Industrial (poly)hydroxylate compounds by enzymatic catalysis

CSIC, Technische Universität Darmstadt and Sustainable Momentum SL have developed FSA enzyme variants with improved chemo- and enantioselectivity in aldol carboligation reactions (single C-C bond formation) rendering (poly)hydroxylate products of industrial interest, such as Roche ester or of 4-chloro-3-hydroxybutanal, under environmentally friendly conditions.

Industrial partners are being sought to collaborate through a patent licence agreement.

An offer for Patent Licensing and/or R+D collaboration

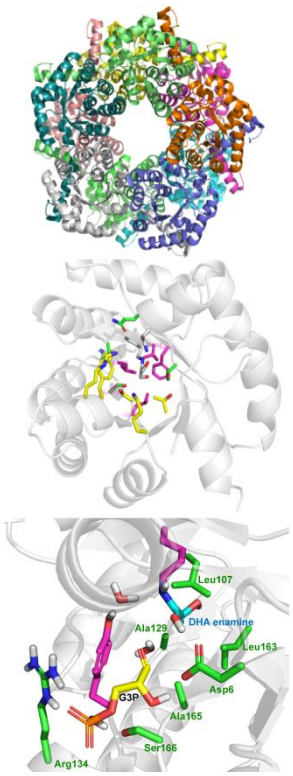
FSA variants for selective single aldol production

(Poly)hydroxylate compounds and other related building blocks are high added-value chemicals for the production of market-demanding pharmaceuticals and fine chemicals.

Development of catalysts to carry out chemoselective and stereocontrolled aldol carboligation reactions offers an important potential to improve chemical manufacturing of such compounds using inexpensive aldehydes as starting materials for processes that are in compliance with the concept and principles of Green Chemistry.

The new variants of fructose-6-phosphate aldolase from *E. coli* (FSA) were designed to show high catalytic activity for enantioselective aldol reactions and to enable production of single hydroxylate compounds, thereby avoiding typical byproduct formation and subsequent reactions that hamper current methodologies for industrial use.

These FSA variants efficiently catalyze single carboligations of a broad range of aldehydes and ketones. Particularly interesting for valuable industrial applications are the remarkable syntheses of the Roche ester or of 4-chloro-3-hydroxybutanal, two key building blocks used for the production of high market value compounds such as statins and other natural products and pharmaceutical compounds.



FSA *structure*

Main advantages and applications

- Exclusive selectivity for the designed single aldol addition, avoiding the formation of byproducts.
- FSA variants allowing large structural variety of nucleophilic and electrophilic components, especially simple aliphatic ketones and aldehydes.
- Capacity to obtain building blocks and products difficult to obtain by conventional chemical methods.
- High simplicity and adaptability, with room for on-demand optimization.

Patent Status

European patent application filed

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