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Data Article

Data on heavy metal concentration in common carp fish consumed in Shiraz, Iran

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ABSTRACT

Food contamination by heavy metals can lead to the accumulation of these elements in the body of consumers and the contraction of diseases. Accordingly, heavy metal concentration in common carp fishes consumed in Shiraz, Iran was determined in the present study. The mean concentrations of Pb, Cd, Zn, and Cu were 0.23, 0.07, 0.47, and 0.59 mg/kg (dry weight), respectively. The average concentration of heavy metals in the muscle of common carps consumed in Shiraz was less than the permissible standard of the WHO and FAO. The estimated weekly intake (EWI) of the studied metals was below the provisional tolerable weekly intake (PTWI).

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The maximum and minimum relative risk (RR) equaled 48.93 and 0.55% of the total risk for Cd and Zn, respectively.

Specifications table

Subject area	Environmental science
More specific subject area	Environmental monitoring, food quality
Type of data	Tables, figure
How data was acquired	Atomic Absorption Spectroscopy (Varian AA-7000)
Data format	Raw/analyzed
Experimental factors	Heavy metal concentration
Experimental features	Daily intake of heavy metals was determined.
Data source location	Shiraz, Fars Province, Iran
Data accessibility	The data are available in this article.
Related research article	Health risk assessment of heavy metal intake due to fish consumption in the Sistan region, Iran. 2017; Environmental Monitoring and Assessment 189(11),583

Value of the data

- The data presented in this article present a detailed description of heavy metal concentration in common carp fish consumed in Shiraz, Iran.
- The data can be useful for health systems managers to provide the best guidance to people on fish consumption.
- These data can assist Iranian Fisheries Organization and Management of Fisheries and Aquaculture Affairs of Fars to adopt control instructions in fish farming.
- Relative risk data can be helpful for managers to identify the most harmful contaminants.

1. Data

Water resources can polluted with various organic and inorganic pollutants [1–6]. During the past decades, heavy metal has been considered a global concern due to their stable, non-biodegradable, and persistent properties. Heavy metal pollution has become a substantial issue with important toxicological consequences for the ecosystem, agriculture, and public health [7,8]. The long-term intake of heavy metals harms human well-being [9,10]. Contaminated food, especially seafood, is one of the main sources of human exposure to toxic chemicals [11–13].

This paper presents data supporting heavy metals concentration in common carp fishes consumed in Shiraz, Iran. The maximum heavy metal limits in fish muscles (mg/kg) according to international standards are listed in Table 1. According to the results of this study, the mean concentrations of lead (Pb), cadmium (Cd), zinc (Zn), and copper (Cu) were 0.23, 0.07, 0.47, and 0.59 mg/kg based on dry weight, respectively (Fig. 1). The mean concentrations of the studied metals were approximately lower than those allowed by guidelines. Tables 2 and 3 present the health risk assessment due to common carp fish consumption in Fars population. The estimated weekly intake (EWI) of the studied metals was below the provisional tolerable weekly intake (PTWI). Moreover, the maximum and minimum relative risk (RR) equaled 48.93 and 0.55% of the total risk for Cd and Zn, respectively.

Table 1
Maximum heavy metal limit in fish muscles (mg/kg) according to international standards [13–15].

Organization	Metals			
	Pb	Cd	Zn	Cu
FAO (1983)	0.5	0.05	30	30
FAO/WHO limit	0.5	0.5	–	–
WHO 1989	2	–	–	–
European Commission Regulation	0.3	0.05		
Chinese Food Codex	0.5	0.1	–	–

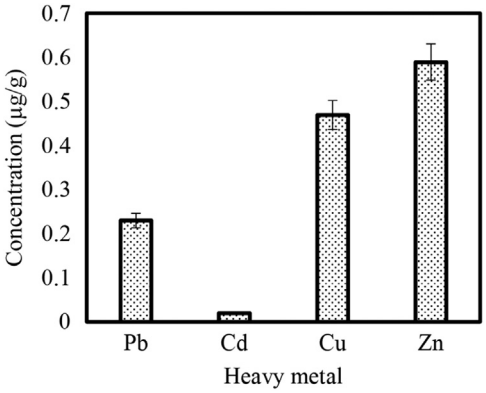

Fig. 1. Concentration of heavy metals in the muscle tissue of carp fish.

Table 2
The estimated EDI and EWI in Fars population through the consumption of common carp fish.

	PTWI (mg/ kg bw /week)[a]	EDI (mg/ kg bw /day)	EWI (mg/ kg bw /week)	%PTWI
Pb	0.025[a]	0.18×10^{-4}	1.30×10^{-4}	0.52
Cd	0.007	0.06×10^{-4}	0.40×10^{-4}	0.56
Zn	7	0.38×10^{-4}	2.65×10^{-4}	0.003
Cu	3.5	0.47×10^{-4}	3.33×10^{-4}	0.009

[a] Makedonski et al. [16].

2. Experimental design, materials, and methods

2.1. Study area description

Shiraz is the fifth most populous city in Iran and the capital of Fars Province, with the total area of approximately 240 km^2. The population of Shiraz equaled 1,700,665 in 2011. The location of Shiraz, Fars Province, Iran is depicted in Fig. 2.

2.2. Sample collection and analytical procedures

To determine the concentration of Pb, Cd, Zn, and Cu in carp species, 30 samples were collected. Fish collected at each stage were washed with distilled water in the laboratory. Then, 20 to 30 g of the usable meat was weighed and stored in the oven at 105 °C for 48 h. Subsequently, samples were transferred to the desiccator and, after reaching a constant weight, were milled until completely powdered. Afterwards, 0.5 g of the powdered fish was added to a dish and 5 ml of concentrated nitric

Table 3
Carcinogenic and non-carcinogenic daily consumption rate limit (CR_{lim}), maximum allowable consumption rate (CR_{mm}), target hazard quotient (THQ), cancer slope factor (CSF), cancer risk (CR), and relative risk (RR) for the consumption of common carp fish in Shiraz, Iran.

Metal	RfD (mg/kg bw/day)[a]	Non-carcinogenic rate limit		Carcinogenic rate limit		THQ	CSF (mg/kg/day)	CR[b]	RR (%)
		CR_{lim} (kg/day)	CR_{mm} (meals/month)	CR_{lim} (kg/day)	CR_{mm} (meals/month)				
Pb	0.02	0.56	75	0.33	44	9.27×10^{-3}	8.5×10^{-3}[b]	1.57×10^{-7}	40.20
Cd	0.0005	0.46	62	–	–	5.54×10^{-3}	–	–	48.93
Zn	0.3	41.48	5563	–	–	12.63×10^{-3}	–		0.55
Cu	0.04	4.40	590	–	–	2.38×10^{-3}	–	–	10.32

[a] Taweel et al. [17].
[b] Miri et al. [13].

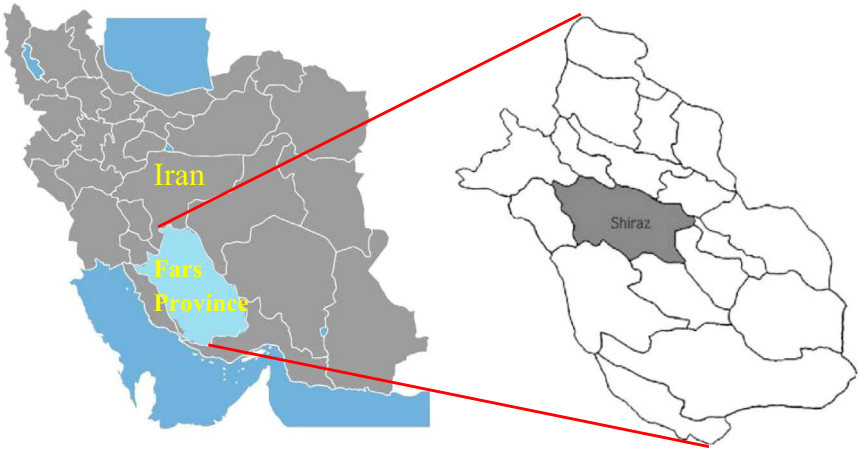

Fig. 2. The location of the study area, i.e. Shiraz, Fars Province, Iran.

acid was added to it. Finally, it was heated at 140 °C on a heater until the elements were readily solved. The resulting suspensions were filtered using filter paper and the filtered solution was transferred to a graduated balloon and reached the volume of 50 ml. After complete blending and uniformity of the obtained solution, the concentrations of metals were determined via atomic absorption spectroscopy.

Consumption rate limits, including the estimated daily intake (EDI), estimated weekly intake (EWI), provisional tolerable weekly intake (PTWI), daily consumption rate limit (CR_{lim}), and maximum allowable consumption (CR_{mm}) were calculated based on methods reported by previous studies [13].

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Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.11.029.

References

[1] M. Dehghani, M. Farhang, A. Zarei, Investigation of carbonyl compounds (acetaldehyde and formaldehyde) in bottled waters in Iranian markets, Int. Food Res. J. 25 (2018).
[2] M. Ghaderpoori, M. Paydar, A. Zarei, H. Alidadi, A.A. Najafpoor, A.H. Gohary, M. Shams, Health risk assessment of fluoride in water distribution network of Mashhad, Iran, Human. Ecol. Risk Assess.: Int. J. (2018) 1–12.
[3] R. Khosravia, H. Eslamib, A. Zareic, M. Heidarid, A. Norouzian, N.S. Baghanie, A. Mokammelg, M. Fazlzadehe, S. Adhamih, Comparative evaluation of nitrate adsorption from aqueous solutions using green and red local montmorillonite adsorbents, Desalination Water Treat 116 (2018) 119–128.
[4] M. Masoudinejad, M. Ghaderpoori, A. Zarei, J. Nasehifar, A. Malekzadeh, J. Nasiri, A. Ghaderpoury, Data on phosphorous concentration of rivers feeding into Taham dam in Zanjan, Iran, Data Brief (2018) 564–569.
[5] M. Qasemi, M. Afsharnia, M. Farhang, A. Bakhshizadeh, M. Allahdadi, A. Zarei, Health risk assessment of nitrate exposure in groundwater of rural areas of Gonabad and Bajestan, Iran, Environ. Earth Sci. 77 (2018) 551.
[6] M. Qasemi, M. Afsharnia, A. Zarei, M. Farhang, M. Allahdadi, Non-carcinogenic risk assessment to human health due to intake of fluoride in the groundwater in rural areas of Gonabad and Bajestan, Iran: a case study, Hum. Ecol. Risk Assess.: Int. J. (2018) 1–12.
[7] M.H. Dehghani, S. Tajik, A. Panahi, M. Khezri, A. Zarei, Z. Heidarinejad, M. Yousefi, Adsorptive removal of noxious cadmium from aqueous solutions using poly urea-formaldehyde: a novel polymer adsorbent, MethodsX. (2018).
[8] M.H. Dehghani, A. Zarei, A. Mesdaghinia, R. Nabizadeh, M. Alimohammadi, M. Afsharnia, Adsorption of Cr (VI) ions from aqueous systems using thermally sodium organo-bentonite biopolymer composite (TSOBC): response surface methodology, isotherm, kinetic and thermodynamic studies, Desalination Water Treat. 85 (2017) 298–312.
[9] M. Sanchooli Moghaddam, S. Rahdar, M. Taghavi, Cadmium removal from aqueous solutions using saxaul tree ash, Iran. J. Chem. Chem. Eng. 35 (2016) 45–52.
[10] M. Taghavi, M.A. Zazouli, Z. Yousefi, B. Akbari-adergani, Kinetic and isotherm modeling of Cd (II) adsorption by l-cysteine functionalized multi-walled carbon nanotubes as adsorbent, Environ. Monit. Assess. 187 (2015) 1–10.
[11] Y. Fakhri, N. Saha, A. Miri, M. Baghaei, L. Roomiani, M. Ghaderpoori, M. Taghavi, H. Keramati, Z. Bahmani, B. Moradi, A. Bay, R.H. Pouya, Metal concentrations in fillet and gill of parrotfish (Scarus ghobban) from the Persian Gulf and implications for human health, Food Chem. Toxicol. 118 (2018) 348–354.
[12] S.M. Ghasemi, A. Mohseni-bandpei, M. Ghaderpoori, Y. Fakhri, H. Keramat, M. Taghavi, B. Moradi, K. Karimyan, Application of modified maize hull for removal of Cu(II) ions from aqueous solutions, Environ. Prot. Eng. 43 (2017) 93–103.
[13] M. Miri, E. Akbari, A. Amrane, S.J. Jafari, H. Eslami, E. Hoseinzadeh, M. Zarrabi, J. Salimi, M. Sayyad-Arbabi, M. Taghavi, Health risk assessment of heavy metal intake due to fish consumption in the Sistan region, Iran, Environ. Monit. Assess. 189 (2017) 583.
[14] M. Varol, M.R. Sünbül, Comparison of heavy metal levels of farmed and escaped farmed rainbow trout and health risk assessment associated with their consumption, Environ. Sci. Pollut. Res. 24 (2017) 23114–23124.
[15] Y.-G. Gu, Q. Lin, H.-H. Huang, L.-g Wang, J.-J. Ning, F.-Y. Du, Heavy metals in fish tissues/stomach contents in four marine wild commercially valuable fish species from the western continental shelf of South China Sea, Mar. Pollut. Bull. 114 (2017) 1125–1129.
[16] L. Makedonski, K. Peycheva, M. Stancheva, Determination of heavy metals in selected black sea fish species, Food Control. 72 (Part B) (2017) 313–318.
[17] A. Taweel, M. Shuhaimi-Othman, A. Ahmad, Assessment of heavy metals in tilapia fish (Oreochromis niloticus) from the Langat River and Engineering Lake in Bangi, Malaysia, and evaluation of the health risk from tilapia consumption, Ecotoxicol. Environ. Saf. 93 (2013) 45–51.