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Switchable UPO biocatalysis by genetically encoded photosensitizers

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PURPOSE OF THE ABSTRACT

Unspecific peroxygenases (UPOs) can oxyfunctionalise a broad set of substrates only requiring hydrogen peroxide as a co-substrate. High turnover numbers, stabilities and excellent selectivities render UPOs exciting enzymes for C–H activations. Major challenges of UPOs – heterologous expression, regioselective transformations and haem-bleaching – were intensive subject to different research projects.[1] Herein we report on a new approach to avoid haem-bleaching and thus inactivation of the enzyme.

A fusion construct – photosensitizer, linker, UPO – was successfully designed and expressed in *Pichia Pastoris*. Photochemical as well as chemical optimisation followed and a broad substrate scope was screened. The PhotUPOs showed TONs in the range of a few thousand and ee-values above 99 %. This system adds an easy and switchable biophotocatalytic access to oxyfunctionalised C-H bonds.

FIGURES

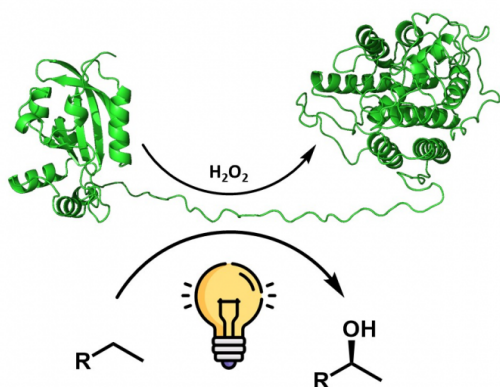


FIGURE 1

Figure 1: Principle of PhotUPO, utilizing a genetically encoded photosensitizer to fuel the UPO.

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FIGURE 2

KEYWORDS

BIBLIOGRAPHY