Antioxidant activity of new Morin derivatives obtained by filamentous fungi biotransformation

Kamila B. Japiassu[1] (IC), Evilanna L. Arruda[1] (PG), Eric de Souza Gil[2] (PQ), Valéria de Oliveira[1]* (PQ)

[1] Universidade Federal de Goiás

*valeriaoliveira@ufg.br

[1,2] Laboratório de Bioconversão - LaBiocon e Laboratório de Análises Farmacêuticas e Ambientais - LAFAm - Faculdade de Farmácia, Rua 240, equina com 5° Avenida , s/n, Setor Leste Universitário - CEP 74605-170 - Goiânia - Goiás

Palavras Chave: *Biotransformation, Filamentous fungi, Antioxidant activity, Morin.*

Abstract

This paper presents the antioxidant activity of morin and its derivatives obtained by biotransformation.

Introduction

The application of microorganisms is a interesting strategy for functionalization of natural and synthetic products[1]. The biotransformation with filamentous fungi in the production of new bioactive compounds is presented as a promising and environmental friendly tool[2]. Antioxidant molecules can be characterized by their ability to slow or prevent oxidative damage, which main function is the lock of the oxidation reactions, providing protection to the membranes and other cell parts[3]. Studies indicate morin is an antioxidant that can protect various human cells, such as myocytes, endothelial cells and hepatocytes, against oxiradicals generated *in situ* [4]. The aim of this study is to produce novel morin derivatives by biotransformation with filamentous fungi and evaluate the antioxidant activity of morin and of these compounds. For this, different genres of filamentous fungi (*Aspergillus sp, Beauveria sp*, *Cuninghamella sp*, *Cylindrocarpus sp*, *Fusarium sp*, *Mucor sp*, *Rhizopus sp* and *Absídia sp*) of LaBiocon collection were used as catalysts of reaction of biotransformation.

Results and Discussion

Figure 1. Scheme of formation of Morin derivates

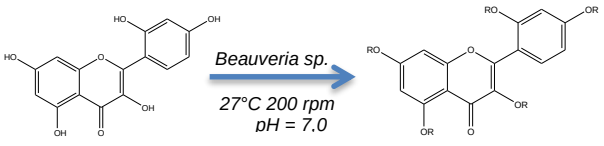
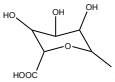
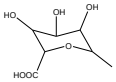


Figure 1: R_1 =  , SO_3H or H; R_2 =  , CH_3 or H.

Two products were obtained, characterized by RMN H^1 and MS (*m/z* = 559,02 ($[MH]^+$) and *m/z* = 493,28 ($[MH]^+$). RMN ^1H-^{13}C HMBC/HSQC analyzes will be performed in order to determine the exact position of the methyl, sulfate and glucuronide groups.

Figure 2. Voltammogram of differential pulse

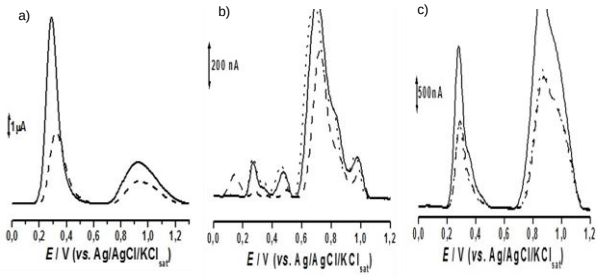


Figure 2: Differential pulse Voltammograms of a) Morin; b) Derivative 1; c) Derivative 2, obtained in 1 ml of 0.1 M phosphate buffer solution (pH 6.0) for 150 ml of the sample solution, first scan (straight line), second scan (the dotted line), third run (dashed line): pulse amplitude of 50 mV for 0.4 s pulse width, and scan rate of 5 mV/s.

Voltammograms show derivatives which continue to present antioxidant activity, because of positive inductive effect of CH_3 increases electronic density and helps lower the oxidation potential, and the glucuronide increases solubility and can, thus, promote diffusion and kinetic. Furthermore, it is polar and suffer less adsorption.

Conclusions

Electrochemical tests show good antioxidant activity towards the substrate and their derivatives. From the nine strains used for screening,the genus of *Beauveria sp* was selected as the best catalyst for the reaction. It was possible to obtain two products.

Acknowledgment

CNPq – PIBIC

[1] Leresche, J. E., Meyer, H. P. *Org. Process Res. Dev.*, **2006**, 10, 572-580.

[2] Xim, X. L. *J. Mol. Catal. B: Enzym*., **2015**, 122, p. 141-146.

[3] Cusack, K. P. *Bioorg. Med. Chem. Lett*., **2013,** 23, 5471-83.

[4] Lee, Y. S.; Baek, N.; Nam, T. *J. Enzym Inhib*., **2015,** 16, 1-13.