Supplementary data for the article:

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Supplemental Material

Title:
A high-throughput cellulase screening system based on droplet microfluidics

Authors:
Raluca Ostafe[a], [c], [d], Radivoje Prodanovic [b], [c], W. Lloyd Ung [c], David A. Weitz [c] and Rainer Fischer* [a], [d]

Affiliation:
[a] Dr. R. Ostafe, Prof. Dr. R. Fischer*
Fraunhofer Institute for Molecular Biology and Applied Ecology (IME)
Forckenbeckstrasse 6, D-52074 Aachen, Germany
Fax: (+49 241 6085-10000)
E-mail: rainer.fischer@ime.fraunhofer.de
[b] Prof. Dr. R. Prodanovic
Faculty of Chemistry
University of Belgrade
Studentski trg 12, 11000, Belgrade, Serbia
[c] Dr. R. Ostafe, Prof. Dr. R. Prodanovic, W.L. Ung, Prof. Dr. D.A. Weitz
School of Engineering and Applied Sciences/Department of Physics
Harvard University
Cambridge, MA 02138
[d] Prof. Dr. R. Fischer
Institute of Molecular Biotechnology
RWTH Aachen University
Worringerweg 1, D-52074 Aachen, Germany
* Corresponding author

Experimental data

Fabrication of microfluidic devices.
PDMS devices were prepared using soft lithography as previously described[8].

Emulsification and sorting.
Monodisperse aqueous drops in fluorocarbon oil (Novec HFE 7500, 3M, Minnesota, USA) were prepared using a co-flow, flow-focusing geometry. The fluorocarbon oil contained 1% (v/v) Krytox-PEG-Krytox detergent synthesized as previously described[11]. Two solutions were co-flowed, one containing library cells (*S. cerevisiae* YPH500 cells, Agilent Technologies, Santa Clara, USA) and the other containing the substrate. The library cells comprised a defined mixture of cells transformed with cel5A pESC-Trp (positive cells) or empty pESC-Trp (negative cells). The substrate solution consisted of APF (100 µM, Invitrogen), VBrPOx (200 mU/mL, Sigma Aldrich), HOx (3 U/mL, Danisco Deutschland GmbH), CMC (0.3% (w/v), Sigma Aldrich), NaBr (10 mM) and BSA (1.5 mg/mL) in Tris H_2SO_4 (50 mM, pH 7.4). We obtained 30-µm drops by flowing the three streams at 15 μLh^{-1} (cells and substrate stream) and 30 μLh^{-1} (oil stream), respectively, through a 10-µm nozzle. The drops were passed through a 20-min incubation line and re-injected into a sorting device, where the positive drops were sorted as previously described [8] onto YNB CAA Glu agar plates. The plates were incubated at 30°C for 2 days.

Agar plate assay.
Colonies were transferred to YNB CAA Gal/Raf 0.1% (w/v) CMC plates for the agar plate assay. The YNB CAA Gal/Raf 0.1 % (w/v) CMC plates were incubated for 24 h at 30°C and the Congo red agar plate assay was performed as previously described[5], [13]. Cells expressing cellulase activity were revealed by transparent halos.