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Supplement of

Metal ion binding and tolerance of bacteria cells in view of sensor applications

Jonas Jung et al.

Correspondence to: Jonas Jung (jonas.jung@tu-dresden.de)

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The pH values were measured with a pH meter (Sevencompact, Mettler-Toledo GmbH, Giessen, Germany) after two days both with and without incubated bacteria cells (Table 1).

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Table 1: pH values of metal salt solutions of different concentrations incubated for two days with bacteria cells of *L. sphaericus* JG-B53 and *S. ureae* ATCC 13881.

	concentration [mol/l]	no cells	<i>L. sphaericus</i> JG-B53	<i>S. ureae</i> ATCC 13881
CuSO₄	1x10 ⁻¹	4.01	3.92	3.89
	1x10 ⁻²	4.55	4.23	4.19
	1x10 ⁻³	5.01	5.40	5.82
HAuCl₄	2.5x10 ⁻³	2.37	2.02	2.04
Ho(NO₃)₃	1x10 ⁻¹	6.42	5.06	5.29
	1x10 ⁻²	6.15	5.02	4.77
	1x10 ⁻³	6.27	5.52	6.64
KAuCl₄	1x10 ⁻²	2.73	2.23	2.19
	1x10 ⁻³	3.14	3.03	3.11
Sm(NO₃)₃	1x10 ⁻¹	5.18	4.00	4.24
	1x10 ⁻²	5.34	4.19	4.28
	1x10 ⁻³	5.25	7.34	6.42
YCl₃	1x10 ⁻¹	4.82	4.06	4.37
	1x10 ⁻²	5.13	4.59	5.09
	1x10 ⁻³	5.09	6.10	6.37

Figure 1 shows the washed cells of *L. sphaericus* JG-B53 and *S. ureae* ATCC 13881 in ddH₂O after two days of incubation.

10 A sedimentation of cells at the bottom of the tube is visible, which is more pronounced in the *S. ureae* sample.

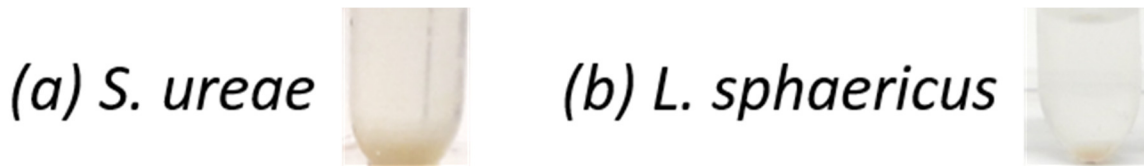


Figure 1: Washed cells of *L. sphaericus* JG-B53 and *S. ureae* ATCC 13881 in water after 2 days incubation.

Bacteria cells incubated with metal salt solutions for two days were studied by SEM (Figure 2 - 5).

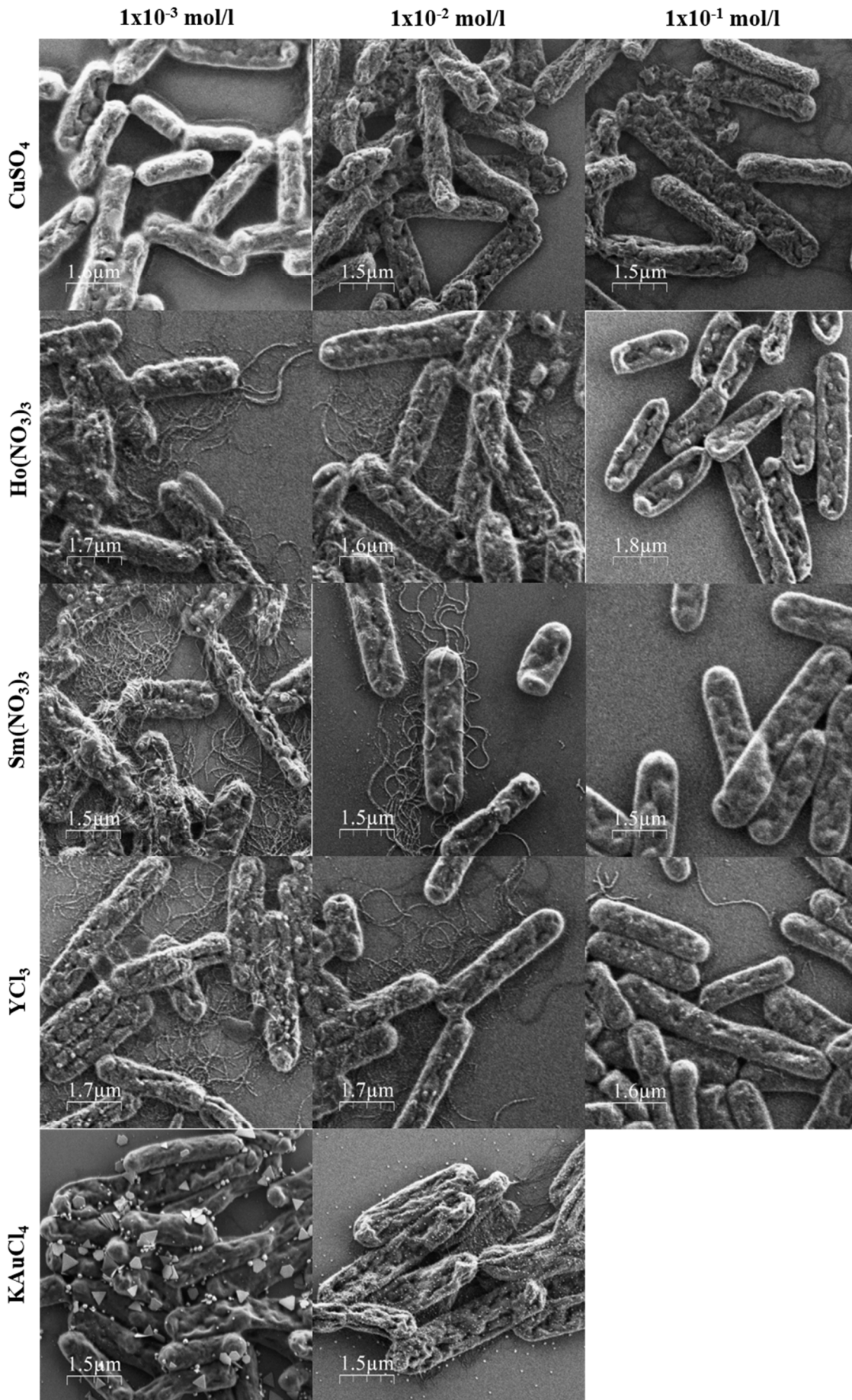


Figure 2: SEM images from *L. sphaericus* JG-B53 cells from metal binding test after 2 day incubation with CuSO_4 , $\text{Ho}(\text{NO}_3)_3$, $\text{Sm}(\text{NO}_3)_3$, YCl_3 or KAuCl_4 solutions of different concentrations.

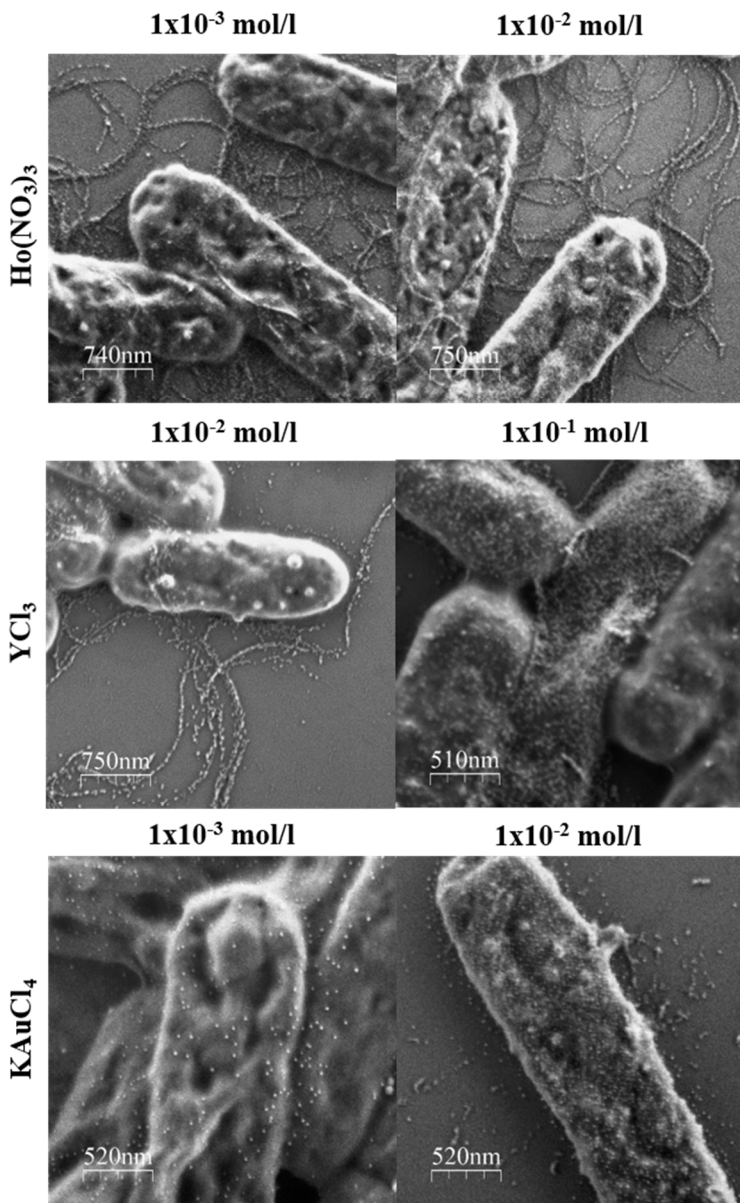


Figure 3: Higher resolution SEM images from *L. sphaericus* JG-B53 cells from metal binding test after 2 day incubation with $\text{Ho}(\text{NO}_3)_3$, YCl_3 or KAuCl_4 solutions of different concentrations.

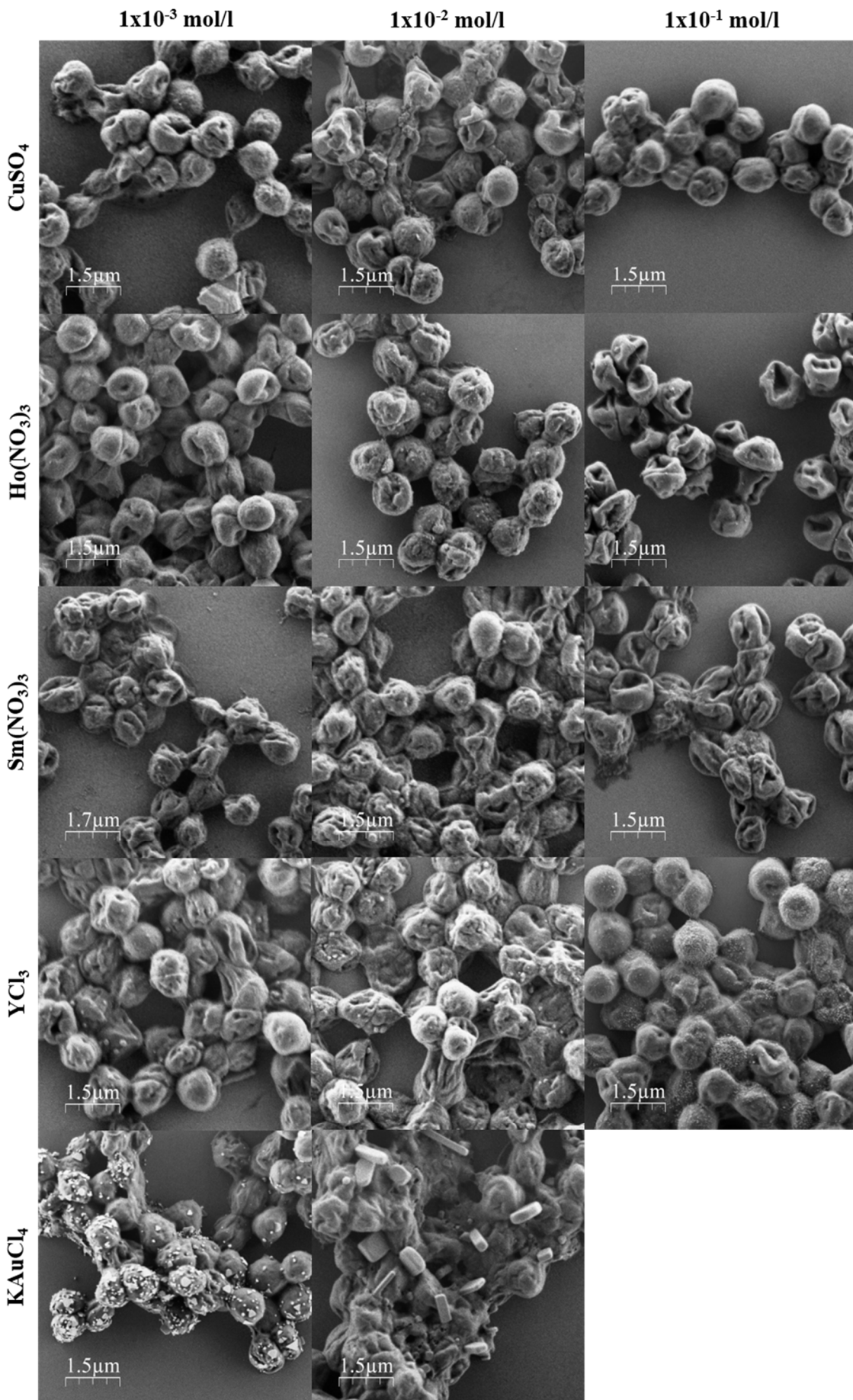


Figure 4: SEM images from *S. ureae* ATCC 13881 cells from metal binding test after 2 day incubation with CuSO_4 , $\text{Ho}(\text{NO}_3)_3$, $\text{Sm}(\text{NO}_3)_3$, YCl_3 or KAuCl_4 solutions of different concentrations.

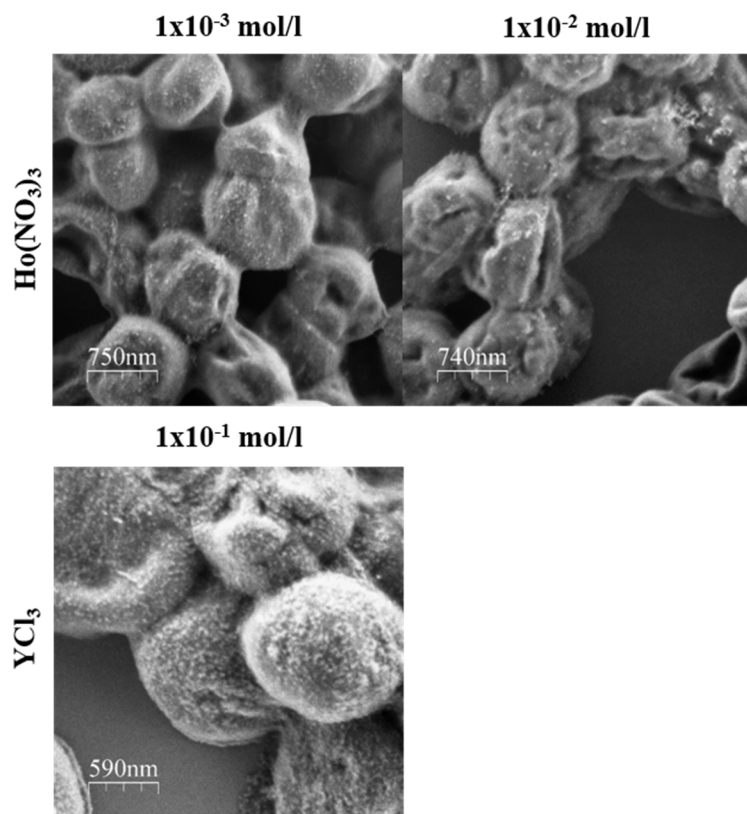


Figure 5: Higher resolution SEM images from *S. ureae* ATCC 13881 cells from metal binding test after 2 day incubation with, $\text{Ho}(\text{NO}_3)_3$ or KAuCl_4 solutions of different concentrations.