

Chalcone-Derived Lactones: Synthesis, Whole-Cell Biotransformation, and Evaluation of Their Antibacterial and Antifungal Activity

Autorzy

Witold Gładkowski

Monika Siepka

Barbara Żarowska

Agata Białońska

Barbara Gawdzik

Mariusz Urbaniak

Czesław Wawrzeńczyk

Rok wydania

2023

Czasopismo

Molecules

Numer woluminu

28

Strony

3800/1-3800/18

DOI

10.3390/molecules28093800

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Four compounds with lactone moiety were synthesized from chalcone **1** in three- or four-step synthesis. γ -Bromo- δ -lactone **5** was the only product of bromolactonization of acid **4** whereas bromolactonization of ester **3**, apart from lactone **5** also afforded its isomer **6** and two diastereoisomeric δ -hydroxy- γ -lactones **7** and **8**. Lactone **8** was also obtained in 88% yield as a product of simultaneous dehalogenation and translactonization of γ -bromo- δ -lactone **5** by *Penicillium frequentans* AM 359. Chalcone-derived lactones **5–8** were subjected to the tests on antimicrobial activity and the results compared with activity of starting chalcone **1**. Obtained lactones **5–8** in most cases limited the growth of tested bacterial and fungal strains. The highest activity was found for δ -hydroxy- γ -lactone **8** which completely inhibited the growth of *Staphylococcus aureus*, *Fusarium graminearum*, *Aspergillus niger*, and *Alternaria* sp. The introduction of lactone moiety into chalcone scaffold significantly improved antimicrobial activity of the compound: γ -bromo- δ -lactone **6** and δ -hydroxy- γ -lactone **8** were significantly stronger growth inhibitors of *S. aureus* and *F. graminearum*. In the case of the latter, a clear positive effect of the lactone function on the antifungal activity was also observed for γ -bromo- δ -lactone **5**.

Słowa kluczowe

chalcone, bromolactonization, hydroxylactones, microbial dehalogenation, translactonization, antibacterial activity, antifungal activity

CC-BY

Licencja na prawach której można swobodnie kopiować, rozprowadzać, zmieniać i remiksować objęty prawem autorskim utwór (Utwór-przedmiot prawa autorskiego) pod warunkiem podania imienia i nazwiska autora utworu pierwotnego oraz źródła pochodzenia utworu.

Pełny tekst licencji:

<https://creativecommons.org/licenses/by/3.0/pl/legalcode>

Adres publiczny

<http://dx.doi.org/10.3390/molecules28093800>

Strona internetowa wydawcy

<http://www.mdpi.com/journal/metals>