Supporting Information

A tale of two water supplies in China: finding practical solutions to urban and rural water supply problems

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1. Preparation of Figure 1

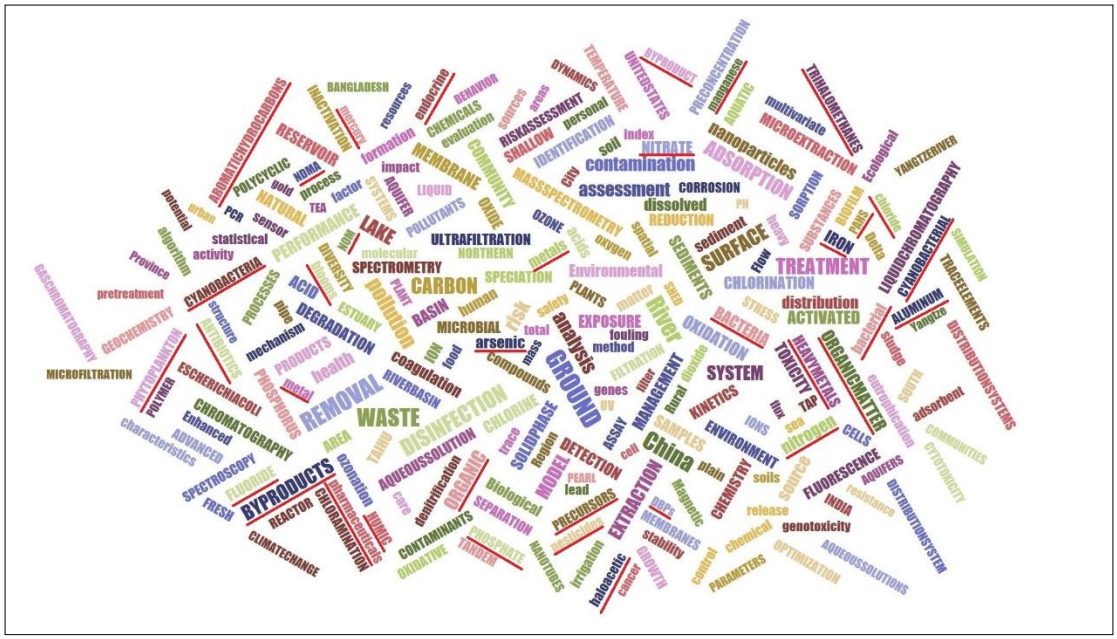

Fig. 1. Word cloud analysis of keywords regarding China's drinking water quality.

(Note: The whole keywords of 2846 related literature were searched from www.webofknowledge.com/ and submitted to https://www.jasondavies.com/wordcloud/ to create the word cloud analysis. The water quality issues were underlined. More details could be found in the Supporting Information.)

We searched the website "www.webofknowledge.com/" for each literature written by Chinese scholars with the keywords of "drinking water" and "quality". A total of 2846 records were obtained from the core collection. The whole keywords of these records were collected by us and uploaded to the open source website "https://www.jasondavies.com/wordcloud/". Then, word cloud analysis results could be got for free.

2. Preparation of Table 1

Table 1. Statistics of the water treatment plants with advanced treatment process around China

Regions	Provincial areas	Number	Capacity (kilo m^3/d)
North China	Beijing	6	3400
	Tianjin	5	1200
	Hebei	8	1250
	Shanxi	1	400
	Inner Mongolia	1	300
Northeast China	Heilongjiang	5	860
	Jilin	2	500
East China	Shanghai	12	4600
	Jiangsu	79	15000
	Zhejiang	24	5000
	Anhui	1	80
	Shandong	13	1600
Central China	Henan	3	1000
	Hunan	5	1400
South China	Guangdong	7	3000
Southwest China	Yunnan	1	300
Northwest	/	0	0
Total		173	39890

The authors made the statistics by searching the literature, searching the homepage of some water companies, and calling the engineers in some water companies to verify the information. The following reference was also used.

Cui Y.C., Cui X.B., Shi X.D., Shi R. Brief history of the studies of drinking water treatment with the micro-polluted source water in China and that of the Society. Annual Conference of the National Drinking Water Advanced Treatment Society. Zhengzhou, China, 2018.10. (in Chinese)

3. Supporting information for Section 3.1.4

Table S1. Specific emergency treatment technologies for the pollutants concerned in China water industries

Technology	Heavy metals	Inorganic ions	Pesticides & herbicides	Benzenes & derivates	Short-chain Chlorohydrocarbon	Other organic chemicals	Disinfectant & DBPs	Pathogen & microbe*	No. of items
Conventional process	Ag, Ba	Phosphate	Decamethrim (nonsoluble)					Coliform, F-coliform, TBC	7
Powdered Activated Carbon adsorption**	Limited efficiency	Limited efficiency	DDT, Rogor, Parathion-methyl, Parathion, Malathion, Demeton, Dichlorovos, Dipterex, Chlorothalonil, Atrazine, 2,4-D, Bentazone, Lindane, hexachlorocyolohexane, Heptachlor, Heptachlor epoxide, Alachlor, Furadan, Chlorpyrifos, Pentachlorophenol 20	Benzene, Toluene, Ethylbenzene, Xylene, Styrene, Chlorobenzene, 1,2-Dichlorobenzene, 1,4-Dichlorobenzene, Trichlorobenzene, Tetrachlorobenzene, Hexachlorobenzene, Cumin, Phenol, 2,4,6-Trichlorophenol, 2,4-Dichlorophenol, Nitrobenzene, 2,4-Dinitrobenzene, 2,4,6-Trinitrobenzene, Nitrochlorobenzene, 2,4-Nitrochlorobenzene, Aniline, Benzidine, Polycyclic aromatic hydrocarbon (PAH), Benzpyrene, Polychlorinated biphenyl (PCB) 26	Limited efficiency	Pentachloropropane, Chloroprene, Hexachloro-1,3-butadiene, Anion synthetic detergent, Di-Sec-octyl phthalate, Dibutylphthalate, Diethylphthalate, Oils, Epichlorohydrin, Microcystin-LR, Geosmin, 2-methylisoborneol, Bisphenol A, Turpentine, Chrysolepic acid 15	Limited efficiency for formed DBPs		61

Technology		Heavy metals	Inorganic ions	Pesticides & herbicides	Benzenes & derivates	Short-chain Chlorohydrocarbon	Other organic chemicals	Disinfectant & DBPs	Pathogen & microbe*	No. of items
Chemical precipitation	By alkaline precipitation	Ag, Be, Cd, Co, Cu, Hg, Mn, Ni, Pb, V, Ti, Zn								19
	By sulfide	Ag, Cd, Cu, Hg, Ni, Pb, Zn								
	By ferric precipitation	As, Mo, Sb, Se, V								
	Combined or other ***	As, Ag, Ba, Cr(VI), Sb, Tl								
Oxidation or reduction	Oxidation	Mn^{2+}	S^{2-}, CN^{-}, NH_4^+ (<2 mg/L), NO_2^-	Hard to achieve mineralization. Needs concern for the formation of transition by-products			Microcystin-LR, Methyl mercaptan, Dimethylsulfur, Dimethyldisulfur, Dimethyltrisulfur, Ethyl mercaptan, Hydrazine hydrate	CNCl		13
	Combined	As (III), Cr(VI), Se, Tl (I)								3
	Reduction							ClO_3^-, ClO_2^-, BrO_3^-		3

Technology		Heavy metals	Inorganic ions	Pesticides & herbicides	Benzenes & derivates	Short-chain Chlorohydrocarbon	Other organic chemicals	Disinfectant & DBPs	Pathogen & microbe*	No. of items
Air striping					Benzene	Chloroethelene, dichloromethane, 1,2-dichloroethylane, 1,1-dichloroethylene, 1,2-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, Trichloroethylene, Tetrachloroethylene, Carbon tetrachloride,		$CHCl_3$, $CHBrCl_2$, $CHBr_2Cl$, $CHBr_3$, Total THMs		15
Enhanced disinfection									TBC, Coliform, F-Coliform, E coli, Giardia, Cryptosporidium	6
Other methods	Special adsorption	As	F							2
No effective emergency treatment technology yet			NH_4^+(>2 mg/L), NO_3^-, B				Aldehyde	DCAA, TCAA, Form-aldehyde, Chloral,		13

Technology	Heavy metals	Inorganic ions	Pesticides & herbicides	Benzenes & derivates	Short-chain Chlorohydrocarbon	Other organic chemicals	Disinfectant & DBPs	Pathogen & microbe*	No. of items
							NDMA		
Summary	19	7	21	26	10	23	14	6	126

Note: * F-coliform indicates fecal coliform. TBC indicates total bacteria count.

** Powdered activated carbon adsorption is very useful for emergency response. The adsorption parameters of each chemical was determined by our jar tests instead of literature because few literature conducted adsorption isotherm experiments in the scope of low concentration around drinking water criteria. For example, the parameters of the Freundrich equilibrium equation for DDT removal in one reference were k=0.322 and 1/n=0.50, while those obtained in this test were k=0.0398 and 1/n=0.4244 in the scope of 0.001 to 0.05 mg/L. To reduce the DDT concentration from 0.025 to 0.001 mg/L, the required PAC dosages were 2.4 mg/L and 11.3 mg/L, respectively, according to the reference and this test. The low dosage according to the literature cannot support the emergency treatment.

*** “Combined” refers to the combination of oxidation or reduction and precipitation. After the oxidation or reduction, the transited contaminants have the species with low solubility which could be removed by precipitation.

Reference: Zhang Y., Zhang X.J., Chen C., Dong H. Guidelines for emergency drinking water treatment, Edition 2. China Architecture and Building Press, Beijing, 2017. (In Chinese)