

Table S2. Definition and relative abundance of the KEGG pathways providing heavy metal resistance of bacterial communities in soils

KEGGs (gene)	Metal	KEGGs function	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
K03892 (<i>arsR</i>)	As	ArsR family transcriptional regulator, AsO ₄ ³⁻ / AsO ₃ ³⁻ / SbO ₃ ³⁻ - responsive transcriptional repressor	15.78	18.10	15.78	16.04	14.35	16.62	18.09	16.68	15.54	16.95
K17686 (<i>copA</i>)	Cu	P-type Cu ⁺ transporter	12.06	13.60	11.23	13.10	13.61	12.90	12.02	14.68	13.72	12.21
K03709 (<i>troR</i>)	Mn	DtxR family transcriptional regulator, Mn-dependent transcriptional regulator	6.80	9.03	7.03	6.53	5.05	7.35	8.74	6.89	6.70	8.07
K16264 (<i>czcD</i>)	Co/ Zn/Cd	Co-Zn-Cd efflux system protein	7.04	6.71	7.05	6.10	6.79	6.91	7.51	6.58	6.94	6.82
K15726 (<i>czcA</i>)	Co/Zn/Cd	heavy metal efflux system protein	6.88	6.47	7.27	7.77	10.41	8.39	5.56	9.82	10.69	6.58
K15727 (<i>czcB</i>)	Co/Zn/Cd	membrane fusion protein, heavy metal efflux system	6.32	5.75	5.93	7.11	7.87	7.18	5.20	7.76	8.76	5.67
K01534 (<i>zntA</i>)	Zn/Cd	Zn ²⁺ /Cd ²⁺ -exporting ATPase	4.55	4.92	3.70	5.43	3.88	4.19	3.57	3.72	3.14	5.58
K01533 (<i>copB</i>)	Cu	P-type Cu ²⁺ transporter	3.33	4.37	4.36	3.21	7.13	4.20	4.30	6.46	6.19	3.82
K02077 (ABC.ZM.S)	Zn/Mn	Zn/Mn transport system substrate-binding protein	3.96	4.35	4.54	4.46	3.24	3.90	4.69	2.69	2.96	4.72
K07787 (<i>cusA</i>)	Cu/Ag	Cu/Ag efflux system protein	2.71	4.04	1.98	3.93	5.21	3.97	2.34	5.37	5.62	3.20
K07238 (TC.ZIP)	Zn	Zn transporter, ZIP family	3.93	3.93	3.74	3.32	2.02	3.38	4.06	1.95	1.85	4.60
K03322 (<i>mntH</i>)	Mn	Mn transport protein	3.83	3.51	4.44	3.78	2.33	3.82	3.73	2.15	2.59	4.63
K15725 (<i>czcC</i>)	Co/Zn/Cd	outer membrane protein, heavy metal efflux system	3.98	3.29	4.60	4.79	5.85	4.79	3.20	4.95	5.24	3.42
K07245 (<i>pcoD</i>)	Cu	Cu resistance protein D	3.53	2.56	4.40	1.95	1.41	1.84	4.21	0.81	0.84	3.07
K09816 (<i>znuB</i>)	Zn	Zn transport system permease protein	2.91	2.47	1.90	2.43	2.86	2.09	2.75	2.83	2.35	2.26
K09815 (<i>znuA</i>)	Zn	Zn transport system substrate-binding protein	3.23	2.17	1.87	2.49	2.77	1.79	2.93	2.82	2.07	2.57
K02074 (ABC.ZM.A)	Zn/ Mn	Zn/Mn transport system ATP-binding protein	2.04	1.69	2.55	1.90	1.41	1.61	2.35	1.22	1.61	1.37

K02075 (ABC.ZM.P)	Zn/ Mn	Zn/Mn transport system permease protein	1.94	1.32	2.48	2.22	1.27	1.63	1.81	1.42	1.61	1.08
K03893 (<i>arsB</i>)	As	As pump membrane protein	2.85	1.04	2.02	1.10	1.06	1.11	1.84	0.31	0.43	1.24
K07665 (<i>cusR</i>)	Cu	two-component system, OmpR family, Cu resistance phosphate regulon response regulator CusR	2.32	0.68	3.15	2.33	1.47	2.31	1.08	0.88	1.12	2.15