

Abstract

DNA/BSA binding affinity of pyocyanin produced by *Pseudomonas aeruginosa* †

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† Presented at the 9th International Electronic Conference on Medicinal Chemistry, 1–30 November 2023;

Available online: <https://ecmc2023.sciforum.net/>.

Abstract: Pyocyanin (PYO) is a green blue pigment that is produced extracellularly by the Gram-negative bacteria *Pseudomonas aeruginosa*. Its color depends on pH value. It exists in blue zwitterion form at neutral and alkaline conditions, while in an acidic environment, it becomes pink after protonation. PYO has shown the antibacterial activity, as well as the ability to inhibit the growth of fungi like *Aspergillus fumigatus* and *Candida albicans*. Moreover, it shows the high cytotoxic effect against the human pancreatic cancer cells by inducing their apoptosis. To evaluate the possible mechanism of antimicrobial activity of PYO, in the present study, we have investigated its interactions with calf thymus DNA (ct-DNA) and bovine serum albumin (BSA) by fluorescence emission spectroscopy. The obtained value of binding constant to BSA is relatively high ($K_A = 5.3 \times 10^6 \text{ M}^{-1}\text{s}^{-1}$), showing the ability of PYO to bind to this transport protein. We have also used synchronous fluorescence spectroscopy to explore the structural changes in BSA in the presence of the studied biopigment. In contrast with the mentioned results for binding to BSA, PYO has shown a low affinity to ct-DNA, what can be seen from the value of its binding constant ($K_A = 7.8 \times 10^3 \text{ M}^{-1}\text{s}^{-1}$).

Keywords: BSA interaction; DNA interaction; fluorescence emission spectroscopy; pyocyanin

Citation: Andrejević, T.P.; Ašanin, D.P.; Pantelic, L.; Pantović, B.V.; Nikodinovic-Runic, J.; Glišić, B.Đ.

DNA/BSA binding affinity of pyocyanin produced by *Pseudomonas aeruginosa*. *Med. Sci. Forum* **2023**, *2*, x. <https://doi.org/10.3390/xxxxx>

Academic Editor: Firstname Lastname

Published: date

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Supplementary Materials:

Author Contributions: Conceptualization, T.P.A.; J.N.-R. and B.Đ.G.; methodology, T.P.A. and B.V.P.; validation, J.N.-R., D.P.A. and B.Đ.G.; formal analysis, T.P.A. and D.P.A.; investigation, T.P.A.; resources, D.P.A.; J.N.-R. and B.Đ.G.; writing—original draft preparation, T.P.A.; D.P.A. and B.V.P.; writing—review and editing, J.N.-R. and B.Đ.G.; visualization, T.P.A. and B.V.P.; project administration, D.P.A.; J.N.-R. and B.Đ.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research was supported by the Science Fund of the Republic of Serbia, Grant No. 7730810, Value-added biologics through eco-sustainable routes – BioECOLOGics. This research has also received funding from the Ministry of Science, Technological Development and Innovation of

the Republic of Serbia (Agreements No. 451-03-47/2023-01/200042, 451-03-47/2023-01/200122 and 451-03-47/2023-01/200378). 1
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Institutional Review Board Statement: Not applicable. 3

Informed Consent Statement: Not applicable. 4

Data Availability Statement: The spectroscopic data used to support the findings of this study are available on request from the corresponding author. 5
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Conflicts of Interest: The authors declare no conflict of interest. 7
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