

Supporting Information

Rapid screening of toxicity to thermotolerant yeasts: inhibition of growth and fermentation by ionic liquids and zwitterions

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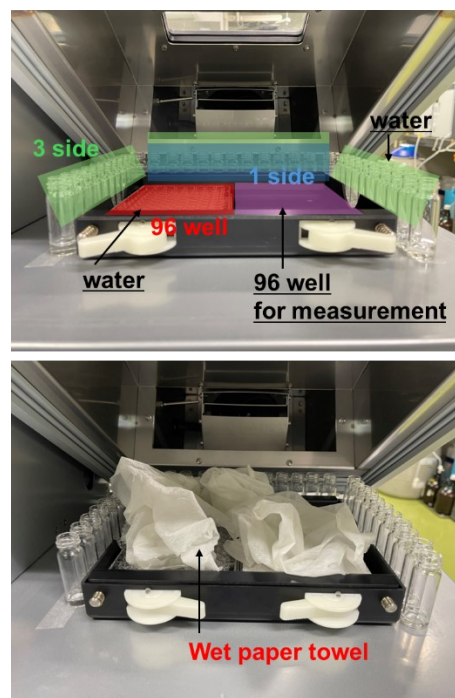
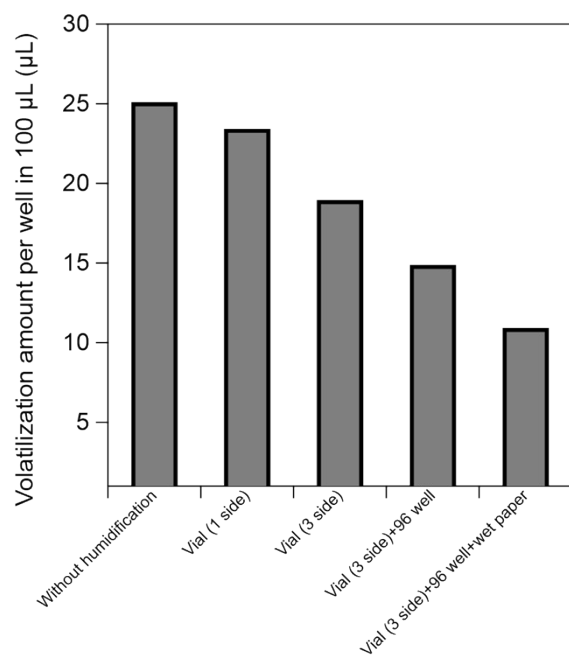


Fig. S1 Volatilization amount per well after 6h incubation with various humidification methods.

For humidification, the vials and wells in the 96-well plate (left one in the picture) were filled with water, and paper towels were always kept wet. The experimental for this estimation is shown below.

Water (100 µL) was added to each well of the 96-well plate. The plate was placed in an incubator under the respective humidification conditions and incubated for 6 hours.

Volatilisation was measured according to the equation:

$$\text{Volatilization amount per well (mg)} = \frac{\text{Weight 96 well before incubation (mg)} - \text{Weight 96 well after incubation (mg)}}{96}$$

The density of water was calculated as 1 µL/mg.

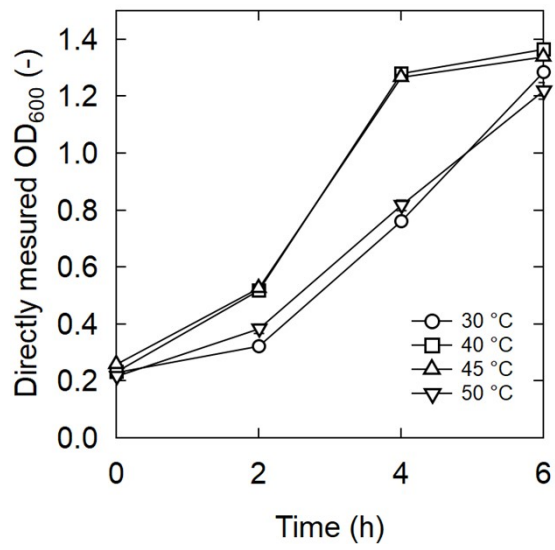


Fig. S2 OD₆₀₀ after incubation in media at 30, 40, 45, and 50 °C. Strain: *K. marxianus* DMKU3-1042.

Initial OD₆₀₀: 0.2.

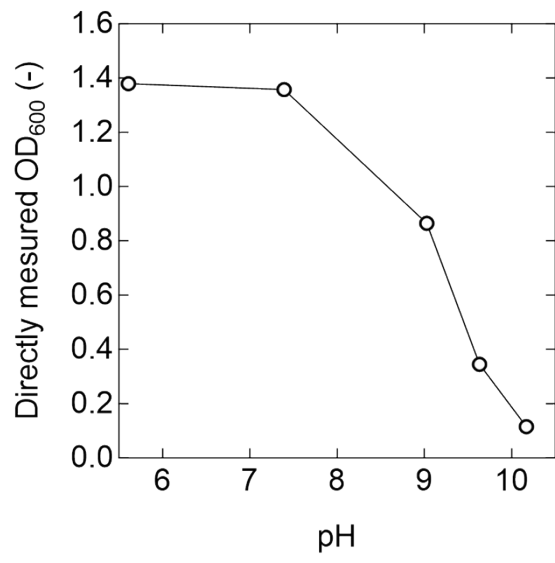


Fig. S3 OD₆₀₀ of *K. marxianus* (DMKU3-1042) solution after incubation at 40 °C at various pH, adjusted with NaOH.

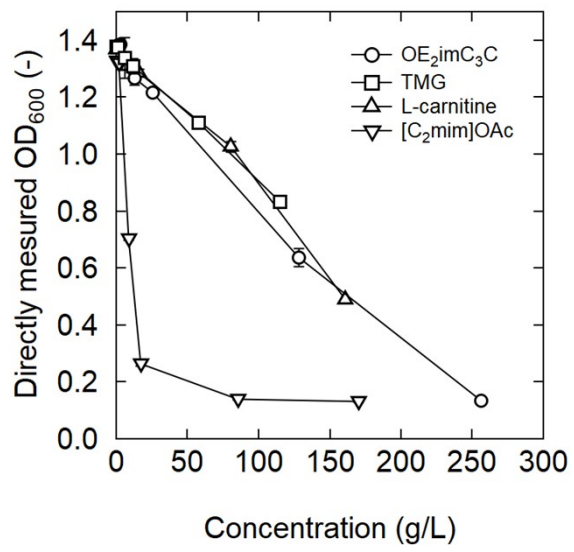


Fig. S4 OD₆₀₀ after 6h incubation at 40 °C in media supplemented with OE₂imC₃C, TMG, L-carnitine, and [C₂mim]OAc. Strain: *K. marxianus* DMKU3-1042. Initial OD₆₀₀: 0.2.

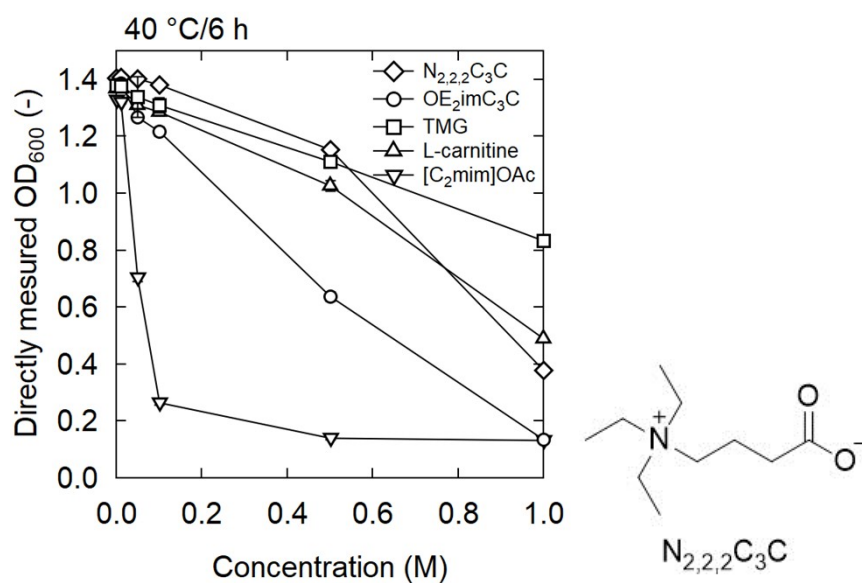


Fig. S5 OD_{600} after 6h incubation in media supplemented with $N_{2,2,2}C_3C$, $OE_{2im}C_3C$, TMG, L-carnitine, and $[C_2mim]OAc$ at 40 °C. Strain: *K. marxianus* DMKU3-1042. Initial OD_{600} : 0.2.

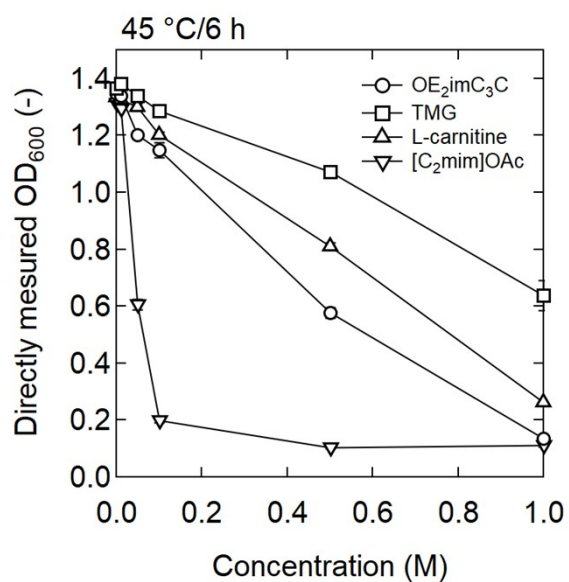
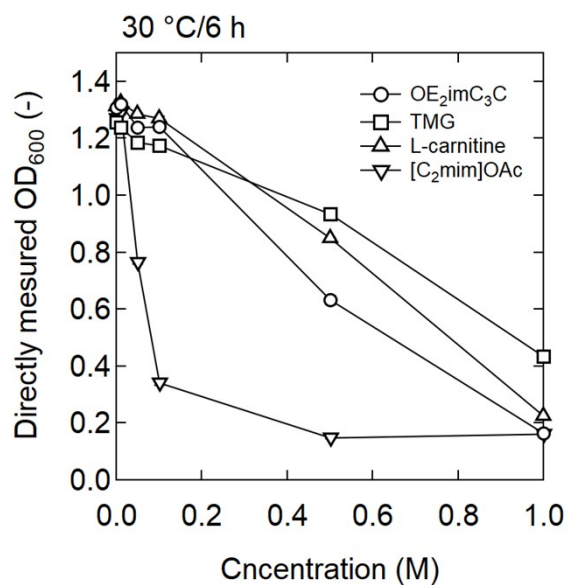


Fig. S6 OD₆₀₀ after 6h incubation in media supplemented with OE₂imC₃C, TMG, L-carnitine, and [C₂mim]OAc at 30 and 45 °C. Strain: *K. marxianus* DMKU3-1042. Initial OD₆₀₀: 0.2

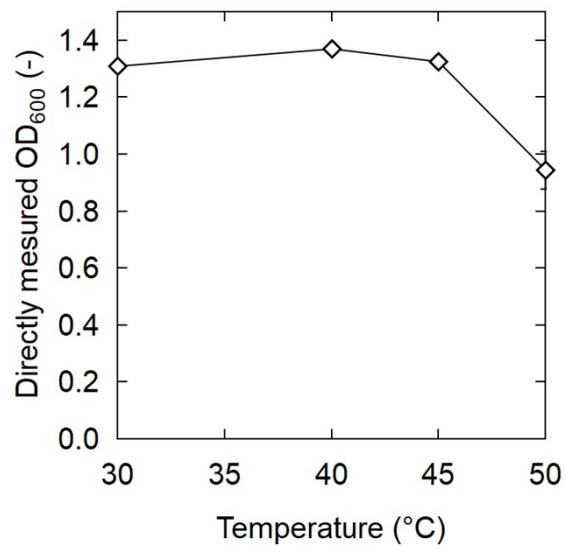


Fig. S7 OD₆₀₀ after 6h incubation without zwitterions/ionic liquids. Strain: *K. marxianus* NBRC1777.

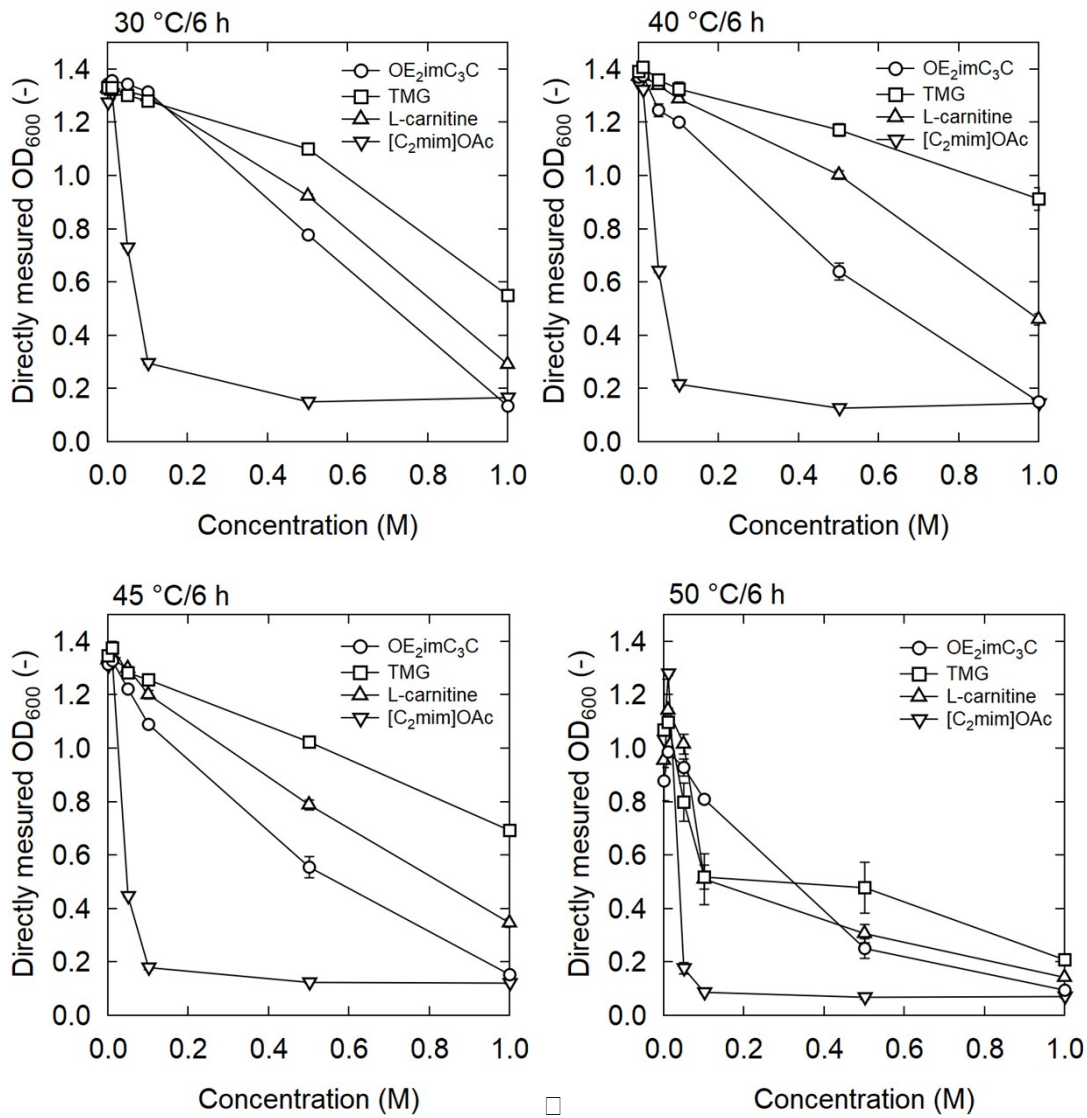


Fig.

S8 OD₆₀₀ after 6h incubation in media supplemented with OE₂imC₃C, TMG, L-carnitine, and

[C₂mim]OAc at 30, 40, 45 and 50 °C. Strain: *K. marxianus* NBRC1777. Initial OD₆₀₀: 0.2.

Table S1. pH of the 1.0 M zwitterion solutions.

	pH
Medium only	6.1
OE ₂ imC ₃ C	7.0
TMG	6.1
L-carnitine	6.5
[C ₂ mim]OAc	6.4

Table S2. Water concentration and zwitterion/water ratio in the 0.5 and 1.0 M zwitterion solutions.

Water concentration was roughly calculated with the density of 1.0 g/mL.

zwitterion conc.	Water conc. (mol/L)		zwitterion/water (mol/mol)	
	0.5 M	1.0 M	0.5 M	1.0 M
OE ₂ imC ₃ C	48.4	41.3	0.0103	0.0242
TMG	52.3	49.0	0.0096	0.0204
L-carnitine	51.0	46.6	0.0098	0.0215