

Supplementary Information

Table S1. Exposure concentration ranges and experimental design details for each test species.

	<i>Aliivibrio fischeri</i>	<i>Idiomarina seosinensis</i>	<i>Halobacillus locisalis</i>	<i>Isochrysis galbana</i>	<i>Tetraselmis chuii</i>	<i>Phaeodactylum tricornutum</i>	<i>Chaetoceros calcitrans</i>	<i>Brachionus plicatilis</i>	<i>Phorcus lineatus</i>	<i>Steromphala umbilicalis</i>	<i>Scrobicularia plana</i>	<i>Mytilus galloprovincialis</i>	<i>Ruditapes philippinarum</i>	<i>Artemia salina</i>	<i>Paracentrotus lividus</i>
Tested concentration BTA	0.393 – 100 (x2)			1.23 – 100 (x3)	1.23 – 100 (x3)	1.23 – 100 (x3)	1.23 – 100 (x3)	1.23 – 100 (x3)	1 – 100 (x3.33)				1.23 – 100 (x3)	1.23 – 100 (x3)	0.047 – 11.11 (x3)
Tested concentration Mg-AI LDH-BTA	0.393 – 100 (x2)	1 – 100 (x3.33)	1 – 100 (x3.33)	1 – 100 (x3.33)	1 – 100 (x3.33)	1 – 100 (x3.33)	1.23 – 100 (x3)	1.23 – 100 (x3)	1 – 100 (x3.33)	1 – 100 (x3.33)	1 – 100 (x3.33)	1 – 100 (x3.33)	1.23 – 100 (x3)	1 – 100 (x3.33)	0.047 – 11.11 (x3)
Tested concentration Zn-AI LDH-BTA	0.393 – 100 (x2)	1 – 100 (x3.33)	1 – 100 (x3.33)	1 – 100 (x3.33)	1 – 100 (x3.33)	1 – 100 (x3.33)	1.23 – 100 (x3)	1.23 – 100 (x3)	1 – 100 (x3.33)	1 – 100 (x3.33)	1 – 100 (x3.33)	1 – 100 (x3.33)	1.23 – 100 (x3)	1 – 100 (x3.33)	0.047 – 11.11 (x3)
standard protocol	ISO 11348-3/ASTM D5660	Kirby-Bauer	Kirby-Bauer	ISO 10253	ISO 10253	ISO 10253	ISO 10253	ISO 19820*	ASTM E729-96**	ASTM E729-96**	ASTM E729-96**	ASTM E729-96**	ASTM E729-96**	ASTM E1440-91*	EPS 1/RM/27
Endpoint	Luminescence inhibition	Growth inhibition	Growth inhibition	Growth inhibition	Growth inhibition	Growth inhibition	Growth inhibition	Immobilization/lethality	Lethality	Lethality	Lethality	Lethality	Lethality	Immobilization/lethality	Larvae development
Exposure time	15 min	24 h	24 h	72 h	72 h	72 h	72 h	48 h	96 h	96 h	96 h	96 h	96 h	48 h	48 h
no. of treatments	9	5	5	5	5	5	5	5	5	5	5	5	5	5	5
no. of replicates	3	4	4	4	4	4	4	6	5	5	5	5	5	3	4
n	-	-	-	20 µL	20 µL	20 µL	20 µL	5	1	1	1	1	1	10	100
type of vessel	-	Petri dish	Petri dish	24-well microplate	24-well microplate	24-well microplate	24-well microplate	Rotokit microplate	200 mL glass flask	200 mL glass flask	200 mL glass flask	200 mL glass flask	200 mL glass flask	24-well microplate	24-well microplate
tested volume	-	filter disk (5mm)	filter disk (5mm)	1980 µL	1980 µL	1980 µL	1980 µL	300 µL	200 mL	200 mL	200 mL	200 mL	200 mL	1 mL	2450 µL

*with minor adaptations suggested by Figueiredo et al. (2019)(56) and Kaczerewska et al.(2020)(80)
**with minor adaptations suggested by Martins et al.(2017)(25)
***with minor adaptarions suggested by Figueiredo et al (2019)(56)

Table S2. Quantification of Al, Mg and Zn over time in aqueous dispersions of Mg-Al LDH-BTA and Zn-Al LDH-BTA, prepared in artificial saltwater, at concentrations of 1.23, 11.11, and 100 mg BTA/L and in non-contaminated artificial seawater (negative control; i.e., 0 mg BTA/L) (n = 1).

Exposure time (h)	Exposure nominal concentrations (mg BTA/L)	Mg-Al LDH-BTA		Zn-Al LDH-BTA	
		Al (mg/L)	Mg (mg/L)	Al (mg/L)	Zn (mg/L)
0	0	0.11	2356	0.11	0.02
	1.23	0.16	1650	0.18	0.52
	11.1	0.54	1651	0.44	2.11
	100	0.38	1252	0.73	3.63
24	0	0.11	1429	0.11	0.01
	1.23	0.17	1813	0.18	0.47
	11.1	0.54	2603	0.36	1.42
	100	0.16	1794	0.58	2.71
48	0	0.13	1302	0.13	0.01
	1.23	0.19	1518	0.16	0.37
	11.1	0.45	1512	0.29	1.06
	100	0.14	2176	1.19	6.39
72	0	0.14	1665	0.14	0.02
	1.23	0.16	1307	0.14	0.29
	11.1	0.32	1412	0.38	1.68
	100	0.30	2064	1.22	5.59
96	0	0.13	1480	0.13	0.02
	1.23	0.16	1961	0.14	0.28
	11.1	0.64	1419	0.34	1.43
	100	0.56	1669	1.78	9.27

Table S3. Quantification of anions in Mg-Al LDH-BTA dispersions over 96 h. The limits of detection (LOD) of chlorides, nitrates, and nitrites are 0.80 mg/L, 0.22 mg/L and 0.64 mg/L, respectively.

Exposure time (h)	Concentration (mg BTA/L)	Chlorides (mg/L)	Nitrates (mg/L)	Nitrites (mg/L)
0	Control	9515	<LOD	<LOD
	1.23	8522	<LOD	<LOD
	11.11	9772	<LOD	<LOD
	100	27423	67.50	<LOD
24	Control	2918	<LOD	<LOD
	1.23	4908	<LOD	<LOD
	11.11	11317	<LOD	<LOD
	100	9491	10.48	<LOD
48	Control	5555	<LOD	<LOD
	1.23	11340	<LOD	<LOD
	11.11	8329	<LOD	<LOD
	100	9535	11.30	<LOD
72	Control	13540	<LOD	<LOD
	1.23	8350	<LOD	<LOD
	11.11	9324	<LOD	<LOD
	100	9227	9.65	<LOD
96	Control	14258	<LOD	<LOD
	1.23	10143	<LOD	<LOD
	11.11	3612	<LOD	<LOD
	100	12570	13.96	<LOD

Table S4. Quantification of anions in Zn-Al LDH-BTA dispersions over 96 h. The limits of detection (LOD) of chlorides, nitrates, and nitrites are 0.80 mg/L, 0.22 mg/L and 0.64 mg/L, respectively.

Exposure time (h)	Concentration (mg BTA/L)	Chlorides (mg/L)	Nitrates (mg/L)	Nitrites (mg/L)
0	Control	9515	<LOD	<LOD
	1.23	11817	<LOD	<LOD
	11.11	5037	<LOD	<LOD
	100	14077	5.32	<LOD
24	Control	2918	<LOD	<LOD
	1.23	9249	<LOD	<LOD
	11.11	8472	<LOD	<LOD
	100	10175	<LOD	<LOD
48	Control	5555	<LOD	<LOD
	1.23	14648	<LOD	<LOD
	11.11	9496	<LOD	<LOD
	100	8082	<LOD	<LOD
72	Control	13540	<LOD	<LOD
	1.23	9396	<LOD	<LOD
	11.11	16975	<LOD	<LOD
	100	6779	<LOD	<LOD
96	Control	14258	<LOD	<LOD
	1.23	7606	<LOD	<LOD
	11.11	5327	<LOD	<LOD
	100	10780	4.47	<LOD

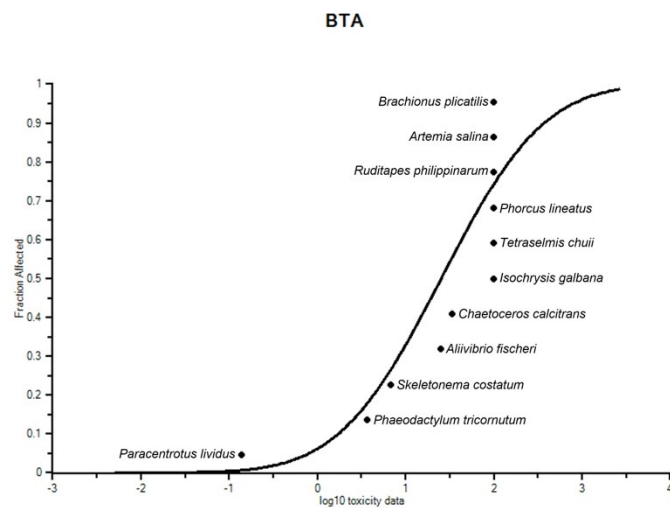


Figure S1. Species sensitivity distribution for BTA using NOEC data for different species.

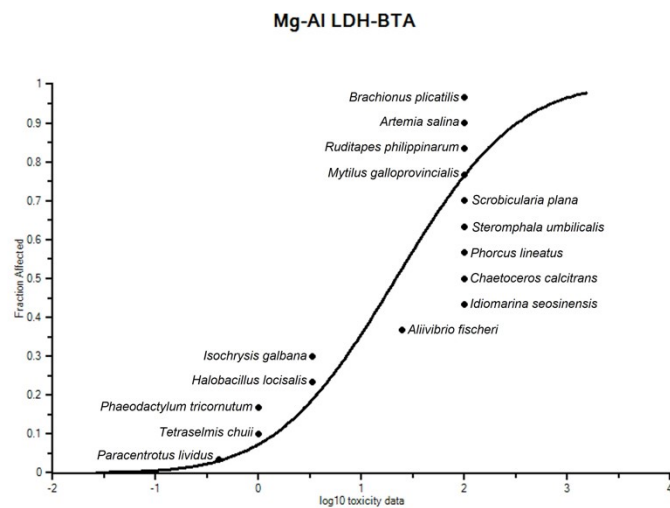


Figure S2. Species sensitivity distribution for Mg-AI LDH-BTA using NOEC data for different species.

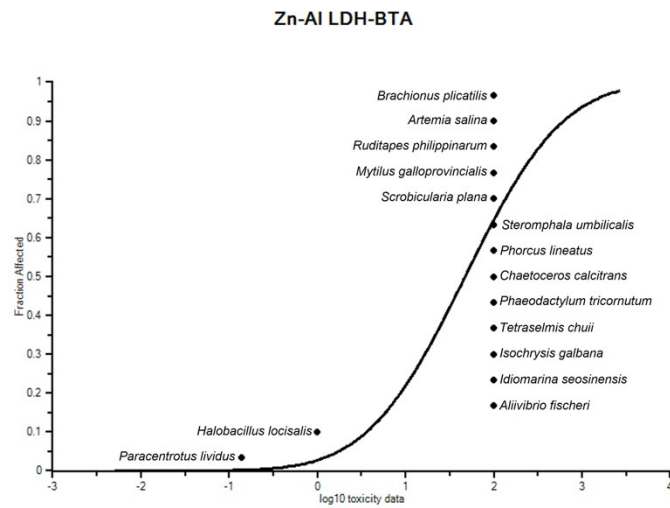


Figure S3. Species sensitivity distribution for Zn-AI LDH-BTA using NOEC data for different species.