# Baeyer-villiger monooxygenases tunable oxidative biocatalysts

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**Abstract**

Pollution, accidents, and misinformation have earned the pharmaceutical and chemical industry a poor public reputation, despite their undisputable importance to society. Biotechnological advances hold the promise to enable a future of drastically reduced environmental impact and rigorously more efficient production routes at the same time. This is exemplified in the Baeyer–Villiger reaction, which offers a simple synthetic route to oxidize ketones to esters, but application is hampered by the requirement of hazardous and dangerous reagents. As an attractive alternative, flavin-containing Baeyer–Villiger monooxygenases (BVMOs) have been investigated for their potential as biocatalysts for a long time, and many variants have been characterized. After a general look at the state of biotechnology, we here summarize the literature on biochemical characterizations, mechanistic and structural investigations, as well as enzyme engineering efforts in BVMOs. With a focus on recent developments, we critically outline the advances toward tuning these enzymes suitable for industrial applications.

**Keywords**

Baeyer−Villiger, Ketone oxidation, Peroxyflavin, Cyclohexanone monooxygenase, Phenylacetone monooxygenase, Biocatalysis, Protein engineering