One-step tetrazole N-*glycosylation catalysed by filamentous fungal biofilm*

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Palavras Chave: *Biotransformation, tetrazoles,* N-*glycosylation*

Abstract

Microbial glycosylation are an alternative to classical organic synthesis, replacing unfriendly reaction conditions.

Introduction

Glycosylation are one the most important and commom molecular modification processes and comprise the glycosidic bond forming by transfer of a sugar moiety from a donor substrate to the starting compounds, giving rise to glycoconjugates[1]. Nowadays, new methods for the synthesis of glycosides have been required, in especial *N*-glycosides, due to the important role they play in carbohydrate chemistry[2.] Classical organic synthesis of these conjugates is feasible, but requires, invariably, protected sugar units, protecting groups, strictly anhydrous conditions, toxic and pollutant glycosylation promoters, making them environmental unfriendly[3,4]. The use of biocatalysts is a favorable strategy to glycosylation. Filamentous fungi are able to glycosylate exogenous substrates with their own enzymatic arsenal. Microbial glycosylation present high selectivity, simplicity, mild reaction conditions and in fewer steps[5]. Biofilms can be produced from cell immobilization, which is physical entrapment of intact cells of viable microorganisms in a region or defined surface, where their catalytic properties are preserved[6]. Higher throughput, flexibility in matrix design, easy extraction, reuse of cells and enzymatic activities more expressive are advantages associated with this strategy[7]. We present here results of production and characterization of filamentous fungal biofilm and their use in obtaining tetrazol *N*-glycoside.

Results and Discussion

One tetrazole *N*-glycoside was obtained from the biotransformation of the compound LQFM 021, synthesized in Laboratório de Química Farmacêutica Medicinal, Faculdade de Farmácia, Universidade Federal de Goiás - UFG, with biofilms of *Cunninghamella echinulata* ATTC 9244, in one-step reaction, under mild conditions (Figure 1). The derivative was identified by HPLC and characterized by ^{1}H NMR and MS. Biofilms were obtained from immobilization in stainless steel springs and incubation with PDSM liquid medium culture. Their characterization was performed by Scanning Electron Microscopy (SEM) (Figure 2), presenting large surface area and mechanical, chemical, thermal and biological stabilities. They have been also reusable and facilitated the extraction process.

Figure 1. Scheme of obtaining *N*-glycoside from the biotransformation of LQFM 021

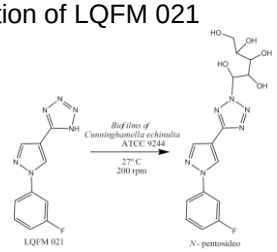
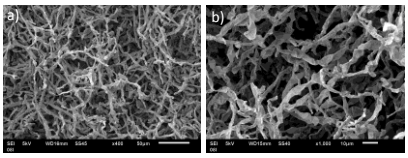


Figure 2. Biofilms of *Cunninghamella echinulata* ATCC 9245 (SEMx400); b) Biofilms of *Cunninghamella echinulata* ATCC 9245 (SEMx1000)



Conclusion

Biofilms of *Cunninghamella echinulata* ATCC 9245, which were identified and characterized, were able to catalyze tetrazole LQFM 021 *N*-glycosylation.

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