

KGO: GO or NO GO in biocatalysis

Scientific assessment of the usability of KGO's for application in biocatalysis.

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Introduction

Biocatalystic enzymes can be obtained from renewable resources, are efficient, biodegradable and essentially non-hazardous. They can be a sustainable economic and environmental benefits. Amino acids are a important source in pharmaceutical industry.

This research aimed to evaluate which alpha-ketoglutarate-dependent oxygenases (KGO's) showed activity to any of the 10 different amino acids.

KGO's showing activity were further characterized to determine the formed product and its potential industrial relevance.



Materials and methods





Figure 2 overview of opproach. 1) cell lysis is initiated in order to gain access to target proteins and then 2) mixed with in substrate to form products over time. 4) reaction products are screened using TLC. 6) positive results from TLC are analysed using UPLC MS/MS.



Amino acid	KGO1	KGO4	KGO7	KGO8	KGO11	KGO18	KGO25	KGO27	KGO28	KGO30	KGO32	KGO34	KGO37	KGO40	KGO43	KGO44	KGO45	KGO47	KGO49	KGO50	empty
L-Leu																					С
L-Iso																					С
L-Ser																					С
L-Glut																					С
Phe																					C
L-Val																					С
L-Asp																					С
L-Ala																					С
L-Arg																					С

Figure 7. Results obtained through TLC analysis. Red: Negative; Green: Positive; Yellow: Possible modification.

Conclusion & Recommendations

- Multiple KGO's show activity to the provided amino acids.
- These data show the potential of KGO's for use in biocatalysis, specifically CH bond activation.
- KGO11 being the one with the highest enzymatic activity profile, thus modifying 99.5% of the amino acid L- leucine in an unidentified product.
- Characterization has to be further optimized for UPLC MS/MS.
- Mobile phases should be chosen based on polarity of the amino acids.

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