Brief Report
Volume 9:2, 2023

Journal of Pharmacognosy & Natural Products

ISSN: 2472-0992 Open Access

A Brief Report on Anthraquinones and its Derivatives

Tankiso Sello*

Department of Pharmacy, National University of Lesotho, Roma, Lesotho

Introduction

Due to their enormous potential to produce bioactive chemicals, marine organisms were the focus of researchers' attention. Their microbes, which appear to be prolific producers of numerous secondary metabolites, increasingly assumed an important role. Because they are grown in bioreactors and can be easily "upscaled," they do not pose a threat to fragile marine habitats. Fungi, which enjoyed their heyday on land following the discovery of penicillin, are once again at the forefront of the search for novel marine molecules due to their tremendous variety, including in deep-sea settings.

Out of the approximately 70,000 fungal species that have already been described worldwide, approximately 1500 species of fungi with marine origins have been reported, mostly from coastal habitats. There are at least 72,000 marine and fungal species, which suggests that the identification of novel chemicals is still in its infancy given that 70% of the world is underwater. Numerous novel and effective marine-derived fungal metabolites have been demonstrated [1,2].

Description

Numerous studies indicate that among marine natural products of fungal origin, polyketides predominate. Polyketides make up a large portion of the biosynthetically produced extrolites that are produced by filamentous fungi. Polyketides include a variety of natural compounds that are frequently structurally complex in addition to the classes of anthraquinones, hydroxyanthraquinones, naphthalenes, naphthoquinones, flavonoids, macrolides, polyenes, tetracyclines, and tropolones. Antibacterial, anticancer, antioxidant, immunomodulatory, cytotoxic, or carcinogenic effects, among many others, have already been demonstrated by many of them. This specifically pertains to the group of anthraquinones, whose effects on living things can vary based on the type and quantity of their components.

Despite having received little research due to their negative reputation, which is largely due to their benzenic patterns (azaphilone colorants from Monascus spp.) these compounds are deserving of the same attention as other families of fungal compounds, whose members have become pillars of the global pharmacopoeia (antibiotics). in Asia The anthraquinonoid chemicals produced by a marine-derived filamentous fungus are the focus of our investigation in this study. The panel of colors, their known roles in organism biology, and a few specific in vitro biological activities are just a few of the intriguing details included in this summary, which focuses on the newly discovered compounds. Given that natural products are an important part of the global market right now.

Anthraquinones are a class of molecules in the quinone family that have a structure made up of three benzene rings. On the central ring of 9,10-anthracenedione, also known as 9,10-dioxoanthracene (formula $C_{14}H_8O_2$), there are two ketone groups. The variety of anthraquinoid compounds is determined by the type and location of the substituents that replace the H atoms on the fundamental structure (R1 to R8). These substituents can be as diverse as -OH, $-CH_3$, $-OCH_3$, $-CH_2OH$, -CHO, or -COOH, or more complex groups. When n hydrogen atoms are replaced by hydroxyl groups, the chemical is called hydroxyanthraquinone (HAQN). Due to their structure, HAQN derivatives are colored and absorb visible light.

An important feature of anthraquinone compounds is their electronic absorption spectra. The significant UV absorption is caused by the existence of a chromophore formed by a system of conjugated double bonds. The spectra of anthraquinone are extremely complex due to the presence of quinonoid and benzenoid transitional absorption bands. The quinonoid bands absorb between 260 and 290 nm, while the benzenoid bands frequently appear between 240 and 260 nm, with severe absorption between 250 and 320 and 330 nm and medium absorption between 322 and 320 nm [3-5].

Conclusion

Anthraquinones are produced by numerous steps or branches of the polyketides pathway in fungi. In terms of secondary metabolites and a priori anthraquinoid biosynthesis, it is now obvious that there is significant variation among species of the same genus and even within species. This may have something to do with the skills that fungi need to learn to adapt to certain conditions in particular environments. For instance, even when P. funiculosum strains isolated from a variety of soils are grown in the same artificial culture medium, the composition of their quinoid pigment complexes varies significantly. Even when a strain describes the polyketides route, not all strains within a species produce anthraquinones.

Acknowledgement

None.

Conflict of Interest

The authors declare that there is no conflict of interest associated with this manuscript.

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How to cite this article: Sello, Tankiso. "A Brief Report on Anthraquinones and its Derivatives." *J Pharmacogn Nat Prod* 9 (2023): 233.

***Address for Correspondence:** Tankiso Sello, Department of Pharmacy, National University of Lesotho, Roma, Lesotho, E-mail: sellotankiso@gmail.com*

Received: 02 February, 2023, Manuscript No. jpnp-23-90817; **Editor assigned:** 04 February, 2023, PreQC No. P-90817; **Reviewed:** 16 February, 2023, QC No. Q-90817; **Revised:** 21 February, 2023, Manuscript No. R-90817; **Published:** 28 February, 2023, DOI: 10.37421/2472-0992.2023.9.233