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Biocatalytic Aerobic Oxidations for the Synthesis of Pharmaceuticals

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PURPOSE OF THE ABSTRACT
Aerobic oxidations using biocatalysts offer a promising solution for addressing key challenges in the chemical industry, such as selective C-H functionalization and C-C or C=O bond formation, while improving atom economy, process safety, and reducing environmental impact. Despite their potential, the large-scale implementation of oxygen-dependent biotransformations is limited due to the need for extensive protein engineering and efficient oxygen delivery methods to achieve optimal reaction performance. In this talk, we will summarize recent developments in the discovery and engineering of oxygenases and oxidases, as well as their application in biocatalytic processes for manufacturing Belzutifan, Islatravir, and Molnupiravir. We will highlight the challenges associated with enzyme-catalyzed oxidations and the strategies employed to overcome them. Our work expands the scope of biocatalytic aerobic oxidations and highlights their potential for sustainable and efficient chemical synthesis.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

Biocatalysis | Hydroxylation | Oxygenases | Oxidases

BIBLIOGRAPHY