BIOTRANS
LA ROCHELLE 2023

N°247 / PC
TOPIC(s) : Enzyme discovery and engineering / Enzyme production, immobilization

Discovery and characterization of a novel Baeyer-Villiger monooxygenase using sequence similarity network analysis

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PURPOSE OF THE ABSTRACT
Baeyer-Villiger monooxygenases (BVMOs) are flavin binding and NAD(P)H-dependent enzymes performing oxygen insertion reactions leading to valuable products.[1] As has been previously reported in several studies, BVMOs are usually unstable during application, preventing their wider usage in biocatalysis.[2,3] Here, we discovered a novel NADPH-dependent BVMO which originates from Halopolyspora algeriensis and was discovered using sequence similarity networks (SSNs). The enzyme is stable over days and yields the normal ester product. The investigation of the substrate scope revieled acceptance of a broad range of aliphatic ketones. The enzyme was biochemically characterized to identify the optimum reaction conditions. The highest conversion (86%) was found in in vitro reactions with 2-dodecanone. This new BVMO could be applied in enzymatic cascades, to utilize aliphatic alkanes as a bioprocess feedstock.

FIGURES

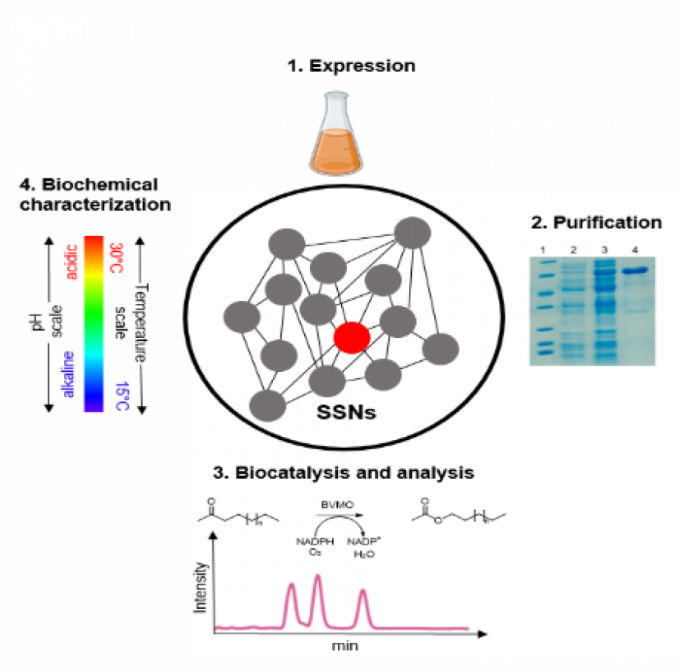

FIGURE 1

BVMO discovery and characterization.

Process of the sequence retrieving, heterologous expression and characterization of the BVMO originated from Halopolyspora algeriensis.

FIGURE 2

KEYWORDS

Baeyer-Villiger monooxygenase | Aliphatic ketones | Biocatalysis

BIBLIOGRAPHY

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