Supplementary Data

Supplementary Data 1. Maximum yields for bio-based chemicals in *Bacillus subtilis* (iYO844).

Supplementary Data 2. Maximum yields for bio-based chemicals in *Corynebacterium glutamicum* (iCW773).

Supplementary Data 3. Maximum yields for bio-based chemicals in *Escherichia coli* (iML1515).

Supplementary Data 4. Maximum yields for bio-based chemicals in *Pseudomonas putida* (iJN1463).

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Supplementary Data 6. Heterologous reactions which improve maximum theoretical yield for bio-based chemical production in *Bacillus subtilis* (iYO844).

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Supplementary Data 10. Heterologous reactions which improve maximum theoretical yield for bio-based chemical production in *Saccharomyces cerevisiae* (Yeast8).

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Supplementary Data 33. Heterologous reactions which improve maximum achievable yield for bio-based chemical production in *Escherichia coli* (iML1515).

Supplementary Data 34. Heterologous reactions which improve maximum achievable yield for bio-based chemical production in *Pseudomonas putida* (iJN1463).

Supplementary Data 35. Heterologous reactions which improve maximum achievable yield for bio-based chemical production in *Saccharomyces cerevisiae* (Yeast8).

Supplementary Data 36. Cofactor swapping target reactions which improve maximum achievable yield for bio-based chemical production in *Bacillus subtilis* (iYO844).

Supplementary Data 37. Cofactor swapping target reactions which improve maximum achievable yield for bio-based chemical production in *Corynebacterium glutamicum* (iCW773).

Supplementary Data 38. Cofactor swapping target reactions which improve maximum achievable yield for bio-based chemical production in *Escherichia coli* (iML1515).

Supplementary Data 39. Hierarchical clustering of 272 metabolic pathways based on Y_T ranks across host strains under aerobic condition using D-glucose as the sole carbon source.

Supplementary Data 40. Hierarchical clustering of 272 metabolic pathways based on Y_A ranks across host strains under aerobic condition using D-glucose as the sole carbon source.

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