Supplementary Material (ESI) for Organic & Biomolecular Chemistry

Supplementary Information

Single-step enzymatic synthesis of (*R*)-2-*O*-α-D-glucopyranosyl glycerate, a compatible solute from micro-organisms that functions as protein stabiliser

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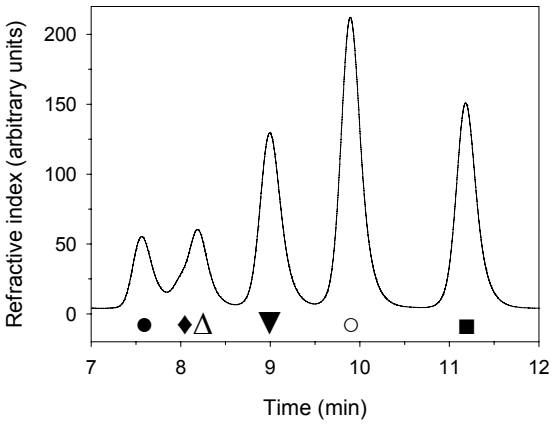
Supplementary Table 1. Influence of Ca^{2+} on the enzymatic synthesis of **2**. The reaction mixture contained 0.3 M sucrose, 0.15 M *R*-glycerate and 20 U/ml sucrose phosphorylase in 50 mM MES buffer, pH 7.0. Samples were taken after 24 h, inactivated by heating and analysed by HPLC. Yield is based on the concentration of glycerate converted. The production rate is the formation of product per time and enzyme activity applied. A control reaction containing NaCl was also performed. This was used to determine the effect of a change in ionic strength on enzymatic synthesis. The results show that neither Ca^{2+} nor ionic strength affects the enzymatic synthesis significantly.

	Product **[M] × 10^{-2}**	**Yield** **[%]**	**Production rate** **[M h^{-1} 1000 kU] × 10^{-2}**
no additive	10.8	72	22.4
0.2 M NaCl	10.2	68	21.3
0.1 M $CaCl_2$	9.9	66	20.7

Supplementary Table 2. Variation of temperature to optimise the enzymatic synthesis of **2**. The reaction mixture contained sucrose and *R*-glycerate each 0.3 M, 20 U/ml sucrose phosphorylase in 50 mM MES buffer, pH 7.0. Samples were taken after 1, 2, 3 and 5 h, inactivated by heating and analysed by HPLC. Mean values of production rates (formation of product per time and enzyme activity applied) are given.

Temperature [°C]	**Production rate [M h^{-1} 1000 kU] $\times 10^{-2}$**
25	43.6
30	61.7
35	75.6
40	75.0



Supplementary Figure 1. HPLC analysis of the product mixture obtained by enzymatic conversion of sucrose in the presence of racemic *R*/*S*-glycerate, leading to formation of **2** and **3**. The experiment was performed using 0.3 M sucrose and 0.3 M *R*/*S*-glycerate. Twenty U/ml sucrose phosphorylase in 50 mM MES buffer, pH 7.0, was used. After 72 h of incubation at 30 °C, the sample was inactivated by heating and analysed. The symbols indicate sucrose (●), **3** (♦), **2** (Δ), D-glucose (▼), D-fructose (○), and *R*/*S*-glycerate (■). The main product peak is assigned to **2**. The shoulder (on the left) of the product peak indicates formation of **3** as second product.