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Original Article

Assessment of heavy metals in cyprinid fishes: Rivers of district Khuzdar Balochistan Pakistan

Avaliação de metais pesados em peixes ciprinídeos: Rios do distrito de Khuzdar Balochistan, Paquistão

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Abstract

The present study was conducted to measured heavy metals in cyprinid fishes in rivers of District Khuzdar Balochistan, Pakistan. In the present study, 25 fish samples were collected that belonged to **8** order of **13** families, The **Cyprinidae family** had the largest number of eight fish species. Present study is focused on Heavy metals in cyprinid fishes. Heavy metals accumulation like Zinc, Manganese, Copper, and Nickel was evaluated in water and various organs of fishes. Atomic Absorption Spectroscopy was used for the identification of these heavy metals in fish species and water bodies. The average concentration (mg/L) of Zn 0.26-0.41, Mn 0.030- 0.073, Cu 0.017—0.080 and NI 0.14-0.79 were observed in water. The Concentration (mg/L), of Zn Conc 0.383-.028 Mn Conc .073- .030 Cu Conc 080-.017 NI Conc .79-.14. The concentration of heavy metals was found both similar and varied simultaneously across the whole research area. Zinc concentration was reported highest, whereas Copper was at the lowest concentration in all fish species .The concentration of heavy metals, in all the fish species under this study, was above the threshold of WHO limits.

Keywords: fish, biodiversity, cyprinid, heavy metals, gut, river.

Resumo

O presente estudo foi realizado para medir metais pesados em peixes ciprinídeos em rios do Distrito Khuzdar Balochistan, Paquistão. No presente estudo, foram coletadas 25 amostras de peixes pertencentes a 8 ordens de 13 famílias. A família Cyprinidae apresentou o maior número de oito espécies de peixes. O presente estudo está focado em metais pesados em peixes ciprinídeos. O acúmulo de metais pesados como zinco, manganês, cobre e níquel foi avaliado na água e em vários órgãos dos peixes. A Espectroscopia de Absorção Atômica foi utilizada para a identificação desses metais pesados em espécies de peixes e corpos d'água. A concentração em água ((mg/L),) Zn Conc. 0,383-.028 Mn Conc. .073- .030 Cu Conc. 080-.017 NI Conc. 0,79-.14. A concentração de metais pesados foi considerada semelhante e variou simultaneamente em toda a área de pesquisa. A concentração de zinco foi relatada mais alta, enquanto o cobre estava na concentração mais baixa em todas as espécies de peixes. A concentração de metais pesados, em todas as espécies de peixes neste estudo, estava acima do limite dos limites da Organização Mundial da Saúde (OMS).

Palavras-chave: peixe, biodiversidade, ciprinídeo, metais pesados, intestino, rio.

1. Introduction

Increasing human influences through pollution of heavy metals have over the years led to the depletion of aquatic biodiversity. Consequently, several foremost endemic fish species have become threatened. Comprehending this, concern for heavy metals or trace assessment in fish species in most of our aquatic medium have increasingly been gaining crushed throughout the world. The family Cyprinidae is a diverse freshwater fish family across the globe. Approximately 3,000 species, both living and extinct, of this family have been reported to date. However, only 1,270 have been reported as extinct (Froese and Pauly, 2015; Eschmeyer and Fong, 2015). Such fish species have a great economic value because of the large quantity of proteins in their body (Mayden et al., 2009). The main feature of heavy metal is their strong attraction to biological tissues and in general their slow exclusion from biological systems.

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Heavy or trace metal is a group of atomic density metals and metalloids that arrive at 4 g/cm^3 or 5 times or multiple times in water (Garbarino et al., 1995; Lenntech, 2004). The toxic metal applies to any metallic parts which are poisonous and deadly even in little concentrations and are made from a wide range of natural and anthropogenic sources (Gupta et al., 2015; Yadav et al., 2017).

The retention of heavy metals in fish species depends upon physiological behavior found in different tissues of various fishes (Zhang et al., 2006; Has-Schon et al., 2008). Cadmium (Cd), chromium (Cr), lead(Pb), zinc (Zn), and copper (Cu), which are required in very small quantities for the functioning of various biological systems, were the heavy metals analyzed in the current study. Pb and Cd are known to have adverse effects on the biological system and may cause respiratory problems (Maurya and Malik, 2019). Fish are at the end of the aquatic food chain and can accumulate metals and transmit them through food to humans, causing chronic or acute diseases (Malik and Maurya, 2015). In essential organs such as the bones, liver, and kidneys, heavy metals accumulate, resulting in many severe health impacts such as carcinogenic and neurotoxic impacts. After consumption of heavy metals in body they associated with the proteins and enzymes then stabilize bio toxic compounds (Duruibe et al., 2007). In ecological and human health, Copper essentiality and toxicity also reported the adverse reaction on liver (Stern, 2010). pollution free water or successful aquaculture depends on a continuous supply with water because fish is more sensitive to water pollutants. Water can theoretically be polluted with suspended heavy metals, nutrients and solids (Sultana et al., 2020).

2. Material Method

2.1. Heavy metals concentration water sample collections

Fifty (50) mL plastic bottles of water samples were collected in three-fold from four stations (Siman, Bara laca Wadh Poralli, Pat na jahl) of water bodies of Poralli River shown in Figure 1. Consequently 1.5 mL of concentrated HNO_3 was added to one liter of water in all bottle samplings for its preservation (APHA, 2012). Water samples were brought for metal detection in Laboratory of Zoology University of Balochistan, Quetta, Pakistan.

2.2. Heavy metals concentration in water

The sample was prepared by boiling 250 mL of water in a beaker to obtain 100 mL. To accomplish complete oxidation and reduce the interference that organic materials could cause, 5 mL of nitric acid and 5 mL of ultra-pure

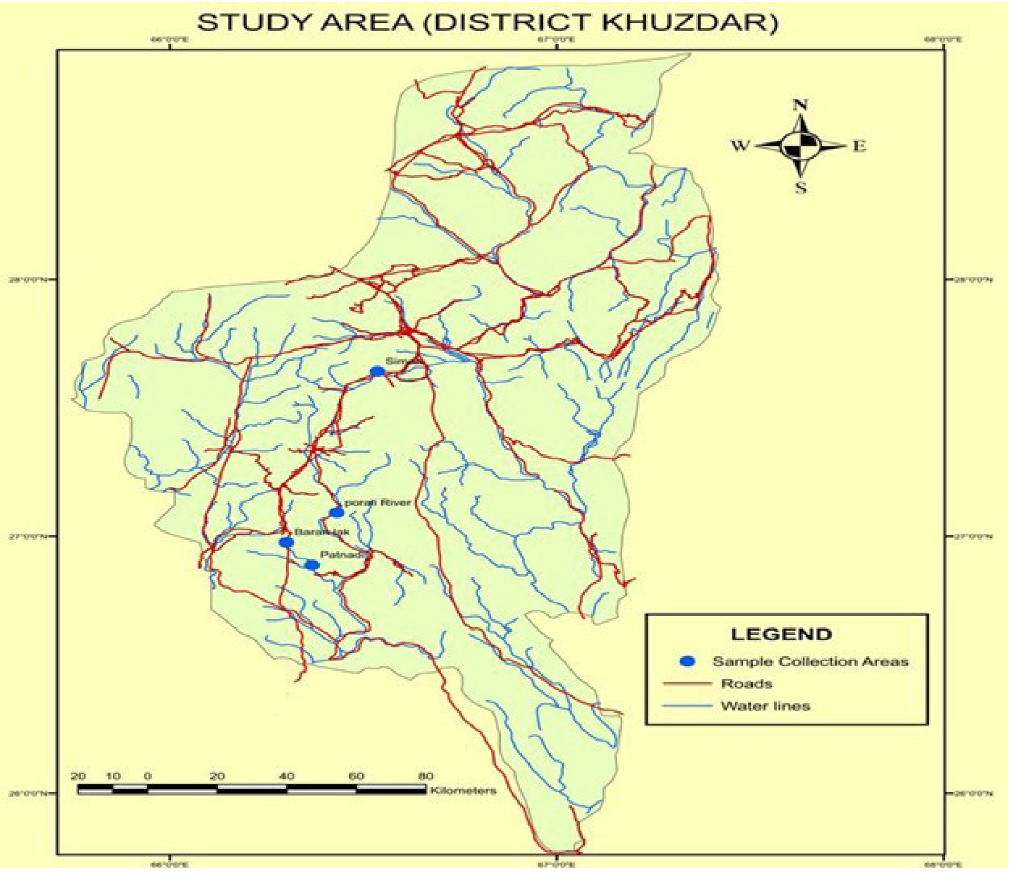

Figure 1. Showing different research stations of water bodies of District Khuzdar.

hydrochloric acid (provided by Merck Germany) were added immediately. Once again the sample was boiled until the water had been expended. The sample was allowed to cool and then 10 mL of distilled water was added, filtered and stocked in a 100 mL vial, with 1% nitric acid (APHA, 2012).

Using a Shimadzu-brand AA-6800 Atomic Absorption Spectrophotometer, the concentrations of Zn, Mn, Cu, and Ni (mg/L) were determined using the flame atomic absorption spectrophotometry method, as recommended by the FAO (Nauen, 1983).

2.3. Collection of fish sample and its assimilation

Fish samples collected from selected stations of District khuzdar were identified as family Cyprinidae which were further dissected to expose their various organs (gills, liver muscles, and heart) for downstream investigation of heavy metals concentration in different tissues of all fish. The dissected organs of fish were oven dried at 150 °C for three hours. The dried organs were kept at room temperature for 28 hours and were prevented from moisture and sun light. The dried organs were grinded independently with the help of Pestel and Morter. The analysis of metal concentration was carried out for each one of 12 samples according the described method (Iqbal et al., 2016).

2.4. Heavy metals concentration in fish

Fish samples were collected in a flask for digestion. Furthermore, 0.1g for of each powdered samples, 4.0 mL of concentrated HNO_3, 2.5 mL of concentrated H_2SO_4 and were added. The mixture was slightly heated on a hot plate after adding five to six drops of H_2O_2. These steps were repeated several times for solution clarification. Then mixture was heated for an additional 20 minutes at 150 °C and allowed to cool at room temperature. Furthermore, the solutions of metals were filtered up to 50 mL with volumetric flask and diluted with deionized water up to the mark. A Solar Atomic Absorption Spectrophotometer (SAAS, Model 3100) from (Thermo scientific) was used to measure concentration of heavy metals in water samples and fish species (Iqbal et al., 2017).

2.5. Preparation of the calibration curve

Merck provided the greatest purity level of standard solutions for Zn, Mn, Cu, and Ni (99.98%). An average standard of 100 ppm concentration was created using a 1000 ppm standard of Zn, Mn, Cu, and Ni. Then, with 1 percent nitric acid, the working standards of 0.001; 0.01; 0.1; 1.0; and 2.0 ppm were used. In the atomic absorption spectrophotometer, the absorbance readings of the standards were then taken at various wavelengths for each element. Finally, the calibration curve was plotted: concentration vs. absorbance, and the samples' concentrations were read using the calibration curve.

2.6. Heavy metals assessment

The aim of this study was also to evaluate heavy metals in the different fish organs, as this may be an early indicator of freshwater pollution in order to safeguard the quality of aquatic life to promote fish production. Heavy metals were analyzed using an Atomic Absorption Spectrophotometer. The concentrations of Zn, Mn, Cu and Ni were measured.

2.7. Statistical analysis

Data are discussed as means ± S.E. Statistical analyses were performed using a two-way analysis of variance followed by a (Tukey and Post hoc) of SPSS. For heavy metal assessment of statistical differences between different parameters the method of (Steel and Torrie, 1996) used.

3. Results

Table 1 presents the list of fish biodiversity in water bodies of District Khuzdar, Balochistan, Pakistan. However, from 25 fish species collected from the water bodies of District Khuzdar, only three fish species were not commercially important species, while the remaining 22 fish species were of immense commercial importance. These fish species belong to 8 orders and 12 families respectively. The Cyprinidae family had the largest number of fish species (8), followed by the three species of the family Channidae. Two species belonged to Mastacembelidae, Notopteridae and Bagridae, while the family Clupedae, family Heteropneustid, family Cichlidae, family Gobiidae, family Congridae family Ophichthidae, family Siliuridaein and family Percidae represented one species each in the fresh water bodies of Khuzdar district, Balochistan, Pakistan. *Cyprinus carpio* and *Oreochromis mossambicus* are exotic fish species that were also recorded.

In present study, the water bodies of four stations i.e. (Siman, Bara laca Wadh Poralli, Pat na jahl) of District Khuzdar, Balochistan, Pakistan rivers were selected which is shown in Table 2. Zinc (Zn) showed the highest concentration whereas Manganese (Mn) was present at the lowest concentration. Metals concentration was in the following consequent order respectively: Zn > Ni > Cu > Mn.

In present study the mean concentration of Zn (mg/L), in *Labeo gonius* has been shown in Table 3 which ranged from 1.80-4.15. It ranges 1.0-11.20 in *Cirrhinus reba*. In *Tor putitora its range was recorded as* 1.4-7.6 and in *Labeo calbasu* the range of concentration was 1.85-7.07.

The study of the Manganese (mg/L) showing the mean concentration has been shown in Table 4 It stated that Manganese (mg/L), in different fish species has been recorded in the following order: in *Labeo gonius* it ranges from 0.18-0.41, in *Cirrhinus reba* it ranges from 1.30 to 1.65, in *Tor putitora* it ranges from 0.16-1.8 and in *Labeo Calbasu* it ranges from 0.17-3.0 respectively.

The study of mean concentration of Cu (mg/L), has been shown in Table 5. In *Labeo gonius* it ranges between 0.04-0.07. In *Cirrhinus reba* it ranges between 0.12 to 0.15. In *Tor putitora* it ranges between 0.14-1.25 and In *Labeo Calbasu* it ranges between 0.7-1.8 respectively.

The study of mean concentration of NI (mg/L), has been shown in Table 6. which states that the mean concentration of NI in *Labeo gonius* ranged from 0.25-0.39. In *Cirrhinus reba* it ranged from 0.25-0.77. In *Tor putitora* it ranged from *1.1*-2.6 while in that of In *Labeo cal basu* it ranged from 1.7-3.3.

Table 1. Fish species that were identified during study period from Khuzdar River during January to December 2019.

Order	Family	Species	Status
Cypriniformes	Cyprinidae	*Labeo rohita*	Commercial
		Cirrhinus mrigala	Commercial
		Cyprinus Carpio	Non commercial
		Catla catla	Commercial
		Tor putitora	Commercial
		Labeo gonius	Commercial
		Labeo Calbasu	Commercial
		Cirrhinus reba	Non commercial
Channiformes	Channidae	*Channa punctata* (Bloch, 1793)	Commercial
		Channa striata (Bloch, 1793)	Commercial
		Channa marulius (Hamilton, 1822)	Commercial
Osteoglossiformes	Notopteridae	*Notopterus chitala* (Hamilton, 1822)	Commercial
		Notopterus notopterus (Pallas, 1769)	Commercial
Siluriformes	Bagridae	*Rita rita* (Hamilton, 1822)	Commercial
	Siliuridae	*Wallago attu* (Bloch and Schneider, 1801)	Commercial
		Sperata seenghala	Commercial
	Heteropneustidae	*Heteropneustes fossilis* (Bloch)	Commercial
Clupeiformes	Clupeidae	*Tenuolosailisha* (Richardson)	Commercial
Perciformes	Cichlidae	*Oreochromis mossambicus* (Peters, 1852)	Non commercial
	Gobiidae	*Glossogobius giuris* (Hamilton, 1822)	Commercial
	Percidae	*Perca flavescens*	Commercial
Synbranchiformes	Mastacembelidae	*Mastacembelus armatus* (Lecepede, 1800)	Commercial
		Mastacembelus pancalus (Hamilton)	Commercial
Anguilliformes	Congridae	*Neochanna apoda Günther*, 1867	Commercial
	Ophichthidae	*Anguilla rostrata*	Commercial

Table 2. Concentration (mg/L) of heavy metals of water bodies of District Khuzdar.

Main station	Sub station	Zn Conc	Mn Conc	Cu Conc	NI Conc
Siman	A 1	.3950 A	.0800 B	.0300 C	.9100 B
	A 2	.3780 A	.0700 B	.0270 C	.8000 B
	A 3	.3780 A	.0700 B	.0190 C	.6700 B
	Average	**0.383**	**.073**	**.025**	**.79**
Bara laca	B 1	.2650 A	.0200 B	.0180 B	.2000 B
	B 2	.2650 A	.0250 B	.0180 B	.2000 B
	B 3	.2700 A	.0600 B	.0160 C	.3000 B
	Average	**.266**	**.035**	**.017**	**.20**
Wadh Poralli	C 1	.2900 A	.0500 B	.0900 B	.1400 c
	C 2	.2800 A	.0600 C	.0700 B	.1400 B
	C 3	.2800 A	.0900 B	.0700 C	.2500 B
	Average	**.28**	**.066**	**.080**	**.14**
Pat na jahl	D 1	.4100 A	.0300 C	0.700 B	.1400 B
	D 2	.4100 A	.0390 C	0.800 B	.1500 B
	D 3	.4400 A	.0300 C	0.600 B	.1600 B
	Average	**.41**	**.030**	**.70**	**.150**
WHO Limit (ppm)		5	2.5	0.5	0.5

Different letters of identical column point out significant variances P<0.05 (ANOVA).

Table 3. The mean concentration of Zn (mg/L), in various organs of Cyprinid fish from District Khuzdar.

Organ	Stations	*Labeo gonius*	*Cirrhinus reba*	*Tor putitora*	*Labeo Calbasu*
Gills	A	4.1500 A	11.100 A	7.300 A	6.200 A
	B	4.1500 A	11.220 A	7.500 A	5.600 A
	C	4.1500 A	12.100 A	7.540 A	6.740 A
	D	4.1500 A	11.200 A	8.100 A	7.600 A
	Average	**4.15**	**11.20**	**7.6**	**3.5**
Muscle	A	2.990 A	2.800 A	7.420 A	7.330 A
	B	2.950 A	2.700 A	7.420 A	6.450 A
	C	2.300 A	3.500 A	6.800 A	7.800 A
	D	2.300 A	3.600 A	7.840 A	6.840 A
	Average	**2.64**	**2.45**	**7.37**	**7.07**
Liver	A	3.800 A	7.900 A	2.000 A	5.000 A
	B	3.800 A	7.900 A	2.000 A	4.000 A
	C	3.800 A	7.900 A	2.000 A	5.000 A
	D	3.710 A	6.900 A	2.000 A	4.000 A
	Average	**3.80**	**7.9**	**2.0**	**4.5**
Heart	A	1.700 A	1.000 A	1.400 A	1.900 A
	B	1.900 A	1.000 A	1.400 A	1.900 A
	C	1.800 A	1.000 A	1.500 A	1.800 A
	D	1.800 A	1.000 A	1.400 A	1.800 A
	Average	**1.80**	**1.0**	**1.4**	**1.85**
WHO Limit (ppm)		5	5	5	5

Different letters of identical column point out significant variances P<0.05 (ANOVA).

Table 4. The mean concentration of Mn (mg/L), in various organs of Cyprinid fish from District Khuzdar.

organ	Stations	*Labeo gonius*	*Cirrhinus reba*	*Tor putitora*	*Labeo Calbasu*
Gills	A	.4100 B	1.300 B	1.300 B	3.000 B
	B	.4100 B	1.300 B	1.300 B	3.000 B
	C	.4100 B	1.300 B	1.200 B	3.000 B
	D	.4200 B	1.300 B	1.300 B	3.000 B
	Average	**.410**	**1.30**	**1.3**	**3.0**
Muscle	A	.2200 B	1.700 A	1.900 B	1.200 B
	B	.2400 B	1.600 B	1.900 B	1.100 B
	C	.2500 B	1.600 B	1.800 B	1.200 B
	D	.2600 B	1.700 B	1.700 B	1.100 B
	Average	**.2425**	**1.65**	**1.8**	**1.15**
Liver	A	.3200 B	1.100 B	1.400 B	2.800 C
	B	.3500 B	1.100 B	1.40O B	2.800 C
	C	.3100 B	1.600 B	1.500 B	2.700 C
	D	.3000 B	1.500 B	1.500 B	2.600 C
	Average	**.320**	**1.32**	**1.45**	**2.7**
Heart	A	.1900 B	1.000 B	.1700 B	.1700 B
	B	.1800 B	1.000 B	.1600 B	.1600 B
	C	.1800 B	1.800 B	.1600 B	.1700 B
	D	.1900 B	1.790 B	.1700 B	.1900 B
	Average	**0.185**	**1.39**	**.165**	**.17**
WHO Limit (ppm)		2.5	2.5	2.5	2.5

Different letters of identical column point out significant variances P<0.05 (ANOVA).

Table 5. The mean concentration of Cu (mg/L), in various organs of Cyprinid fish from District Khuzdar.

Organ	Stations	*Labeo gonius*	*Cirrhinus reba*	*Tor putitora*	*Labeo Calbasu*
Gills	A	.0600 D	.1300 C	1.000 C	.2500 C
	B	.0400 D	.1600 C	1.000 C	.2500 C
	C	.0400 D	.1500 C	1.000 C	.2500 C
	D	.0500 D	.1500 C	1.000 C	.3700 C
	Average	**.047**	**.147**	**1.0**	**.250**
Muscle	A	.0500 C	.1500 C	1.200 B	.1300 C
	B	.0600 C	.1400 C	1.200 B	.1300 C
	C	.0700 C	.1510 C	1.200 B	.1500 C
	D	.0400 C	.1600 C	1.200 B	.1600 C
	Average	**.055**	**.150**	**1.2**	**.142**
Liver	A	.0600 C	.1300 C	1.900 D	1.300 B
	B	.0700 C	.1200 C	1.800 D	1.300 B
	C	.0800 C	.1200 C	1.800 D	1.200 B
	D	.0900 C	.1300 C	1.700 D	1.200 B
	Average	**.075**	**.125**	**1.8**	**1.25**
Heart	A	.0600 C	.1500 C	.7100 B	.9500 B
	B	.0500 C	.1500 C	.7200 B	.9600 B
	C	.0500 C	.1400 C	.6800 B	.8600 B
	D	.0600 C	.1500 C	.6900 B	.7600 B
	Average	**.055**	**.150**	**0.7**	**.88**
WHO Limit (ppm)		0.5	0.5	0.5	0.5

Different letters of identical column point out significant variances P<0.05 (ANOVA).

Table 6. The mean concentration of NI (mg/L), in various organs of Cyprinid fish from District Khuzdar.

Organ	Stations	*Labeo gonius*	*Cirrhinus reba*	*Tor putitora*	*Labeo Calbasu*
Gills	A	.2900 C	.9000 C	1.930 B	1.700 C
	B	.2900 C	.3300 C	1.930 B	1.700 C
	C	.2800 C	.3900 C	1.860 B	1.800 C
	D	.2900 C	.3900 C	1.800 B	1.800 C
	Average	**.290**	**.502**	**1.88**	**1.75**
Muscle	A	.2800 B	.7000 C	1.100 B	1.800 B
	B	.2700 B	.7000 C	1.100 B	1.890 B
	C	.2200 B	.6000 C	1.200 B	1.870 B
	D	.8200 B	.7000 C	1.200 B	1.870 B
	Average	**.397**	**.70**	**1.15**	**1.87**
Liver	A	.2600 B	.2200 C	2.700 A	3.400 B
	B	.2600 B	.2400 C	2.600 A	3.400 B
	C	.2700 B	.2700 C	2.700 A	3.300 B
	D	.2700 B	.2700 C	2.600 A	3.100 B
	Average	**.265**	**.25**	**2.65**	**3.3**
Heart	A	.2700 B	.900 C	1.100 A	1.700 A
	B	.2700 B	.9200 C	1.100 A	1.700 A
	C	.2500 B	.719 C	1.200 A	1.800 A
	D	.2400 B	.580 C	1.200 A	1.700 A
	Average	**.257**	**.77**	**1.15**	**1.7**
WHO Limit (ppm)		0.5	0.5	0.5	0.5

Different letters of identical column point out significant variances P<0.05 (ANOVA).

In *Cal basu* the metal concentration showed highest as compare to other selected fish because of their feeding nature *Cal basu* is a bottom feeder mostly common carp as a benthic feeder .The Substantial amount of debris, clearly showed that the fish is a bottom feeder. In deep water the metal accumulation reported highest then surface water.

4. Discussion

Fresh water is a resource that may be diverted extracted, or contaminated by humans in ways that compromise its value as a habitat for organisms. Freshwater ecosystems globally are among the most threatened ecosystems (Strayer and Dudgeon, 2010).The main reasons of the loss of biodiversity in freshwaters are habitat fragmentation and degradation, introduction of exotic species and its water diversions, invasion, pollution and impacts of global climate change (Gibbs, 2000). These impacts have caused simple declines in the range and abundance of many freshwater species and decline in biodiversity (Sala et al., 2000).

These freshwater species are threatened by increasing droughts over recent decades and increased utilization of water resources for agricultural and industrial purposes.

In current study we measured heavy metals in Cyprinid fishes. Zinc (Zn) is well known as an important mineral for organisms. It is reported that it can bio-accumulate in fatty tissues of fish and disturbs their reproductive physiology (Rahman et al., 2012). In previous study Zinc (Zn) (mg/L), mean range was reported as 3.67-5.30 & 13.51-62.33 in fish tissues of freshwater from Lake of Awassa (Tariq et al., 1993). The concentration of Zn 2.10 (mg/L), has been reported from Indus river (Čelechovská et al., 2007). Zinc concentration was also reported with 8.70 +0.11mg in the H. Odoe (Bloch, 1794) and 18.80+0.13mg in the M. cyprinoids (Linnaeus, 1758). However, put forth the results of his research which are contrary to results drawn in our findings stating that the mean range of Zn is almost 54.09-367.39 (mg/L), in fishes of Taihu Lake and Yangtze river, from China (Fu et al., 2013).

Manganese (Mn) has been studied to be taken up directly via gills or indirectly via gut from food and consumed sediments (Bendell-Young and Harvey, 1986). Similar finding in current study of Manganese was reported in *P. annectens annectens* (Owen, 1839) as 0.01+0.02-1.91+0.18 and in H. odoe (Bloch, 1794) from 0.57+0.71 to 5.35+0.11 (Nwani et al., 2009). Previous study on *Thalassoma trilobatum*, Mg was reported in its tissues as 1.42 (mg/L), (Pravinkumar et al., 2015).However, the dissimilar results were fluctuated between 0.782-4.217 (ppm) (Tariq et al., 1994), 2.81-4.61 (Idodo-Umeh, 2002).

Copper is an essential constituent of many enzymes and it plays a major role in the synthesis of hemoglobin (Collins et al., 2010). Similar results of Cu concentration were studied by (Čelechovská et al., 2007). which stated that the mean concentration of 0.02 (ppm) in *C. carpio*. However, line of researcher have reported contrary results of Cu concentration ranged with present work. It has also been reported that about 2.48ppm Cu is found in cultured dam of *C. carpio* from Northern Jordan Valley near Wadi El-Arab. Copper concentration has reported in *M. tapirus*, (Pappenheim, 1905) 3.70+0.40 -8.19+0.17 while in H. odoe (Bloch, 1794), 5.76+0.08 -10.20 + 0.13 (Al-Weher, 2008). Recorded Cu as 15.7 mg kg^{-1} of some species fish of River Kwilu-Ngongo from Congo (Ngelinkoto et al., 2014) .Recorded from 41.36 ± 0.38 mg kg^{-1} of M. Armatus canal of effluent-loaded from India (Javed and Usmani, 2016). Measured 0.035 - 0.464mg of NI in fishes of Ikpoba River (Oguzie, 2003; Munir et al., 2016). Reported in fish of Dogra *Crossocheilus latius* and recorded highest Ni concentration that ranged from 12.47 ± 0.024 in Changhoz dam of Karak district, Khyber Pakhtoon Khua, Pakistan. All values were under the threshold of WHO limits.

The process of an organism absorb metals in its body from the food or surrounding medium, either by ingestion or absorption is known as bioaccumulation (Ademoroti, 1996) The above bio-recommended thresholds consumption of heavy metals cause toxic effect to the organisms. the following has been disccuseed as general signs related with lead cadmium,, zinc, aluminium poisoning and copper: stomatitis, diarrhoea, tremor, hemoglobinuria depression, vomiting, convulsion, and gastrointestinal (GI) disorders, pneumonia when instable vapours and fumes are gasped (McCluggage, 1991).

Biologically, Zinc Dietary intake prolonged in humans, could lead to deficiencies in copper and iron, fever, headache, vomiting, abdominal pain, nausea tiredness, and. skin irritant. There are no reports on the possible carcinogenicity of zinc and compounds on humans (Fosmire, 1990).

Zinc is distinguished to be non-toxic, particularly if taken orally. Though, excess amount can cause dysfunction of system result of impairment reproduction and growth (Chang et al., 2004).

High Mn effect the central nervous system of vertebrates by preventing metabolic pathways and also other dopamine formation in fish the regulation of Na is disrupted by Mn and may cause death ultimately. Fish contaminated by Mn that can cause disorders in the consumers. High levels of manganese could pose health problems which apparent in the form of aggressive and impulsive behavior in some cases sexual stimulation and euphoria (Jabeen and Chaudhry, 2010).

Copper affects growth, behavior and reproduction of fish. Copper affected Fish become lethargic, darker and indifferent to external incentives, and also cause melanophores. Trace amount of copper also affected the behavior and life of icthofuana. (Jabeen and Chaudhry, 2010). Consequently indicating that the examined fishes could pose copper associated health hazards to consumers (Ngelinkoto et al., 2014). Excessive amount of Ni that was listed WHO may cause in pulmonary odema. Pulmonary effects (alveoli, emphysema, and bronchiolitis) and renal effects may occur.

Nickel is important mineral for human beings and animals. Its high consumption effects several pathological respiratory can cause in lungs of human beings. The Ni is needed in small amounts to produce red blood cells (RBCs), but it becomes slightly toxic in excess quantity. Its chronic exposure can cause decrease in body weight, heart and liver damage, and skin irritation. In aquatic animals, the

Ni is accumulated but its presence is not magnified along the food chains (Pandey and Madhuri, 2014).

5. Conclusion

Present study disused the fish biodiversity, dietary habits and heavy metals concentration in cyprinid fishes in rivers of Khuzdar district, Balochistan, Pakistan. The commercial fishing in rivers of district Khuzdar, Balochistan, Pakistan is playing a pivotal role in the economic development of the local community in general and the province in particular. The river water in the said district is basically used for the purpose of irrigation, fishing and etc. Twenty-five (25) fish species were collected from the rivers of district Khuzdar, Balochistan, Pakistan.. Correspondingly, the metal concentration analyzed in four cyprinid species comprised of Zinc, Manganese, Copper and Nickel. Zinc (Zn) concentration was highest in some cyprinid fishes, The highest concentration from WHO threshold list effect on human health.

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