Derivation of water quality criteria for carbamazepine and ecological risk assessment in the Nansi Lake basin

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Table S1 Instrument parameter for HPLC-MS/MS

LC parameter	**LC setting**	**MS/MS parameter**	**ICP-MS settings**
Column	Waters UPLC BEH C_{18} (50 mm × 2.1 mm, 1.7 μm)	Mode	MRM
Mobile phase A	ultrapure water with 0.01% formic acid	Ion source	ESI
Mobile phase B	Methanol	Capillary voltage	ESI^+ 3.0 kv
Flow rate	0.3 mL/min: 0–2 min, 20% B to 60% B; 2–10 min, 60% to 100% B; remain 4 min.	Parent ion (m/z)	195.1
Injected volume	10 μL	Daughter ion (m/z)	138.2
Column temperature	40℃	Cone voltage	22 v
		Collision energy	17 eV

Table S2 Carbamazepine occurrence in surface water of China

Sampling site	**Types**	**Time**	**Concentration (ng/L)**	**Average (ng/L)**	**Reference**
Yangtze River	River	January and March 2013	1.87	88.16	[1]
		July 2008	362		[2]
		October 2013	2.00		[3]
		2014-2015	13.0		[4]
		cold season 2012	0.09		[5]
		warm season 2013	0.16		[5]
		November 2009	238		[6]
Yellow River	River	cold season 2012	0.33	2.97	[5]
		warm season 2013	1.60		[5]
		Normal season 2014	4.82		[7]
		Wet season 2014	3.57		[7]
		Dry season 2014	4.53		[7]
Pearl River	River	May 2008	15.0	10.48	[8]
		/	15.6		[9]
		/	0.83		[10]
Hai River	River	March 2013	56.4	89.73	[11]
		cold season 2012	0.45		[5]
		warm season 2013	0.29		[5]
		July and November of 2015	0.53		[12]
		May 2014	24.7		[13]
		July 2008	456		[14]
Huai River	River	cold season 2012	1.73	2.69	[5]
		warm season 2013	1.03		[5]
		Normal season	3.25		[7]

Sampling site	Types	Time	Concentration (ng/L)	Average (ng/L)	Reference
		2014			
		Wet season 2014	2.92		[7]
		Dry season 2013	4.53		[7]
Songliao River	River	cold season 2012	0.07	0.90	[5]
		warm season 2013	0.09		[5]
		dry season	2.44		[15]
		2018-2019	1.0		[16]
Chao lake	Lake	January and March 2013	2.70	2.70	[1]
Dongting lake	Lake	January and March 2013	2.30	1.18	[1]
		2017	0.06		[17]
Poyang lake	Lake	January and March 2013	2.60	2.60	[1]
Tai lake	Lake	January and March 2013	1.30	3.23	[1]
		2019	5.16		[18]
Qingshan Lake	Lake	dry season	4.20	1.67	[15]
		median water season	0.22		[15]
		wet season	0.59		[15]
Baiyangdian	Lake	May 2019	60.3	36.9	[19]
		November 2019	13.5		[19]

Table S3 Chronic toxicity of Carbamazepine to freshwater animals

Species	Taxonomic Group	Exposure Type	Duration Days (d)	Effect	Endpoint	Concentrations (ng/L)	Reference
Monera	Algae	Flow-through	56	Population	LOEC	10000	[20]
Chaetophora sp.	Algae	Static	9	Population	NOEC	2000	[21]
Raphidocelis subcapitata	Algae	Not reported	4	Population	NOEC	100000000	[22]
Scenedesmus acutus var. acutus	Algae	Not reported	30	Population	NOEC	500000	[23]
Parachlorella kessleri	Algae	Static	3	Population	NOEC	10000	[24]
Chlorella pyrenoidosa	Algae	Not reported	30	Population	NOEC	500000	[23]
Algae sp.	Algae	Flow-through	56	Population	NOEC	10000	[20]
Limnodynastes peronii	Amphibians	Renewal	21	Development	NOEC	10000	[25]
Ceriodaphnia sp.	Crustaceans	Static	31	Population	NOEC	2000	[26]
Calanoida	Crustaceans	Static	31	Population	NOEC	2000	[26]

Species	Taxonomic Group	Exposure Type	Duration Days (d)	Effect	Endpoint	Concentrations (ng/L)	Reference
Cyclopoida	Crustaceans	Static	31	Population	NOEC	2000	[26]
Chydorus sp.	Crustaceans	Static	31	Population	NOEC	2000	[26]
Hyalella azteca	Crustaceans	Renewal	10	Growth	EC10	2400000	[27]
Ceriodaphnia dubia	Crustaceans	Renewal	7	Reproduction	NOEC	25000	[22]
Daphnia pulex	Crustaceans	Renewal	14	Reproduction	NOEC	100000	[28]
Gammarus fossarum	Crustaceans	Renewal	21	Biochemistry	NOEL	1000000	[29]
Gobiocypris rarus	Fish	Flow-through	28	Enzyme(s)	NOEC	910	[30]
Danio rerio	Fish	Renewal	42	Reproduction	LOEC	11200	[31]
Pimephales promelas	Fish	Renewal	28	Growth	NOEC	862000	[32]
Cyprinus carpio	Fish	Flow-through	28	Histology	NOEC	5000	[33]
Oncorhynchus mykiss	Fish	Renewal	42	Growth	NOEC	200000	[34]
Plantae	Plants	Static	31	Population	NOEC	2000	[26]
Typha sp.	Plants	Not reported	21	Growth	NOEC	2000000	[35]

Species	Taxonomic Group	Exposure Type	Duration Days (d)	Effect	Endpoint	Concentrations (ng/L)	Reference
Lemna gibba	Plants	Renewal	7	Injury	NOEC	1000000	[36]
Chironomus tentans	Insects	Renewal	10	Growth	EC10	2600000	[27]
Chironomus riparius	Insects	Static	28	Development	NOEC	164000	[37]
Invertebrates	Invertebrates	Static	31	Population	NOEC	2000	[26]
Brachionus calyciflorus	Invertebrates	Not reported	2	Mortality	NOEC	377000	[22]
Gastropoda	Molluscs	Static	31	Population	NOEC	2000	[26]
Planorbella trivolvis	Molluscs	Static	31	Population	NOEC	2000	[26]
Physella acuta	Molluscs	Static	31	Population	NOEC	2000	[26]
Elimia livescens	Molluscs	Static	31	Population	NOEC	2000	[26]
Lymnaea stagnalis	Molluscs	Static	31	Population	NOEC	2000	[26]
Potamopyrgus antipodarum	Molluscs	Renewal	28	Reproduction	NOEC	250000	[38]
Corbicula manilensis	Molluscs	Renewal	30	Behavior	NOEC	4620	[39]

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