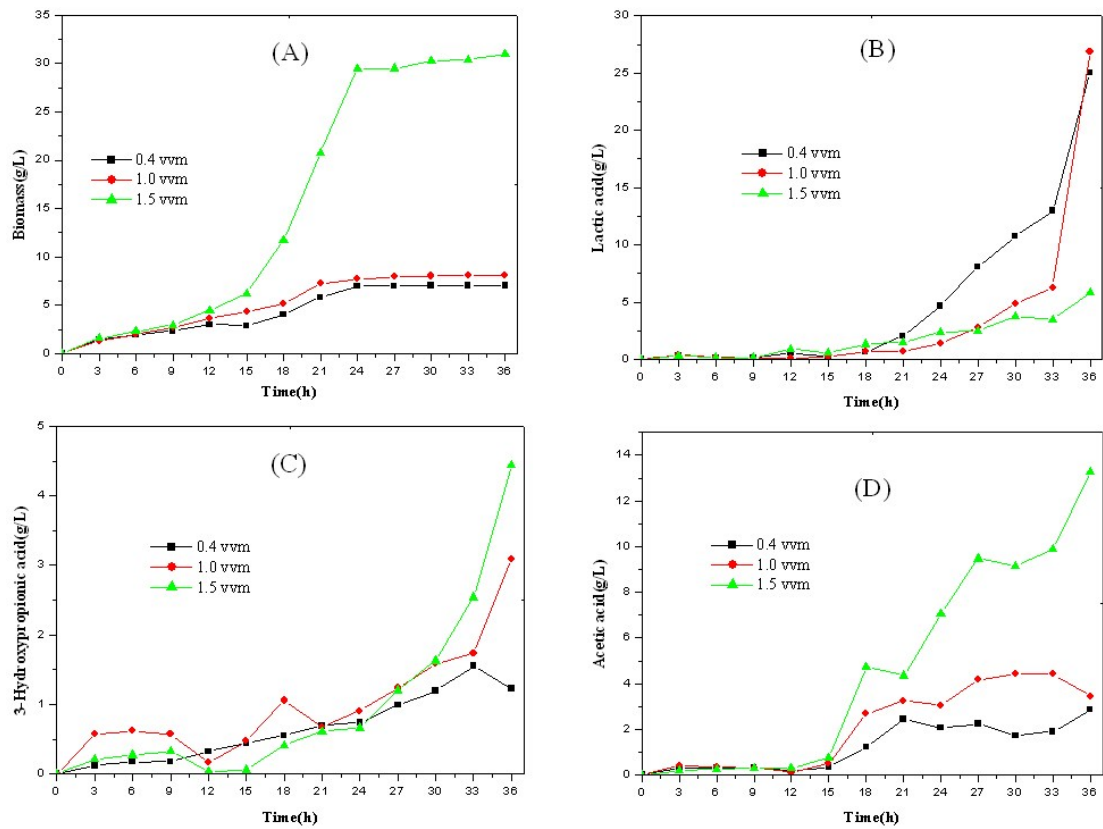


**Supplementary Fig. 1** Oligo-mediated homologous recombination to modify the enzymes associated with glycerol metabolism. 3-HPA: 3-hydroxypropionaldehyde; 3-HP: 3-hydroxypropionic acid; 1,3-PDO: 1,3-propanediol; DHAP: dihydroxy acetone phosphate; 2,3-BDO: 2,3-butanediol; PEP: phosphoenolpyruvic acid; AHL: acyl-homoserine lactone; SAH: S-Adenosyl-L-homocysteine; AI-2: autoinducer 2; SRH: S-ribosyl-L-homocysteine.





**Supplementary Fig. 3** Bioreactor cultivation of the recombinant strain Kp3 under different conditions. Agitations were set at 200 rpm, 300 rpm and 400 rpm with air supply at 0.4, 1.0 or 1.5 vvm.

**Supplementary Table 1.** Primers used in this study.

Primer	Sequence (5'-3')
<i>Bam</i> H-Red-F	CGCGGATCCACGCTTTTATCGCAACTCTCT (for PCR amplification of Red recombinases)
<i>Hind</i> -Red-R	CCCAAGCTTTCATCGCCATTGCTCCCCAAATAC
<i>Bam</i> H-aldH-F	CGCGGATCCATGAATTTTCATCATCTGGC (for PCR amplification of <i>aldH</i> gene)
<i>Sac</i> -aldH-R	TCCGAGCTCTCAGGCCTCCAGGCTTATCCA
<i>Sac</i> -cm-F	TCCGAGCTCCAATAAACCGGTAAACCAGCA (for amplification of chloromycetin resistance gene)
<i>Hind</i> -cm-R	CCCAAGCTTAGCTGATAGAAACAGAAGCC
AT-F	ATAACCTGAAGCGAGAAGGTATATTATGAATTTTCATCATC
AT-R	GACATGACGGCCCCCTCGTTAACAGAGCTGATAGAAACAGAAG
<i>Bam</i> H-llddU-F	CGCGGATCCAGCAGATTGGCGTCTCCGATATTC (for PCR amplification of the upstream homologous arm of <i>lldd</i> gene)
<i>Eco</i> R-llddU-R	CCGGAATTCACGAGTTCTCCCTGGAATTTTCAT
<i>Eco</i> R-llddD-F	CCGGAATCTTCTCCACGTTTTCCCTTACGCCGC (for PCR amplification of the downstream homologous arm of <i>lldd</i> gene)
<i>Hind</i> -llddD-R	CCCAAGCTTTTGGTGAAACGGCGGTGATTGAGGA
<i>Bam</i> H-anti- <i>ldh</i> -F	CGCGGATCCCTGAAAGATCGCGGCT (for PCR amplification of antisense module of <i>ldh</i> gene)
<i>Bam</i> H-anti- <i>ldh</i> -R	CGCGGATCCAGTTGTTGCTGATGAACCCCATAT
<i>Eco</i> R-anti- <i>poxB</i> -F	CCGGAATTCACATCCCATCCAGCGAAAT (for PCR amplification of antisense module of <i>poxB</i> gene)
<i>Hind</i> -anti- <i>poxB</i> -R	CCGGAATTC AATAAGCTGCGCCAGCT
<i>Eco</i> R-and- <i>poxB</i> -R	CCGGAATTC AATAAGCTGCGCCAGCT
<i>Sac</i> -pk-F	TCCGAGCTCCGTTATTTGTCGCCGCCAT
<i>Hind</i> -aldH-R	CCCAAGCTTTCAGGCCTCCAGGCTTATCCAGAT

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pET-F	AGATCTCGATCCCGCGAAATTAATACGAC (for colony PCR)
T7-ter	CAAAAACCCCTCAAGACCCGTTTAGAGGC
Below are oligos	
M-02059	TTCGGCCTCGGCACCTTTAATGAGCTGTAATAGAGCTGATCGCCTTCAGCAGTCAGGTC
M-01632	ACCATCTCCACCCGCGAGGCCAGCGACTAATAGATGTCGATATCGCGGTGATCACCGTC
M-02143	GATGCCCCATGGGCGATGCCCGTGGCGTAATAGGCGCCACCGGGATGTACGCCCGCCGC
M-04368	CTGACGGCGCTACAGCTGGCGCGAAATAATAATTTTGTGCGCCGCGAGCAGGCCATGG
M-00764	TTGAAGTATGCAAAGACGGAGAGAAGCTAATAGCGTTTTAATTTTTATGATTAGCGGCG
M-03613	ATGCAGCTCAACATTACAGGACACAATAATTACGCCTGCGATGCGCGAATTCGTT
M-01740	GCTGCCACACTGCTTACTCTTACACCATAATAGATACCGCGCTCATCTGCGCACGGCG
M-04320	GGCGCGGCGGCGTTCGATTGCCGTTTGTAAATAGGGCTGGCCATTCATATCGTGCTGGTT
M-04011	CAGGGCACTACCAGCTCCCGGGCCGTTTAATAGATCATGATGCCAATATCGTCAGCGTC
M-00904	ATTAACGGTTTGTGTTGACTGTCATCGCTAATAGTCCCGGTGCTGGCCATCGCCGCCAC
M-01695	GCACTGGGGCCTGGCGCCGCGCTGGATTAATAGATCAACAACAACGAAGTGAAGCCTG
M-02688	AGAGATCATTGCCAACTACCACGGAATAATAGGACGCGGAAGTGGTGCTGGTGAAGG
M-03018	CTTTATGCGCGATCATCTGAACGGAATAATAGGAAATTATCGACATTCGCCAATGGG
M-02792	AGCCCCTTCGCGCTGCGGCAGTTCGCCTAATAGGCGAACGTCTGCCGCTGACCGGGGTG
M-0030	GGCGGCCTGCTCTCCAATATCCCGGAGTAATAGGCTGGCGCTCACCGCCCTGGAGAGCC
M-03828	TTCAACGAGCAGGTGCGCTATGCCTGGTAATAGCGCGCTGCAGGATCTAAAAAGCACGC
M-01662	TTCGATGAGCTGCAGGGGATGAAGCGCTAATAGCGTTAGCGTTGGCATGGTGCAGGGCG
M-03762	CCGCCAGGCTCCGGGCAAATCACCACCTAATAGCAGCGATGTATCGGTAAACGATGCCA
M-02580	TCATTGACCTTTACCCAGGATCTGGAGTAATAGGACCGGCATACCGGACGCGGGCTTG
M-03260	ATGATGAAAGAGGGGCGGGGCGCAGCTAATAGCGGCGTAACCTTCTGTTTAGCAAAA
M-00395	CGCTACACGCGCCGTTTCTTGGGCGTTAATAGCGGCTGGCTGTTGACCACCCAGGTAT
M-02893	ATTGCAACCCTGGTGACGGGCGTTTTATAATAGCCTGGACAAGTTCATTTTTGCACCGA
M-03830	CGTAGCCTGCTGAAAACGAAGCAAAAATTAATAGTTCGGATTATCAGCCTGTTCCGCG
M-04434	GCGCATGCTGAAAAGCTTTGCGCACAGTAATAGCGTACGCCTGACTCCACAGCGTCTGG
M-04462	CGGCCGATCTTTGATATCGCCATGGATTAATAGCTACGTCTCGCAGCAAACCTTCTCCC
M-04463	TATGAGAGTAAAGGATTGATCCACAGTTAATAGGAATGCCGGCAATCAGCGGCGCTACC

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M-02788	CCGCTGTGGCTGGGCATCGATTTGGGCTAATAGCGACGTGGTGTGCGATGGTGGTTGACC
M-04285	GTGAACGTTGAGAACGAGCTGGATATTTAATAGGCTGTTTCGCGCTTTATGGGCAGGAA
M-04527	AAGGTGGCAGCCTGCGCTACGCTGCTGTAATAGAGCCACCTCTGTATTACTGGGAAG
M-03602	ATGAATGAAGCGGCGCAGAAAACCTTCTAATAGCCTGAAGAATGAACAGCCGAAGATTA
M-00254	TTTGCCGGGCTGCTGGTGGTGATGATTTAATAGTATGCTGGCCGAAATGGCGGTCGCCA
M-00986	AAACTGGGTTGGTCCCAGTATCACGACTAATAGTTTCTACGGTAACGGTTTCCAGAACA
M-00051	GGCAACTACCCGGACAACGCCGTCTTTAATAGCAACGTCGATATTAACCAGGGGAATA

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The underlined sequences indicate restriction sites. F, forward; R, reverse.