

Northumbria Research Link

Citation: Butterworth, Lynne, Perry, John, Burton, M., Davies, Gideon, Reed, Robert and Gould, Frances Kate (2003) Evaluation of novel β -ribosidase substrates for the differentiation of Gram-negative bacteria. *Journal of Applied Microbiology*, 96 (1). pp. 170-176. ISSN 1364-5072

Published by: Wiley-Blackwell

URL: <http://dx.doi.org/10.1046/j.1365-2672.2003.02130.x>
<<http://dx.doi.org/10.1046/j.1365-2672.2003.02130.x>>

This version was downloaded from Northumbria Research Link:
<https://nrl.northumbria.ac.uk/id/eprint/1576/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)

Evaluation of novel *&bgr;-*ribosidase substrates for the differentiation of Gram-negative bacteria

Butterworth, L.A. - Perry, J.D. - Davies, G. - Burton, M. - Reed, R.H. - Gould, F.K.

Abstract

To synthesize novel substrates for the detection of *&bgr;-*ribosidase and assess their potential for the differentiation of Gram-negative bacteria.

Two novel chromogenic substrates, 3',4'-dihydroxyflavone-4'-*&bgr;-*D-ribofuranoside (DHF-riboside) and 5-bromo-4-chloro-3-indolyl-*&bgr;-*D-ribofuranoside (X-riboside) were evaluated along with a known fluorogenic substrate, 4-methylumbelliferyl-*&bgr;-*D-ribofuranoside (4MU-riboside). A total of 543 Gram-negative bacilli were cultured on media containing either DHF-riboside or X-riboside. Hydrolysis of DHF-riboside or X-riboside resulted in the formation of clearly distinguishable black or blue-green colonies, respectively. Hydrolysis of 4MU-riboside was evaluated in a liquid medium in microtiter trays and yielded blue fluorescence on hydrolysis which was measured using fluorimetry. *&bgr;-*Ribosidase activity was widespread with 75% of strains, including 85.6% of Enterobacteriaceae, showing activity with at least one substrate. Genera that demonstrated *&bgr;-*ribosidase activity included *Aeromonas*, *Citrobacter*, *Enterobacter*, *Escherichia*, *Hafnia*, *Klebsiella*, *Morganella*, *Providencia*, *Pseudomonas*, *Salmonella* and *Shigella*. In contrast, strains of *Proteus* spp., *Acinetobacter* spp., *Yersinia enterocolitica*, *Vibrio cholerae* and *Vibrio parahaemolyticus* generally failed to demonstrate *&bgr;-*ribosidase activity.

The novel substrates DHF-riboside and X-riboside are effective for the detection of *&bgr;-*ribosidase in agar-based media and may be useful for the differentiation and identification of Gram-negative bacteria.

This is the first report describing the application and utility of chromogenic substrates for *&bgr;-*ribosidase. These substrates could be applied in chromogenic media for differentiation of Gram-negative bacteria.

