda and EL-Bats farms, with P-values of 0.001 and 0.001 when compared to the EL Galini farm and 0.001 and 0.001 respectively when compared to the Locanda farm. In addition to, there was a significant increase of levels Mean value S.D of in EL-Bats farm with P-value (0.001) when compared to EL Galini farm and P-value (0.003) when compared to Locanda farm, but a significant decrease of levels Mean value S.D of Cu in Locanda farm with P-value (0.01) as well. Nevertheless, despite a substantial rise in levels Mean value S.D of Fe in Locanda farm with P-value (0.04), there was a significant decline in levels Mean value S.D in EL-Bats farm with P-value (0.001) when compared to EL Galini farm and P-value (0.001) when compared to Locanda farm. However, levels of Pb and Cd are undetectable.

Detection of heavy metals in diet of three different farms under study

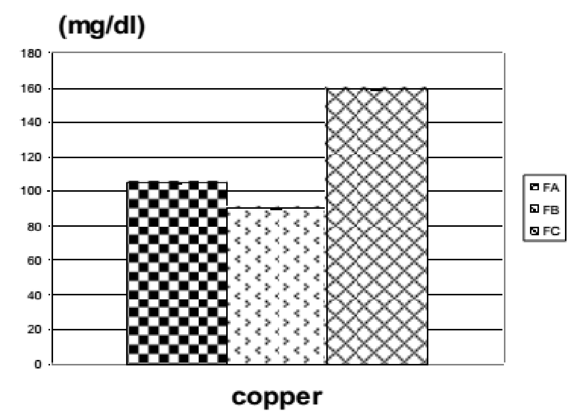
According to Table 3, there was no statistically significant difference between the amounts of Zn and Cu in the Locanda and EL-Bats farms compared to the EL Galini farm. However, when compared to EL Galini farm and P*-value (0.00) when compared to Locanda farm, there was a substantial rise in the levels of mean value and standard deviation of Fe.

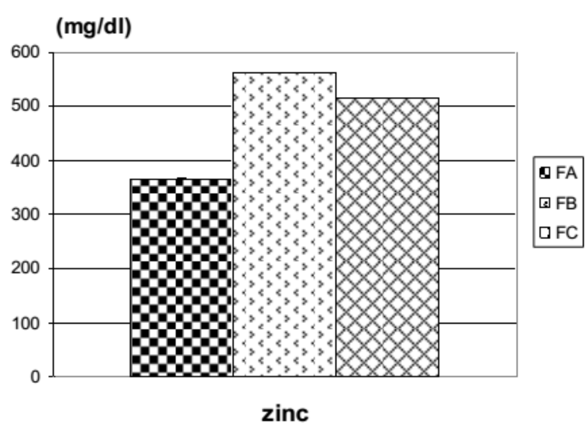
In contrast, EL-Bats farm had high levels of Cd and Pb when compared to Locanda and EL Galini farms (mean value S.D.). According to all heavy metals examined, the three separate farms and diets were contaminated in the following order: Fe > Zn > Cu > Pb > Cd**.**

Table 3. Detection of some heavy metals in diet of three different farm

Parameters		EL-Galini farm	Locanda farm	EL-Bats farm	USEPA
Zinc (mg/kg)	Range Means ± SD	8.0 - 79.8 43.9 ± 50.7	140 -142 141.2 ± 0.5 $^{\# p = 0.2}$	75 - 75.7 75.3 ± 0.4 $^{\# p = 0.5, * p < 0.001}$	0.3
Copper (mg/kg)	Range Means ± SD	10.7 - 22.7 16.7 ± 8.5	19.7 - 20.3 20 ± 0.4 $^{\# p = 0.6}$	23.6 - 27.9 25.8 ± 3.0 $^{\# p = 0.3, * p = 0.2}$	0.001
Iron (mg/kg)	Range Means ± SD	573 - 576 575.2 ± 2.3	671.2 - 672 671.6 ± 0.5 $^{\# p = 0.01}$	630 - 631 630.5 ± 0.7 $^{\# p = 0.01, * p < 0.001}$	0.5
Lead (mg/kg)	Range Means ± SD	1.04 - 1.04 1.0 ± 0.0	0.44 - 0.44 0.4 ± 0.0	1.48 - 1.49 1.4 ± 0.0	0.004
Cadmium (mg/kg)	Range Means ± SD	0.16 - 0.18 0.16 ± 0.0	0.04 - 0.04 0.04 ± 0.0	1.12 - 1.14 1.1 ± 0.0	0.001

p > 0.05 is non- significant, **p < 0.05** is significant, **#P-value**, when different groups compared with EL-Galini farm. *P-value, when different groups compared with Locanda farm.





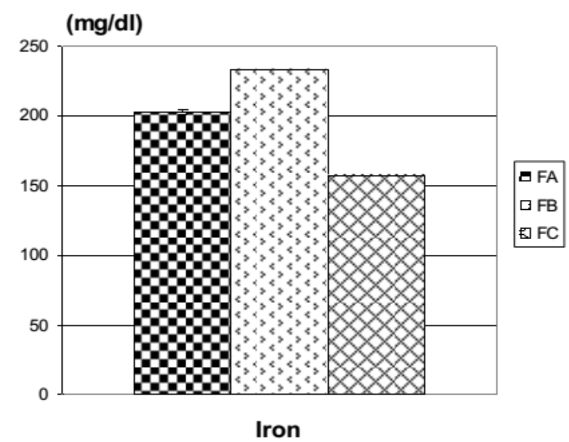
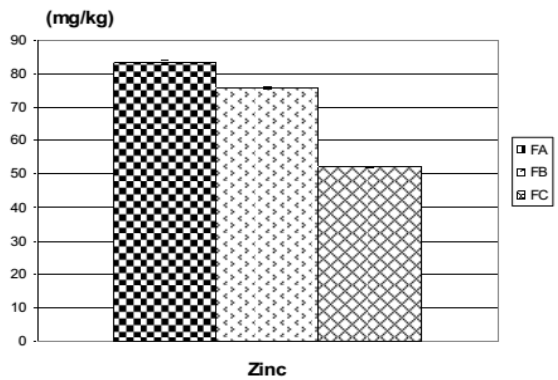
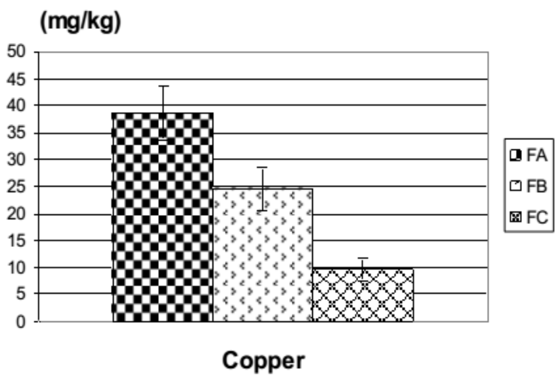


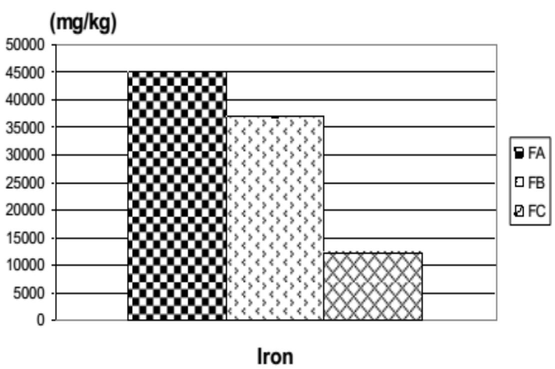
Fig. 3. Heavy metals concentrations of Nile tilapia fish blood in three different farms. FA; El- Gilani farm, FB; Locanda farm, FC; EL-Bats farm

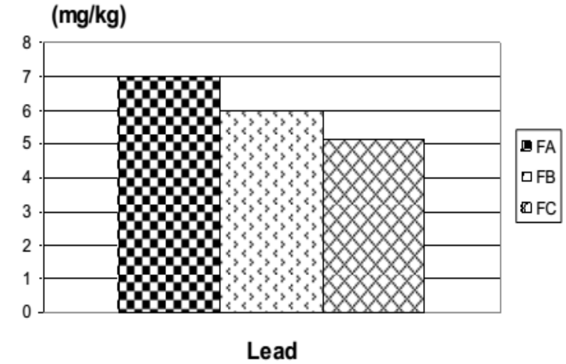
Accumulation of some heavy metals in sediment of three different farms

The levels of mean S.D. Zn, Cu, and Fe decreased significantly in both Locanda and EL-Bats farms, as shown by our findings in Fig. 4. P-values for Zn, Cu, and Fe were 0.004, 0.002, 0.005, and 0.001, respectively, when compared to EL Galini farm, and P*-values for Fe were 0.009,0.01, 0.002, when compared to Locanda farm. Both the Locanda and EL-Bats farms reported Pb levels that were Mean values± S.D. with low values when compared to EL Galini farm, whereas Locanda farm recorded Cd levels that were Mean values S.D. with high values. The heavy metals that were examined at the three farms that were the subject of the research accumulated in the sediments in the following order: Fe>Zn>Cu>Pb>Cd.









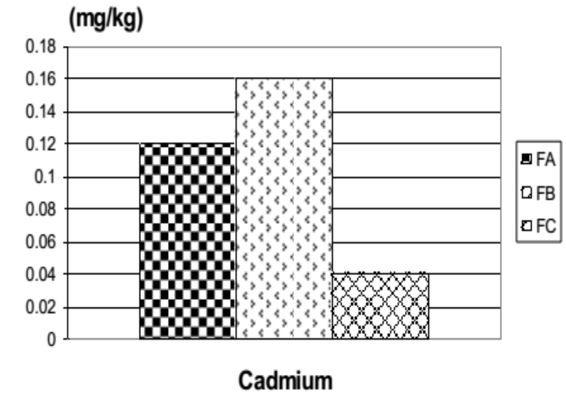


Fig. 4. Accumulation of some heavy metals in sediment of three different farms. FA; El- Gilani farm, FB; locanda farm, FC; EL-Bats farm.

Accumulation of some heavy metals in three different drain plant

According to Table 4 there was a substantial rise in the mean value and standard deviation of Zn in both the EL-Bats and EL-Wadi drains, with P-values of (0.001, 0.001) when compared to the Dyer EL-Berka drainage and (0.001) for the P*-value when compared to the EL Wadi drainage. Additionally, there was a non-significant change in the EL-Bats drainage when compared to Dyer EL-Berka drainage, but a significant increase of levels of Mean value S.D. of Cu in the EL Wadi drainage with a P-value of (0.001).

And whereas the levels of Mean value S.D of Fe in the EL Wadi drainage significantly increased with a P-value of 0.001, they significantly decreased in the EL-Bats drainage with a P-value of 0.01 when compared to the Dyer EL-Berka drainage and P*-value of 0.01 when compared to the EL Wadi drainage. However, when compared to Dyer EL-Berka drainage, Pb levels were observed to be Mean value S.D. with low values in both the EL Wadi and EL-Bats drains. In the plants of three different farms, the examined heavy metals accumulated in the following order: Fe>Zn>Cu>Pb>Cd.

Table 4. Chemical parameters in three different drainage water

Parameters		Drainage		
		Dier-EL Berka	**EL-Wadi**	**EL-Bats**
Zinc (mg/kg)	Range Means ± SD	22.2 - 22.3 22.25 ± 0.07	22.9 - 23.0 22.95 ± 0.07 $^{\# p < 0.001}$	26.3 - 26.4 26.3 ± 0.05 $^{\# p < 0.001, *p < 0.001}$
Copper (mg/kg)	Range Means ± SD	3.6 - 7.9 5.7 ± 3.0	7.1- 8.9 8.0 ± 1.2 $^{\# p < 0.001}$	1.1 - 11.6 6.3 ± 7.1 $^{\# p = 0.9, *p = 0.8}$
Iron (mg/kg)	Range Means ± SD	577.2 - 579.2 578.2 ± 1.4	743.2 - 752.4 747.8 ± 6.5 $^{\# p < 0.001}$	498 - 504 501 ± 4.2 $^{\# p = 0.01, *p = 0.01}$
Lead (mg/kg)	Range Means ± SD	1.12 - 1.12 1.1 ± 0.0	0.4 - 0.4 0.4 ± 0.0	0.6 - 0.6 0.6 ± 0.0
Cadmium (mg/kg)	Range Means ± SD	0.04 - 0.04 0.04 ± 0.0	0.04 - 0.04 0.04 ± 0.0	0.04 - 0.04 0.04 ± 0.0

$p > 0.05$ is non- significant, $p < 0.05$ is significant #P-value; when different groups compared with Dier –El-Berka drain
*P-value, when different groups compared with EL Wadi drain.

Accumulation of some heavy metals in three different farms plant.

According to Table (5) findings, levels of mean and standard deviation for Zn decreased significantly in both the Locanda and EL-Bats farms, with P-values of (0.03,0.01) when compared to the EL Galini farm and (0.001) when compared to the Locanda farm. Additionally, there was a substantial increase in EL-Bats farm with P-value (0.002) when compared to EL Galini farm and P*-value (0.001) when compared to Locanda farm, but a significant drop of levels Mean value S.D of Fe in Locanda farm with P-value (0.01). Additionally, compared to EL Galini farm, there was no statistically significant difference in the levels of mean value and standard deviation of Cu in the Locanda and EL-Bats farms. On the other hand, Cd levels did not alter when compared to EL Galini farm, however Pb levels were recorded as being at high mean values and standard deviations in both Locanda and EL-Bats farms. At the three different farms under research, the studied heavy metals accumulated in the plant in the following order: Fe>Zn>Cu>Pb>Cd.

Table 5. Accumulation of some heavy metals in three different farms plant

Parameters		EL-Galini Farm	Locanda Farm	EL-BatsFArm
Zinc (mg/kg)	Range Means ± SD	30.5-30.6 30 ± 0.07	29.6-29.6 29.6 ± 0.0 $^{\# p = 0.03}$	27.5-27.5 27.5 ± 0.0 $^{\# p = 0.01, *p = 0.001}$
Copper (mg/kg)	Range Means ± SD	6.9-8.5 7.7 ± 1.1	5.9-5.9 5.9 ± 0.0 $^{\# p = 0.2}$	3.6-4.8 4.2 ± 0.8 $^{\# p = 0.08, *p = 0.001}$
Iron (mg/kg)	Range Means ± SD	222.4-225.4 223.9 ± 2.1	166.8-167.2 167 ± 0.01 $^{\# p = 0.01}$	608.8-609.2 609 ± 0.2 $^{\# p = 0.002, *p = 0.001}$
Lead (mg/kg)	Range Means ± SD	0.8-0.8 0.8 ± 0.0	1.2-1.2 1.2 ± 0.0	1.1-1.1 1.1 ± 0.0

Cadmium (mg/kg)	Range Means ± SD	0.04-0.04 0.04 ± 0.0	0.04-0.04 0.04 ± 0.0	0.04-0.04 0.04 ± 0.0

P > 0.05 is non- significant, p 0.05 is significant, #P-value, when different groups compared with EL-Galini farm. *P-value, when different groups compared with Locanda far

4. Discussion

The current study focused on identifying the pollutants that cause water and fish damage, the accumulation of these elements, and their impact on the quality of water and fish in the main sources of water drainage and the farms into which these drains flow. Water usage is considered a national security issue, therefore, the use of water directly from the supply canals is allowed only for governmental hatcheries and not for fish farms which currently use water from the drainage canals (Soltan, 2013). In the present study , The physical properties of water normally considered include: Temperature pH and Total dissolved solids in three different drains (Dyer-Berka, EL-Wadi and EL-Bats) that pour into three different farms under study (EL-Gilini, Locanda and EL-Bats respectively) and results of three major different drainages water was recorded that There was non-significant variation at the level of Mean value ± S.D of temperature of EL Wadi and EL-Bats drains when compared with Dyer-EL Berka drain and at Locanda and EL-Bats farms when comparing with EL Galini farm ,This results agree with Sabac (2005), Ahmed et al. (2014), Khalil et al. (2017) and Goher et al. (2018) who studied temperature during summer in Qaroun lake and recorded very high .

On other hand , pH pH recorded There was non-significant variation at the level of Mean value ± S.D of pH of EL Wadi and EL-Bats drains when compared with Dyer-EL Berka drain and at Locanda and EL-Bats farms when comparing with EL Galini farm ,These results were similar to Sabae (2005), Zaghloul (2008), Khalil et al. (2017), Al-Afify et al. (2019), Abd El-Aal (2020) and Khan et al. (2017), stated that average value of the pH of various ponds around Gurgaon canal was found to be 5.7-7.10. Industrial effluent, adjustments to the water balance (by reducing inflow, increasing water consumption, or increasing precipitation), or saltwater intrusion are three common causes of variations in TDS concentrations in natural waters (Weber-Scannell and Duffy, 2007). The total dissolved solids (TDS) in the EL Wadi and EL-Bats drains significantly decreased when compared to the Dyer-EL Berka drainage, with P-values of 0.005 and 0.04, respectively. In accordance with Al-Afify et al. (2019) and Abd El-Aal (2020), there was also a substantial drop of Mean value S.D of total dissolved solids in Locanda and EL-Bats farms with P-values (0.002 and 0.005, respectively). On other hand, results of chemical parameters obtained relative variation among three different drains of ammonia, ammonia un-ionized values of Mean value ± S.D obtained non – significant variation at EL Wadi and EL-Bats drains when compared with Dyer-Berka drain and also, in Locanda and EL-Bats farms when compared with EL-Galini farm .The results in ammonia un-ionized are similar to Adham et al. (2002), Sabae (2005) and Zaghloul (2008), who observed The concentration of ammonia in the fish ponds and its values in Dayer El-Berka Drain and EL-Bats drain .In fish culture, nitrogen molecules have been discovered as important metabolic byproducts. Due to fertilizer use and industrial contamination, nitrite may accumulate to dangerous levels in moving waterways and high-density aquaculture systems. In conditioned aquaculture systems, it is a byproduct of the bacterial oxidation of ammonia to nitrate (Collins, 1975). Methemoglobin levels rise as one physiological reaction to nitrite. When haemoglobin is oxidized, it loses its ability to attach to and transport oxygen molecules. Consequently, the toxicity of nitrite to fish has recently attracted a lot of attention (Russo and Thurston, 1977).Chemicals parameters in present study showed a significant increase of Mean value ± S.D of nitrate and nitrite with P-value (0.4 and 0.2 respectively) in EL -Bats drain when compared with Dyer EL Berka drainage but , it was recorded non-significant variation in EL Wadi drainage when compared with Dyer EL Berka drainage addition to nitrate and nitriteof Mean value ± S.D non –significant in Locanda and EL-Bats farms when compared with EL-Galini farm , this agree with Sabae (2005), Zaghloul (2008), Khalil et al. (2017) and Al-Afify et al. (2019) . Also the present study obtained relative variation among three different drains of total alkalinity values of Mean value ± S.D obtained non – significant variation at EL Wadi and EL-Bats drains when compared with Dyer-Berka drain ,But our results detected a significant increase levels of Mean value ± S.D of total alkalinity in Locanda farm when compared with EL-Galini farm however, it was detected non-significant variation in EL-Bats farm when compared with EL-Galini farm that agree with Stirling (1985), Adham (2002), Abubakar (2012) and Coldebella et al. (2017), while salinity was a significant decrease of levels of salinity of Mean value ± S.D in Locanda and EL-Bats farms with P-value (0.01) when compared with EL-Galini farm that agree with Zaghloul (2008) showed deterioration in water quality of samples collected from the studied drainage canals (El-Bats and El-Wadi).our study concerned on determination of Organic matter in water drains and farms under study and observed organic matter values of Mean value ± S.D obtained non – significant variation in EL Wadi and EL-Bats drains when compared with Dyer-EL Berka drainage addition to organic matter of Mean value ± S.D in Locanda and EL-Bats farms with P-value (0.02) when compared with EL-Galini farm but , dissolved oxygen value was observed significant increase of Mean value ± S.D with P-value (0.05) in EL Wadi drainage and non-significant in EL –Bats drain when compared with Dyer EL Berka drainage and also showed dissolved oxygen of Mean value ± S.D non-significant in Locanda and EL-Bats farms when compared with EL-Galini farm The result are in agree with Gohar et al. (2018) and Abd El-Aal (2020). Sediments have a vital role in the remobilization of contaminants in aquatic systems under favourable conditions as well as in interactions between water and sediments. Sediments are important sinks for various pollutants like pesticides and heavy metals. Today, it is believed that a significant source of exposure for many species comes through the direct transfer of chemicals from sediments to organisms (Zoumis et al., 2002).Our results showed that, the studied heavy metals accumulated in the sediments of three different farm in order Fe>Zn>Cu>Pb>Cd at all three different farms under study this agree with Ali and Abd-Elsatar (2005). The distribution patterns of some heavy metals (Fe, Mn, Zn, Cu, Pb and Cd) in sediment were Fe > Mn > Zn > Cu > Pb > Cd in some fish farms in EL-fayoum (Goda1 and 2, EL-shoura and shalakany). Aquatic plants can uptake large amounts of metals from water and/or sediment through active and passive absorption, with this absorption capacity of metals through different organs such as roots, stems, and leaves, making these plants suitable for heavy metal alterations in the aquatic environment Cai et al. (2018). However, there is still a lack of information about the capability of various aquatic plants to accumulate heavy metals and the relationships between the plants and the metal concentrations in water and sediment Wang et al. (2014). More knowledge about the accumulation capacity of various aquatic plants is needed from direct observations. Moreover, measuring the accumulation of heavy metals in aquatic plants can provide time-integrated information about the presence of metals in the aquatic ecosystems.

Also, our results discussed contamination of these heavy metals under study in plant of three different drains and farms studied and recorded that the order was Fe>Zn>Cu>Pb>Cd at all three different drain plant and in three different farm plant. That agree with Zaidi et al. (2017) and Li Bai et al. (2018). USEPA

Conclusion

By analysing the content of various in water quality gathered from drains and farms, it was discovered that there was change in quality of some water parameters also, The current study focused on identifying the pollutants that cause water and fish damage, the accumulation of these elements, and their impact on the quality of water and fish in the main sources of water drainage and the farms into which these drains flow.

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