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Engineering of a thermostable tranketolase for larger substrate scope: focus on benzaldehyde derivatives

AUTHORS

Jules PERRARD / TU DARMSTADT, 4 ALARICH-WEISS STRASS, DARMSTADT
Mireia SALVADO PAU / BASF SE, CARL-BOSCH-STRASSE 38, LUDWIGSHAFEN AM RHEIN

PURPOSE OF THE ABSTRACT

Carbon-Carbon bond formation is one of the most attractive topics in organic synthesis. To overcome its limitations, the synthesis of C-C bonds using enzyme catalysis is a promising alternative, which can be achieved using a wide range of carboligases. For this purpose, we have further developed the thermostable transketolase from Geobacillus stearothermophilus (TKgst) as catalyst.

The wild-type TKgst has proven to be useful in the irreversible addition of a two-carbon moiety to an alpha-hydroxyaldehyde when hydroxypyruvate (HPA) is used as a donor substrate [1]. However, the range of acceptors that can be used is the bottleneck of such a reaction. We focused our efforts to enhance the ability of TKgst to accept aromatic substrates such as benzaldehyde and its derivatives (figure 1). Within this scope, two libraries of a single amino acid mutation located in the active site, F435 and L191, have been created and screened for activity.

This work would allow us to investigate the impact of these two residues on the catalytic activity of the enzyme. An in-depth activity and selectivity of the best mutants from these libraries is currently being further investigated.

FIGURES

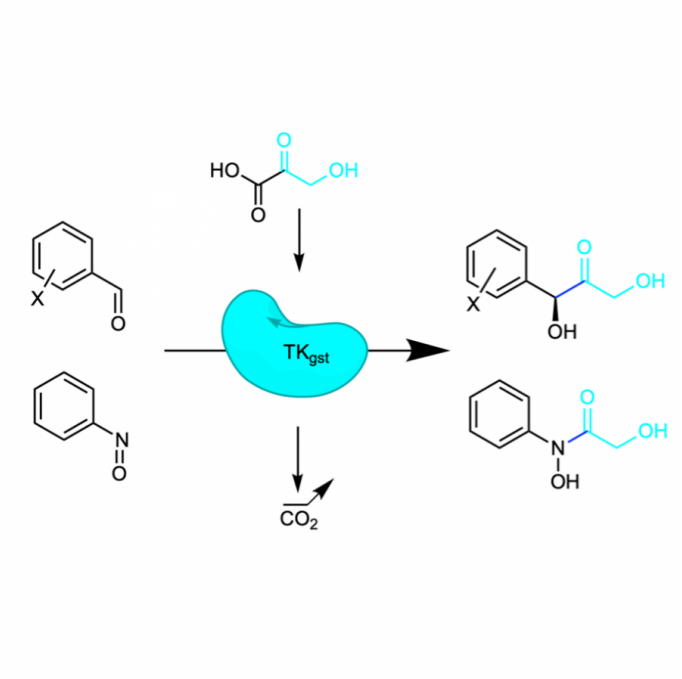

FIGURE 1

figure 1.

Irreversible reaction of TK towards benzaldehyde and analogs. X=NO2, Br, F, CO2H

FIGURE 2

KEYWORDS

Transketolase | Aromatics | Carboligation | Screening

BIBLIOGRAPHY

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