A novel screening method for potential naringinase-producing microorganisms

Satish V. Patil [1,2*]
Sunil H. Koli [1]
Bhavana V. Mohite [1]
Rahul P. Patil [4]
Rohini R. Patil [1]
Hemant P. Borase [3]
Vikas S. Patil [4]

[1] School of Life Sciences, Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon, Maharashtra, India

[2] North Maharashtra Microbial Culture Collection Centre (NMCC), Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon, Maharashtra, India

[3] C. G. Bhakta Institute of Biotechnology, Uka Tarsadia University, Surat, Gujarat, India

[4] University Institute of Chemical Technology, Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon, Maharashtra, India

Abstract

Naringinase has high industrial importance, and the progress in naringinase research is still quite slow. The unavailability of an effective, simple screening method, which will be applicable to different microorganisms such as bacteria, fungi, and actinomycetes, is one of the main reasons for this gap. Therefore, a simple plate assay was developed for effective screening of microorganisms for naringinase by exposing to iodine vapors. This plate assay will fill the technological void for simple screening method and will lead to screen more potent industrially important naringinase-producing microorganisms. © 2019 International Union of Biochemistry and Molecular Biology, Inc. Volume 66, Number 3, Pages 323–327, 2019

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1. Introduction

Citrus fruits and their contents are widely used for medicinal purposes such as antioxidant agents, anti-kidney stones and gall formation, and anti-genotoxic effects [1]. The citrus fruits and peels have flavanone glycoside known as "naringin"; it is one of the major components to determine the bitterness of citrus fruit juice [2]. The debittering of citrus juice has already reported by effective use of enzyme known as "naringinase" [3].

Naringinase is the hydrolytic enzyme chemically known as an α-rhamnopyranosidase, expressed as α-L-rhamnosidase (E.C. 3.2.1.40) and β-D-glucosidase (E.C. 3.2.1.21) [4]. Naringinase is an important ingredient to the food processing industry and also a choice of the enzyme in the pharmaceutical sector for steroid biotransformation, and deglycosylation of glycopeptide antibiotics, flavonoids, or glycolipids [5]. Glycoside compounds such as naringin, hesperidin, ter-phenyl glycosides, rutin, quercitrin, diosmin, and with terminal α-rhamnose and β-glucose are the substrates of naringinase. A citrus fruit flavonoid naringin (4′,5,7′-trihydroxyflavonone 7-rhamnoglucoside) is hydrolyzed by naringinase to rhamnose and prunin (trihydroxyflavonone-7-glucoside) and further hydrolyzed into glucose and naringenin (4′,5,7′-trihydronyflavonone).

Naringinase also has high commercial importance due to medicinal properties such as improvement of the signaling pathway, anti-inflammatory, anticancer by inhibition of proliferation and promotion of cell apoptosis in tumor cells like breast cancer (TNBC) cells, human cervical cancer (SiHa) cells, bladder cancer cells, and also against liver diseases [6–8]. The

*Address for correspondence: Satish V. Patil, PhD, School of Life Sciences, Kavayitri Bahinabai Chaudhari North Maharashtra University, Post Box 80, Jalgaon 425001, Maharashtra, India. Tel.: 0257-2257421; Fax: +91-257-2258403; e-mail: satish.patil7@gmail.com.

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