

Supplementary Information

Critical factors for levulinic acid production from starch-rich food waste: Solvent effects, reaction pressure and phase separation

Shanta Dutta ^a, Iris K.M. Yu ^{a,b}, Jiajun Fan ^c, James H. Clark ^c, and Daniel C.W. Tsang ^{a,*}

^a Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, 181 Chatham Road South, Hung Hom, Kowloon, Hong Kong, China.

^b Department of Chemistry and Catalysis Research Institute, TU München, Lichtenbergstrasse 4, 85748 Garching, Germany.

^c Green Chemistry Centre of Excellence, Department of Chemistry, University of York, York, YO10 5DD, UK.

*Corresponding

author,

dan.tsang@polyu.edu.hk

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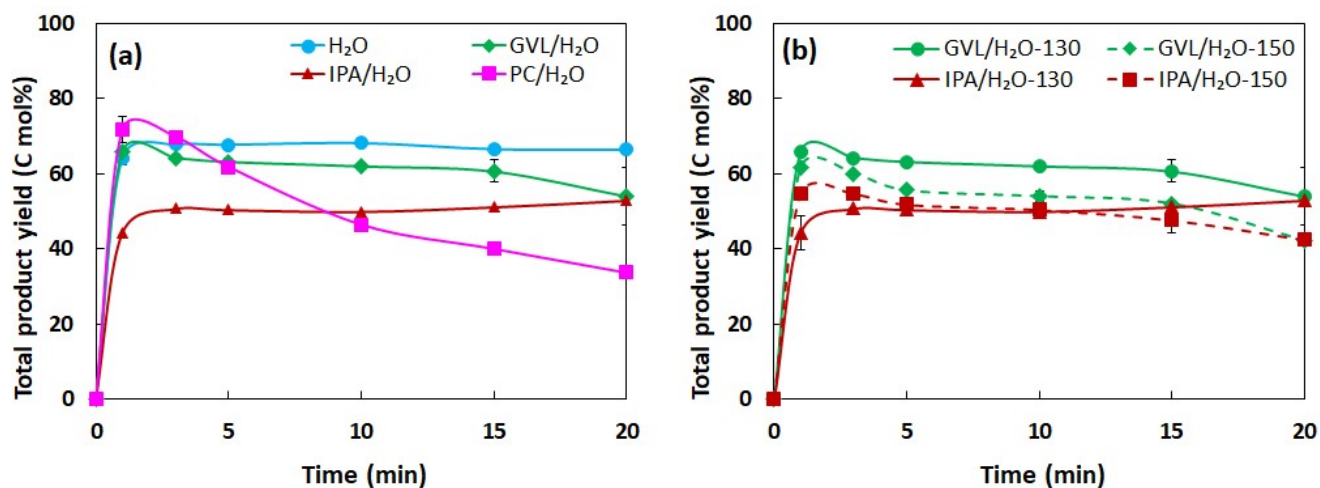


Fig. S1. Total product yields during the catalytic conversion of bread waste under different solvents at (a) at 130°C and (b) at 130°C and 150°C under GVL/H₂O and IPA/H₂O (Reaction conditions: 5 wt% substrate loading, 0.5 M H₂SO₄, 1-20 min, 1:1 solvent ratio).

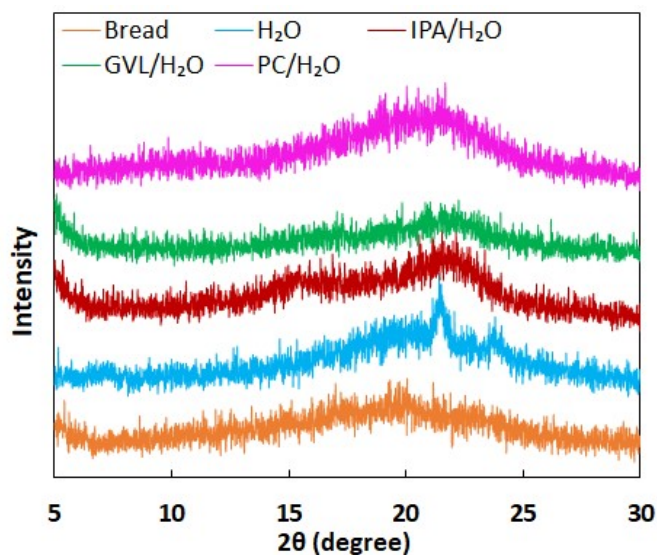


Fig. S2. XRD pattern of untreated bread waste and solid residues collected after reaction under different solvents (Reaction conditions: 5 wt% substrate loading, 0.5 M H₂SO₄, 130°C, 20 min, 1:1 solvent ratio).

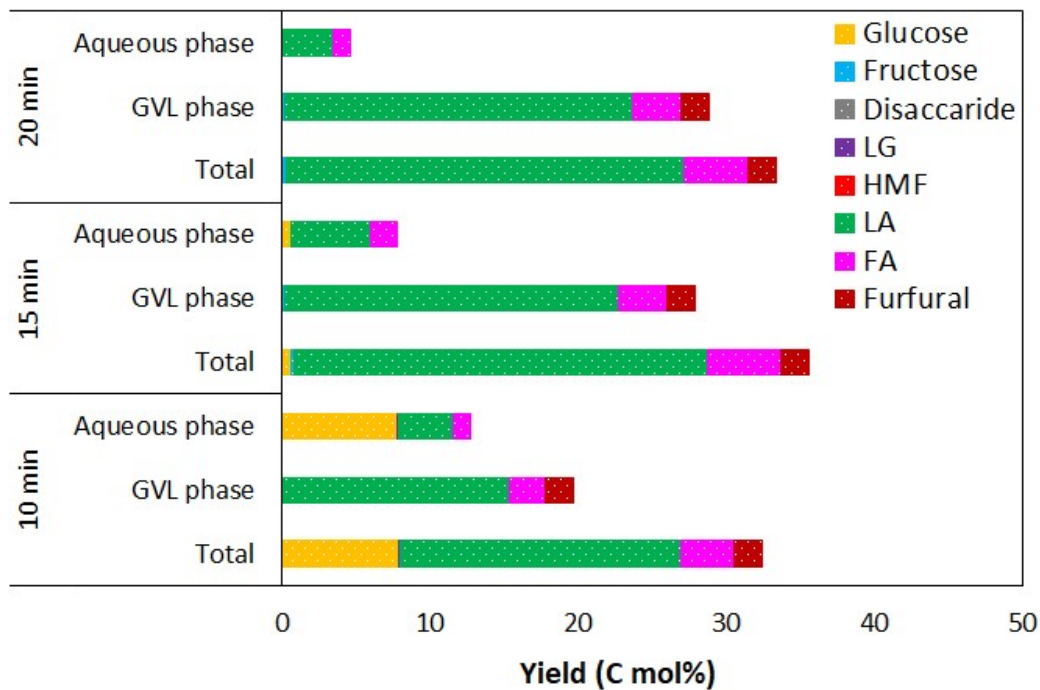


Fig. S3. Distribution of products in the aqueous phase and organic (GVL) phase during the catalytic conversion of bread waste in GVL/H₂O biphasic medium (Reaction conditions: 5 wt% substrate loading, 0.5 M H₂SO₄, 30 wt% NaCl_(aq) 150°C, 10-20 min, 1:1 solvent ratio).

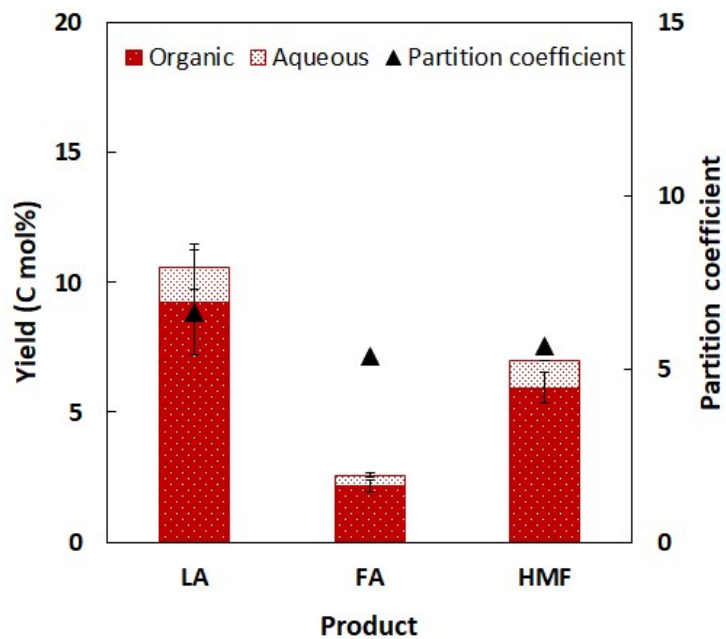


Fig. S4. LA, FA, and HMF distribution in the organic phase and the aqueous phase, and partition coefficients obtained for the catalytic conversion of bread waste in IPA/H₂O biphasic medium (Reaction conditions: 5 wt% substrate loading, 0.5 M H₂SO₄, 30 wt% NaCl_(aq) 150°C, 20 min).