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Anthraquinones and Derivatives from Marine-derived Fungi

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Introduction

Researchers paid particular attention to marine creatures because of their enormous potential to produce bioactive chemicals. The microbes among them, which seem to be prolific producers of a wide variety of secondary metabolites, increasingly assumed an essential role. They can also be easily "upscaled" and are grown in bioreactors, which mean they don't threaten delicate marine habitats. Because of their tremendous variety, including in deep-sea settings, 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.

Around 1500 species of fungi with marine origins were reported, mostly from coastal habitats, out of the approximately 70,000 fungal species that have already been described globally. Given that 70% of the world is under water, there are at least 72,000 marine and fungal species, which suggests that the identification of novel chemicals is still in its early stages. Numerous marine-derived fungal metabolites have been proven to be novel and effective in a variety of fields [1].

Description

Polyketides make up a large portion of the biosynthetically produced extrolites by filamentous fungus, and various studies indicate that polyketides predominate among marine natural products of fungal origin. In addition to the classes of anthraquinones, hydroxyanthraquinones, naphthalenes, naphthoquinones, flavonoids, macrolides, polyenes, tetracyclines, and tropolones, polyketides also include other frequently structurally complicated natural compounds. Many of them have already demonstrated actions that are antibacterial, anticancer, antioxidant, immunomodulatory, cytotoxic, or carcinogenic, among many other effects. This specifically relates to the class of anthraquinones, whose effects on living organisms might vary depending on the type and quantity of component [2].

However, these compounds are deserving of the same attention as other families of fungal compounds, whose members have become pillars of the global pharmacopoeia (antibiotics) and are widely used in the food or staining industries, despite having received little research due to their negative reputation, which is largely due to their benzenic patterns (azaphilone colourants from *Monascus* spp. in Asia). In this study, we look at what is currently known about the anthraquinonoid chemicals that have been produced by filamentous fungus with marine origins. This summary focuses on the newly discovered compounds and includes some intriguing details, such as the panel of colours, their known functions in organism biology, and some specific in vitro biological activities. Given that natural products are a key component of the current global market [3].

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Based on a structure that consists of three benzene rings, anthraquinones are a subclass of molecules that belong to the quinone family. Two ketone groups are present on the central ring of 9,10-anthracenedione, commonly known as 9,10-dioxoanthracene (formula $C_{14}H_8O_2$). The kind and location of the substituents—which can be as different as -OH, $-CH_3$, $-OCH_3$, $-CH_2OH$, -CHO, -COOH, or more complicated groups—that replace the H atoms on the fundamental structure (R1 to R8) determine the diversity of anthraquinoid compounds. The chemical is referred to as hydroxyanthraquinone when n hydrogen atoms are swapped out for hydroxyl groups (HAQN). HAQN derivatives are coloured and absorb visible light as a result of their structural makeup.

The electronic absorption spectra of anthraquinone compounds are a key feature. The existence of a chromophore created by a system of conjugated double bonds is what causes the significant absorption in the UV range. Due to the existence of benzenoid transitional absorption bands as well as quinonoid absorptions, the spectra of anthraquinone are extremely complicated. The quinonoid bands absorb at 260-290 nm, but the benzenoid bands show up quite frequently in the range 240-260, with severe absorption at 250 nm and in 320-330 nm and medium absorption at 322 nm [4].

Marine-derived fungal anthraquinones ecology

A diverse array of filamentous fungi can be found in free waters, inert organic materials, and marine habitats. In addition, they can act as pathogens or endophytes in vertebrates, invertebrates, marine plants, and planktons. Although their effects on the mineralization of organic matter and the degradation of lignocellulolytic substances have been repeatedly shown, our understanding of their various roles in these environments is still limited. In the world of mycologists, however, there is still disagreement on the concept of "marine fungus." Because they can be found in a wide range of ecosystems, from terrestrial settings to aquatic ones, fungi are frequently seen as being omnipresent. Therefore, marine and marine-derived fungus is classified into two ecotypes, each of which belongs to an ecological group rather than a taxonomic one [5].

- Obligatory marine fungi (the real ones), which can only develop and sporulate in saltwater. In a salty environment, their spores have the ability to germinate and produce new thalli.
- Transitional marine fungus is those that have undergone physiological adaptation to live, develop, or reproduce in the marine environment. They are derived from terrestrial or freshwater media.

Conclusion

In fungus, many steps or branches of the polyketides route are used to create anthraquinones. Today, it is evident that there is significant variation across species of the same genus, and even within the same species, in terms of secondary metabolites and a priori anthraquinoid biosynthesis. This may undoubtedly be connected to the abilities fungi must develop in order to adapt to particular conditions in particular environments. As an example, when grown in the same artificial culture media, the composition of the quinoid pigment complexes of P. funiculosum strains isolated from diverse types of soils is considerably varied. Because of this, not all strains within a species are anthraquinones makers, even when the polyketides route is described in a strain.

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Conflict of Interest

The author shows no conflict of interest towards this manuscript.

References

1. Blunt, John W., Brent R. Copp, Robert A. Keyzers, and Murray H.G. Munro, et al. "Marine natural products." *Nat Prod Rep* 29 (2012): 144-222.
2. Molinski, Tadeusz F., Doralyn S. Dalisay, Sarah L. Lievens, and Jonel P. Saludes. "Drug development from marine natural products." *Nat Rev Drug Discov* 8 (2009): 69-85.
3. Newman, David J and Gordon M. Cragg. "Marine-sourced anti-cancer and cancer pain control agents in clinical and late preclinical development." *Marine drugs* 12 (2014): 255-278.
4. Gessler, N.N., A.S. Egorova, and T.A. Belozerskaya. "Fungal anthraquinones." *Appl Biochem Microbiol* 49 (2013): 85-99.
5. Zhang, Yuzhen, Wenfu Hou, and Yueping Tan. "Structure and dyeing properties of some anthraquinone violet acid dyes." *Dyes Pigments* 34 (1997): 25-35.

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