C. R. Chimie 13 (2010) 1397–1400

Contents lists available at ScienceDirect

Comptes Rendus Chimie

www.sciencedirect.com

Full paper/Mémoire

Antifungal effects of secondary metabolites isolated from marine organisms collected from the Tunisian coast

Saoussen Hammami [a], Afifa Bergaoui [a], Naima Boughalleb [b], Anis Romdhane [a], Ines Khoja [a], Monia Ben Halima Kamel [c], Zine Mighri [a,*]

[a] Laboratoire de chimie des substances naturelles et de synthèse organique (99, UR/12-26), 5000 Monastir, Tunisia
[b] Laboratoire de phytopathologie, institut supérieur agronomique de Chott Mariem, 4042 Sousse, Tunisia
[c] Invertebrate, micro-organism, harmful weeds alternative struggle, High School of Horticulture and Animal Production Chott Mariem, 4042 Sousse, Tunisia

ARTICLE INFO

Article history:
Received 22 July 2009
Accepted after revision 23 April 2010
Available online 8 June 2010

Keywords:
Sponges
Tunicate
Secondary metabolites
Antifungal effects
Insecticidal activity

Mots clés :
Spongiaires
Tunicier
Métabolites secondaires
Effets antifongiques
Effet anti-insecte

ABSTRACT

Phallusides 1,2,3 *(1)*, Fasciculatin *(2)*, Acanthelline *(3)*, Axisonitrile *(4)*, Oroïdin *(5)* and the Novel bromopyrolimidazolic compound Axinellizine *(6)* were evaluated for their antifungal effects against several phytopatogenic fungi and were found to possess considerable activities. Insecticidal effect of only Acanthellin *(3)* against the major pest of stored products *Tribolium confusum Duv* has been carried out using direct contact application method showing a significant inhibitory effect of the test material on the *T. confusum Duv* larvae growth. Forty-five percent mortality of the adults was achieved 8 days after treatment.

RÉSUMÉ

Phallusides 1,2,3 *(1)*, Fasciculatin *(2)*, Acanthelline *(3)*, Axisonitrile *(4)*, Oroïdin *(5)* et le nouveau sel d'alkaloïde Axinellizine *(6)* ont été isolés et valorisés par leurs effets antifongiques contre plusieurs souches de champignons phytopatogènes. L'effet anti-insecte de l'acanthelline *(3)* contre le parasite majeur de produits stockés *Tribolium confusum Duv* a été testé en se basant sur la méthode de contact direct montrant un effet inhibiteur significatif de la croissance des larves du *T. confusum Duv*. Une mortalité de 45 % des adultes a été observée, huit jours après traitement.

1. Introduction

Marine sponges and tunicates are known as rich sources of novel microorganisms showing a vast array of biological activities [1,2], many of which can be used for drug development. Continuing our search of new bioactive compounds from plants and marine organisms collected from the Tunisian coast [3–11], we have isolated from ethyl ether extracts four marine organisms: the glycosphingolipids phallusides 1-3 *(1)*, the furanosesquiterpene Fasciculatin *(2)* Acanthellin *(3)*, Axisonitrile *(4)*, Oroïdin *(5)* and a new bromopyrrole derivative named Axinellizine *(6)* (Fig. 1). Fasciculatin, previously isolated from *Ircinia fasciculata*, was reported to have a moderate cytotoxicity and inhibition of lymphocyte proliferation [12]. Preliminary work on Acanthellin and Axisonitrile, indicated their utility as antimalarial drugs [13]. In this study, we report the investigation of the effects of the bioactive secondary metabolites indicated above towards five pathogenic fungi as well as insecticidal activity of Acanthellin against *Tribolium confusum Duv* larvae.

* Corresponding author.
E-mail address: zinemighri@yahoo.fr (Z. Mighri).

1631-0748/$ – see front matter
doi:10.1016/j.crci.2010.04.022

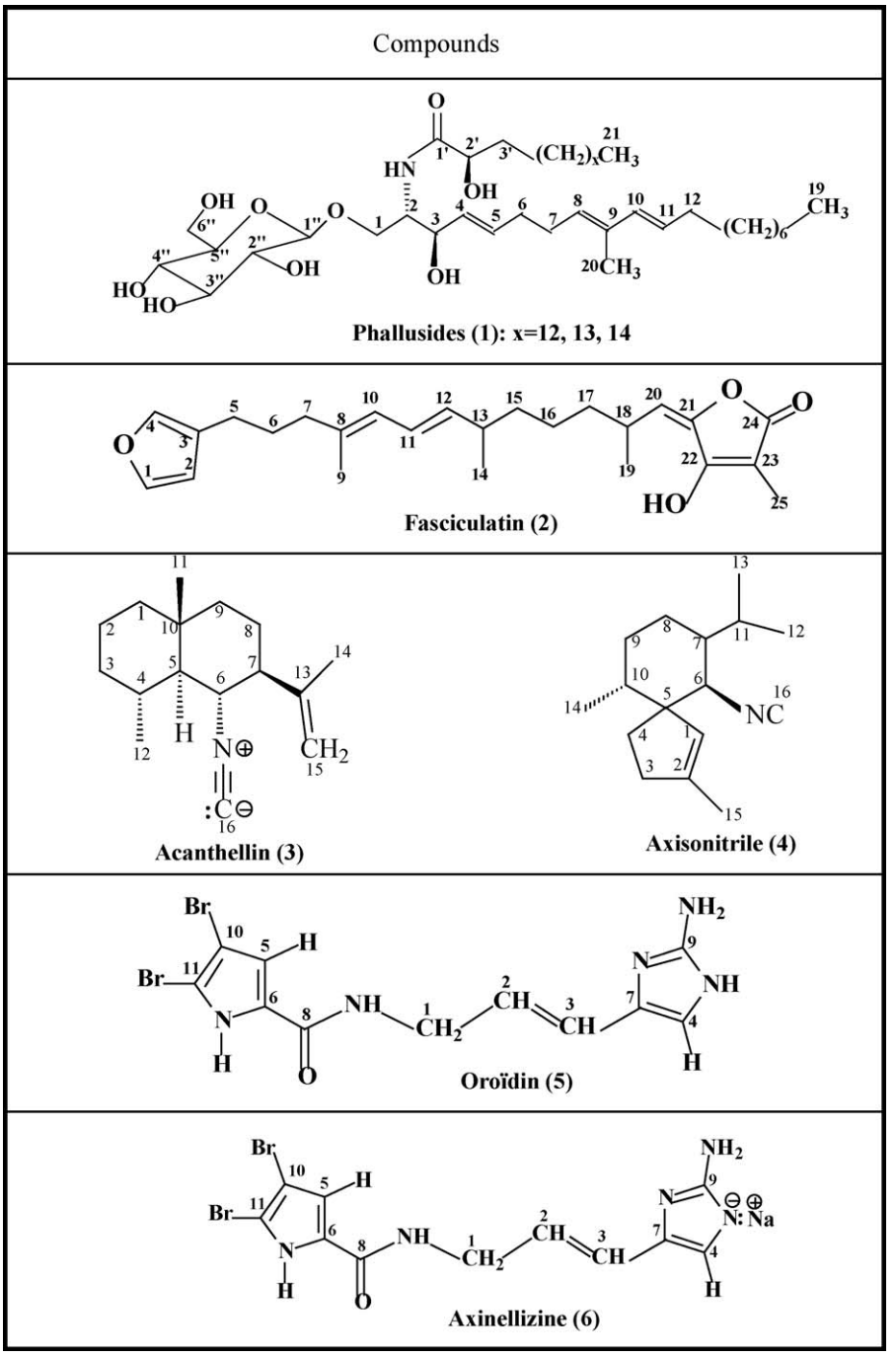

Fig. 1. Natural substances evaluated for their antifungal effects.

2. Material and methods

2.1. Animal material

The tunicate *Sidnyum turbinatum* (polyclinidae family, ascidiaceae order) and the sponges *Ircinia variabilis*, *Acanthella acuta* and *Axinella damicornis* (Axinellidae) were collected by hand at depths of 10 m, 18 m and 25 m, from sidi Elghdamssi island in Monastir region (Center East coast of Tunisia) in August 2003 and were stored in a freezer (−20 °C) until extraction. Voucher specimens were deposited in the Laboratorio de Sostanze Naturali Consiglio Nazionale delle Ricerche, Instituto di Chimica Biomolecolare Pozzuoli, Napolie, Italy.