10th International Conference

mikrobio kosmos

FEMS

ΜΙΚΡΟ BIO ΚΟΣΜΟΣ

Divani Palace Larissa
Larissa, Greece

AFEA Travel and Congress Services
www.afea.gr

FunShield4Med
SECURING FOOD

This project has received funding from the European Union's Horizon Europe Research and Innovation Programme under Grant Agreement No 101079173

ABSTRACT BOOK

10th International Conference
mikrobio kosmos
All microbes for a sustainable future
Divani Palace Larissa
Larissa Greece
NEW DATES 30 Nov | 02 Dec 2023

PP090

BIOTECHNOLOGICAL PRODUCTION OF BACTERIAL PIGMENT PRODIGIOSIN AND BIOACTIVE PROPERTIES OF ITS METAL COMPLEXES WITH Cu(II) AND Zn(II)

Jelena Lazic[1], Jelena Milovanovic[1], Tina P. Anejević[2], Darko P. Ašanin[3], Tatjana Ilic-Tomic[1], Biljana Đ. Glišić[2], Jasmina Nikodinovic-Runic[1]

1Institute of Molecular Genetics and Genetic Engineering, University of Belgrade, Belgrade, Serbia, 2University of Kragujevac, Faculty of Science, Department of Chemistry, Kragujevac, Serbia, 3University of Kragujevac, Institute for Information Technologies Kragujevac, Kragujevac, Serbia

Prodigiosin (PG, Fig. 1a) is a biologically active pyrrolylpyrromethene alkaloid whose structure was first confirmed in 1962 [1]. PG is commonly produced by Gram-negative bacteria, such as Serratia spp. and has an eco-physiological role [2]. Its biological activities were extensively researched, and numerous pharmacological properties were established, including anticancer and immunosuppressive [3].

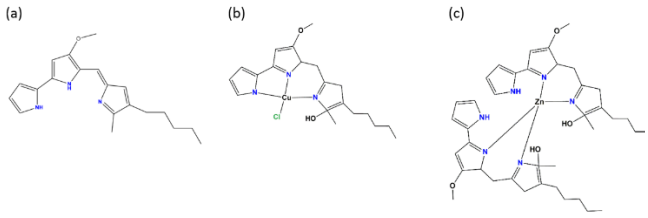

Fig. 1. (a) Structure of prodigiosin (PG) and its metal complexes (b) [Cu(PG)Cl] and (c) [$Zn(PG)_2$].

However, high cost of extraction and purification still represent the bottleneck in the microbial production of PG. Meat and fish processing wastes have high potential as raw materials for conversion into useful products of higher value. In this study, meat offcuts were assessed as the sole nutrient for the fermentative production of PG from S. marcescens. Using this substrate lowered the cultivation medium cost and shortened the fermentation time to 12 h, while allowing a satisfying PG yield of 83.1 mg/L. The isolated PG was used in one-step reactions with $CuCl_2$ or $ZnCl_2$ in terc-BuOH at 25 °C. The obtained [Cu(PG)Cl] (Fig. 1b) and [$Zn(PG)_2$] (Fig. 1c) complexes were characterized by UV-Vis and IR spectroscopy and their bioactivity potential was assessed.

Antimicrobial activity was assessed in a disc assay against 4 human pathogens: Escherichia coli NCTC 9001, Pseudomonas aeruginosa ATCC 10332, Staphylococcus aureus NCTC 6571, Candida albicans ATCC 10231, but no effect was observed for the tested concentrations of 200 µg per disc and lower. However, the anticancer potential of the new derivatives is promising and the bovine serum albumin (BSA) binding study revealed that complexes bind to BSA tightly and reversibly [4].

References:
[1] Nat. Rev. Microbiol. 2006, 4, 887-899.
[2] Molecules 2010, 15 (10), 6931-6940.
[3] J. Basic Microbiol. 2021, 61 (6), 506-523.
[4] RSC Advances 2023, under review.

Acknowledgements:
This research was funded by the Science Fund of the Republic of Serbia, IDEAS, 7730810, BioECOLogics.