

1 **Supplemental figure captions:**

2 **Supplemental Figure S1.** Expression of pm133, pm1338 and pm1338gs4 in the engineered *B. subtilis* (BSUC1).

3 **Supplemental Figure S2.** Influence of pH and temperature on the production rate by the whole cell biocatalyst containing
4 pm133 (gray color bar), pm1338 (blue color bar) and pm1338gs4 (red color bar). **A.** influence of pH on the production rate; **B.**
5 influence of temperature on the production rate. Data were analyzed using the Student's t test. *P* values less than 0.05 were
6 considered statistically significant

7 **Supplemental Figure S3.** Influence of site-directed mutagenesis of the four amino acids (278, 317, 415 and 418) in the
8 pm133gs4 which are close to the active sites. **A.** Effect of site-directed mutagenesis of the amino acid at position 278 on the
9 activity. **B.** Effect of site-directed mutagenesis of the amino acid at position 317 on the activity. **C.** Effect of site-directed
10 mutagenesis of the amino acid at position 415 on the activity. **D.** Effect of site-directed mutagenesis of the amino acid at
11 position 418 on the activity.

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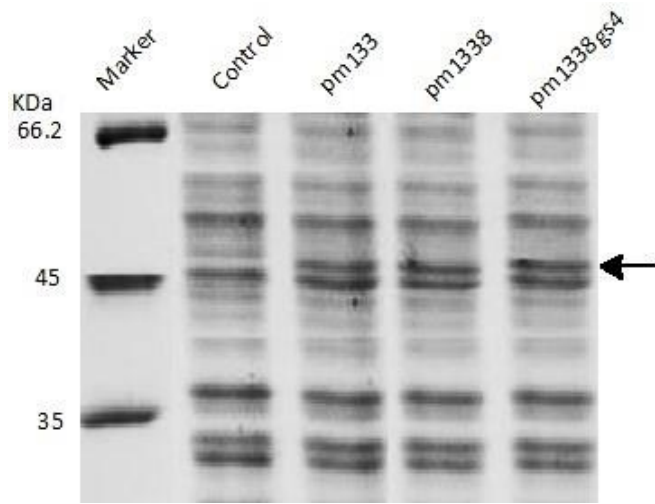
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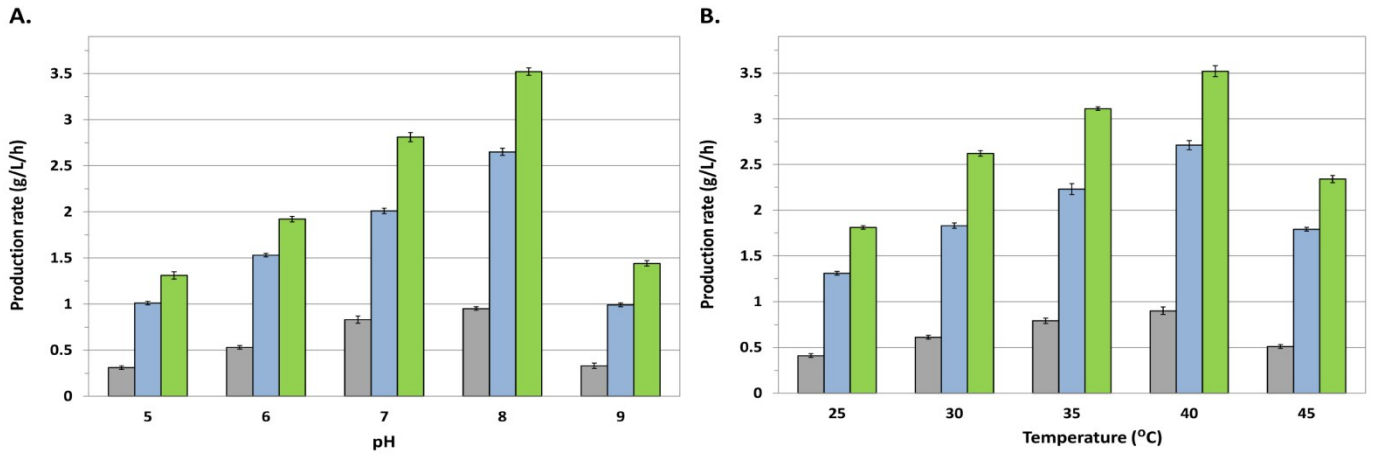
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Supplemental Figure S1

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Supplemental Figure S2

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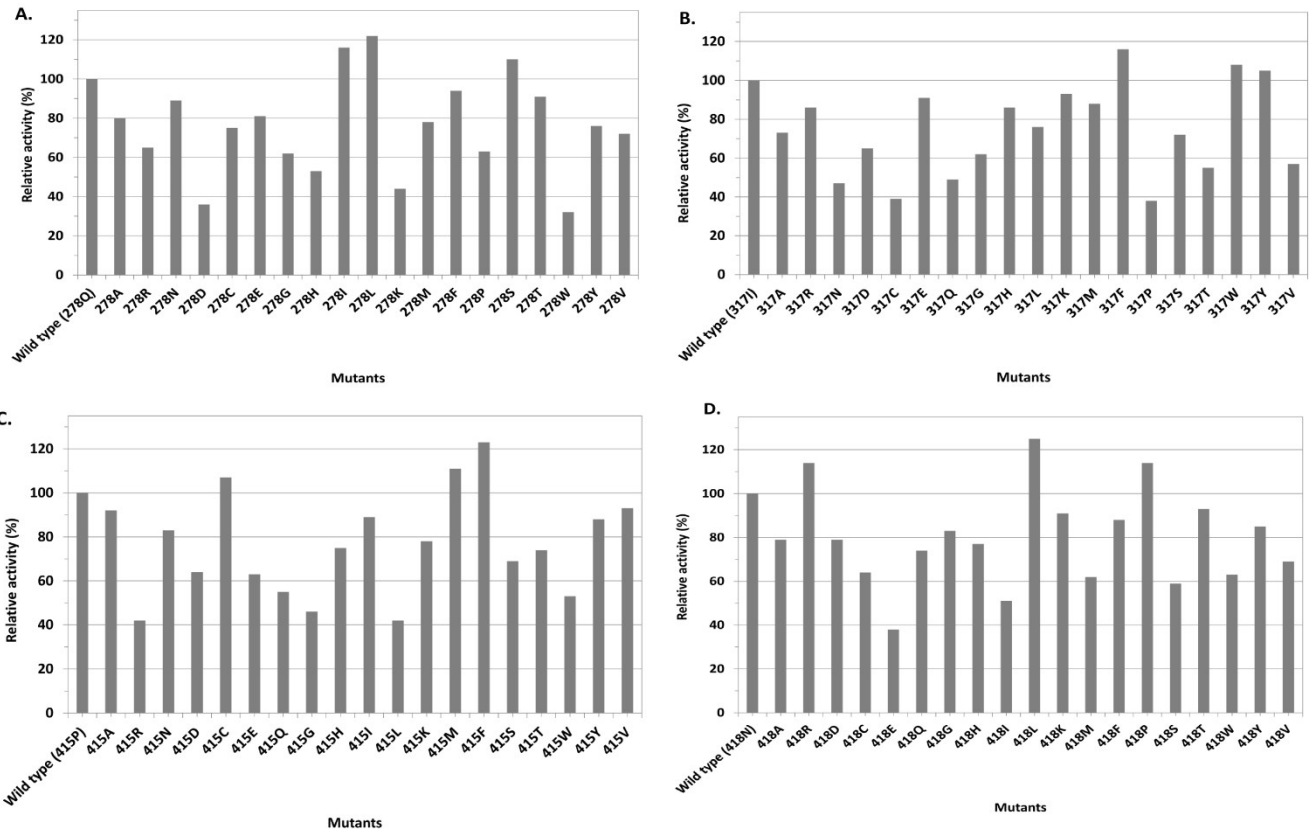
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Supplemental Figure S3