Microbial Baeyer-Villiger oxidation of steroidal ketones using *Beauveria bassiana*: presence of an 11α-hydroxyl group essential to generation of D-homo lactones.

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Streszczenie

This paper demonstrates for the first time transformation of a series of 17-oxo steroidal substrates (epiandrosterone, dehydroepiandrosterone, androstenedione) by the most frequently used whole cell biocatalyst, *Beauveria bassiana*, to 11α-hydroxy-17a-oxa-d-homo-androst-17-one products, in the following sequence of reactions: 11α-hydroxylation and subsequent Baeyer–Villiger oxidation to a ring-D lactone. 11α-Hydroxyprogesterone, the product of the first stage of the progesterone metabolism, was further converted along two routes: hydroxylation to 6β,11α-dihydroxyprogesterone or 17β-acetyl chain degradation leading to 11α-hydroxytestosterone, the main metabolite of the substrate. Part of 11α-hydroxytestosterone underwent a rare reduction to 11α-hydroxy-5β-dihydrotestosterone. The experiments have demonstrated that the Baeyer–Villiger monooxygenase produced by the strain catalyzes solely oxidation of C-20 or C-17 ketones with 11α-hydroxyl group. 17-Oxo steroids, beside the 11α-hydroxylation and Baeyer–Villiger oxidation, also underwent reduction to 17β-alcohols; activity of 17β-hydroxysteroid dehydrogenase (17β-HSD) has significant impact on the amount of the formed ring-D δ-lactone.

Słowa kluczowe

Steroid biotransformation, Steroidal lactone, Microbial Baeyer–Villiger oxidation, Beauveria bassiana, 17β-hydroxysteroid dehydrogenase

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