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Coral boring Aka diagonoxea thomas 1968 (porifera: phloeodictyidae) from Indian Ocean with antifungal property

Vijai Lakshmi[1, 3]*, Praveen Kumar Shukla[2]

[1]Medicinal and Process Chemistry Division, Central Drug Research Institute, Lucknow-226001, (INDIA)

[2]Fermentation Technology Division Central Drug Research Institute, Lucknow-226001, (INDIA)

[3]Biochemistry Depatment, King George Medical University, Lucknow, (INDIA)

E-mail: vijlakshmius@yahoo.com

ABSTRACT

This paper focuses on antifungal property of Aka dionoxea Thomas1968 boring coral of the Indian Ocean. This is the first time that a species of the genus Aka has been reported from the Indian Ocean showed antifungal property. Drug from marine resources is an area which offers an unprecedented opportunity for their pharmacological exploration and hence has received great attention during recent years for natural product chemistry, a promising new area of study. Thirty percent of all potential new natural drugs have been isolated from marine animals. About 75% of the recently registered and patented material to fight cancer comes from sponges. The methanol extract of the sponge showed promising antifungal activity against *Candida albicans* and *Candida neoformans* (MIC 62.5 µg/ml) *Sporothrix schenckii* (MIC 250 µg/ml), *Trichophyton mentagrophytes* (MIC 62.5 µg /ml), *Aspergillus fumigatus* (MIC 125 µg /ml), *Candida parapsilosis* (MIC 62.5 µg/ml).

KEYWORDS

Aka dionoxea Thomas1968;
Antifungal activity;
Marine sponge.

INTRODUCTION

The *Aka diagonoxea* Thomas 1968 is a boring sponge comprises a small group of excavating sponges, living in calcareous substrata, with askeleton formed only by oxeas, and characterized by fistulose tubes which are externally visible. Fistules projecting from the substratum long 20-50 mm and diameter 2-4mm.. Colour of these fistules are pale or white. The pulpy mass inside the chamber is yellow in colour and fistules are hard and breakable[1]. The nearest relative of this species is *Aka labyrinthica*[2]. The genus was originally included in the family Clionaidae[2], but it was later moved to the family Phloeodictyidae by Rützler & Stone[3].

MATERIAL AND METHODS

Collection of material:

Aka diagonoxea was collected from Tamil Nadu coast of India in the month of October and identified by P.A.Thomas, Fisheries Research Institute, Mandapam, India. Specimen sample (Voucher specimen No. 503) has been preserved in the Herbarium of Botany Division, CSIR Central Drug Research Institute, Lucknow, India. Fresh sponges were filled

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in the steel containers containing methanol on Tamil Nadu coast of India and were transported to CDRI laboratory.

Extraction Procedure

Freshly collected *A.diagonoxea* (0.6 kg) was cut into small pieces and extracted with methanol (4x1.0 L) at room temperature. The combined extract was filtered, concentrated under reduced pressure below 45^0 C in a rotavapour to a viscous mass, which was dried under high vacuum to get solvent free extract (15.0 g). The residual animal was rejected. Methanol extract (10.0 g) was fractionated into hexane (0.6 g), chloroform (1.0 g), n-butanol soluble (0.6 g) and n-butanol insoluble fractions (7.8 g). When all the fractions were screened for antifungal testing, the chloroform fraction was found showing promising results.

Methodology of in vitro antifungal testing

The antifungal activity of the sample was determined by two fold micro broth dilution method as per guide lines of[4,5]. Briefly, the compounds were dissolved in DMSO (10%) to get a stock (10 mg/ml) solution. Minimum inhibitory concentrations of standard antifungal (Ketoconazole) and the compounds were measured in 96% Well tissue plate using RPMI 1640 media buffered with MOPS (3-[N-Morpholino] propane sulphonic acid) (Sigma Chemical Co.). Starting incubated at 35 0c in a moist, dark chamber and MIC were recorded spectrophotometrically.

RESULTS AND DISCUSSION

The methanol extract of the sponge showed promising antifungal activity against *Candida albicans* and *Candida neoformans* (MIC 62.5 µg/ml) *Sporothrix schenckii* (MIC 250 µg/ml), *Trichophyton mentagrophytes* (MIC 62.5 µg /ml), *Aspergillus fumigatus* (MIC 125 µg /ml), *Candida parapsilosis* (MIC 62.5 µg/ml). Since the marine environment is an exceptional reservoir of bioactive natural products, which produced several novel structures with unique biological properties, which may not found in terrestrial natural products. The ocean environment is massively complex, consisting of extreme variations in pressure, salinity, 4 temperature, and biological habitats. Among the groups of marine organisms, sponges are the most diverse and abundant, due to their soft bodies and sedentary life styles. These marine invertebrates have evolved chemical defense mechanicsms against other invading organisms,which involve the production of secondary metabolites. Further isolation of pure active compound is required to enhance the antifungal activities in the molecules for the development of a new antifungal agent.

CONCLUSIONS

Isolation of pure compounds from the active methanol extract compounds, may give ehanced activity and can be developed as a potential antifungal agent.

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DECLARATION OF INTERESTS

Both authors have no conflict.

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