BIOTRANS
LA ROCHELLE 2023

N°1457 / PC
TOPIC(s) : (Chemo)enzymatic strategies / Industrial biocatalysis

Development of a heterogeneous biocatalyst for reduction of aliphatic nitro groups

AUTHORS

Tara LURSHAY / UNIVERSITY OF OXFORD, DEPARTMENT OF CHEMISTRY, OXFORD
Daria SOKOLOVA / DEPARTMENT OF CHEMISTRY, UNIVERSITY OF OXFORD, OXFORD
Tim SUDMEIER / DEPARTMENT OF CHEMISTRY, UNIVERSITY OF OXFORD, OXFORD
Jack ROWBOTHAM / DEPARTMENT OF CHEMSITRY, UNIVERISITY OF MANCHESTER, MANCHESTER
Sarah CLEARY / HYREGEN LTD., CIE, BEGBROKE SCIENCE PARK, OXFORD
Holly REEVE / HYDREGEN LTD., CIE, BEGBROKE SCIENCE PARK, OXFORD
Georgia STONADGE / DEPARTMENT OF CHEMISTRY, UNIVERSITY OF OXFORD, OXFORD
Kylie VINCENT / DEPARTMENT OF CHEMISTRY, UNIVERSITY OF OXFORD, OXFORD

PURPOSE OF THE ABSTRACT

Amines are valuable chemical moieties widely used in pharmaceutical synthesis, both as precursors and as drug molecules themselves. They are often produced by late-stage reduction of nitro groups during synthesis.[1] Currently used methods for the nitro reduction reaction usually require unsustainable platinum group metals (e.g., Pt, Pd, Rh) as well as high-intensity conditions including high temperature, pressure and organic solvents.[2] Other hetero- and homo-geneous catalysis methods have been extensively studied, but are not often suited to industrial-scale synthesis.[3]

In recent years biocatalysis has generated much interest as a highly efficient route for specific reactions under mild aqueous conditions.[4] The specificity of these reactions also improves atom economy, diminishing waste products from the reaction. During catalyst development, taking a modular approach to the catalyst allows the reaction to be broken-down into its individual components.[5] Current biocatalysts can be limited in substrate scope, and here we show tuning of the biocatalyst components in order to extend this to include a broader range of nitro substrates able to be hydrogenated under mild conditions.

FIGURES

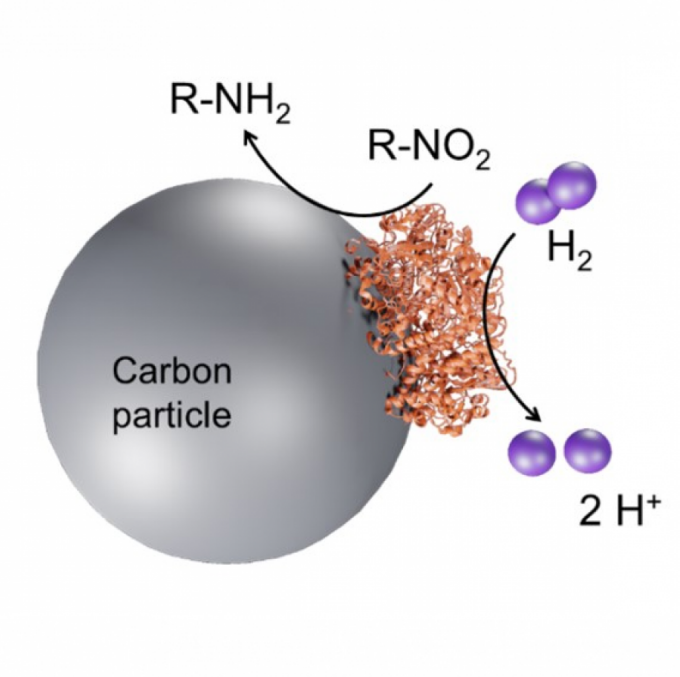

FIGURE 1

Figure 1

Schematic representation of a modular biocatalyst reducing R-NO2 to R-NH2 with H2 as atom-efficient reductant.

FIGURE 2

KEYWORDS

#biocatalysis | #nitro-reduction

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