Host nutrition-based approach for biotechnological production of the antifungal cyclic lipopeptide jagaricin.

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ILRS Authors

Nicolas Schlosser

Projects

Bioprocess development for cyclic lipopeptide production
Details

Abstract

In today's, society multi-resistant pathogens have become an emerging threat, which makes the search for novel anti-infectives more urgent than ever. A promising class of substances are cyclic lipopeptides like the antifungal jagaricin. Jagaricin is formed by the bacterial mushroom pathogen Janthinobacterium agaricidamnosum. It has shown antifungal activity against human pathogenic fungi like Candida albicans and Aspergillus fumigatus. In addition, jagaricin is nearly non-toxic for plants, which makes it a promising agent for agricultural applications. Cyclic lipopeptides formed by microorganisms originate from their secondary metabolism. This makes it very challenging to determine the inducing factor for product formation, especially for unknown microbial systems like J. agaricidamnosum. In the presented study, a biotechnological process for jagaricin formation was developed, investigating impact factors like the medium, oxygen availability, and phosphate. For this reason, experiments were conducted on microtiter plate, shake flask, and stirred tank bioreactor level. Ultimately, a final maximum jagaricin concentration of 251 mg L-1 (15.5 mgJagaricin•gCDW-1) could be achieved, which is an increase of approximately 458 % in comparison to previous results in standard glucose medium. This concentration allows the production of significantly higher amounts of jagaricin and enables further experiments to investigate the potential of this substance.

Identifier

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