



Figure S2. Fermentation profiles of XR-XDH-inserted and XI-inserted strains with *pho13delta* on xylose containing medium.

Cells were initially inoculated at $OD_{600}=5$ and cultivated in 60 g/L xylose for 72 hours at 36 ° C. **a, b**: concentration of D-xylose; **c, d**: concentration of ethanol; **a, c**: *S. cerevisiae* expressing XR-XDH; **b, d**: *S. cerevisiae* expressing XI. Blue line: control strains (YK001 or SS82); Red line: strains with *PHO13* deletion (YK002 or YK149); Green line: strains overexpressing all PPP genes with *PHO13* deletion (YK115 or YK150). Each data point is an average of triplicate cultures.