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Short report

Antiviral activity of *Inonotus hispidus*

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Abstract

The antiviral activity of two phenolic compounds, hispolon and hispidin, isolated from the fruit bodies of the basidiomycete *Inonotus hispidus* as well as of some extracts prepared from fruit bodies and mycelial cultures of this fungus was investigated in allantois on the shell-test system. Ethanolic extracts, hispidin and hispolon showed considerable antiviral activity against influenza viruses type A and B.

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Keywords: *Inonotus hispidus*; Antiviral activity; Hispolon; Hispidin

Plant. *Inonotus hispidus* (Bull.: Fr.) Karst (Hymenochaetaceae), fruit bodies collected in July 1994 in Greifswald (Germany). The mushrooms were cut into small pieces, dried and stored at room temperature in air-tight containers. The fungal material was kindly identified by Prof. Dr H. Kreisel, Institute of Biology, Ernst–Moritz–Arndt University, Greifswald. A voucher specimen is deposited at the Institute of Pharmacy/Pharmaceutical Biology, Ernst–Moritz–Arndt University, Greifswald.

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Uses in traditional medicine. *I. hispidius* was formerly used as a purgative in Germany [1]. Hispidin and hispolon showed in vitro inhibiting effects on immune cells [2].

Previously isolated classes of constituents. Amino acids [3], lipids [4], hispidin [5], hispolon [6].

Tested material. 80% Ethanolic extract (EE) and aqueous extract (WE) from freeze-dried, pulverized and defatted (treatment with *n*-hexane for 12 h in a Soxhlet apparatus) fruit bodies (yield: 26.0 and 3.8%, respectively), and from lyophilized cultivated mycelium (yield: 19.5 and 32%, respectively). Mycelial cultures were derived from tissue plugs of fruit bodies and maintained in 500-ml Erlenmeyer flasks in Hagem medium [7] on a rotary shaker (70 rev./min) at room temperature for 7 days. At the end of the cultivation, the cultures were filtered and the mycelia were freeze-dried. Hispolon and hispidin were isolated from ethanolic extracts of *I. hispidus* as described previously [6]. Amantadine HCl was used as the standard substance.

Table 1

Antiviral activity of hispidin, hispolon, WE and EE from fruit bodies and cultured mycelium of *I. hispidus* on influenza virus type A and B

Treatment	Concentration	Reduction of infectious titer (\log_{10}) of influenza virus A and B		
		Type A		Type B
		H1N1	H3N2	
WE ^a	80 μ g/ml	0.91	0.83	0.83
WE ^b	80 μ g/ml	0.75	0.66	0.5
EE ^a	80 μ g/ml	2.17	1.00	0.33
EE ^b	80 μ g/ml	2.00	1.17	1.67
Hispidin	40 μ g/ml	3.00	3.00	n.d.
Hispolon	10 μ g/ml	0.67	1.50	0.50
	20 μ g/ml	2.84	3.16	1.34
	40 μ g/ml	3.80	3.80	n.d.
	80 μ g/ml	4.00	n.d.	n.d.
Amantadine HCl	5 μ g/ml	2.50	1.50	0

N=6. All assays in duplicate.

WE^a=water extract of fruit bodies.

WE^b=water extract of cultured mycelium.

EE^a=ethanol extract of fruit bodies.

EE^b=ethanol extract of cultured mycelium.

n.d.=Not determined.

A reduction of 1 or more titer units implies an antiviral effect.

Studied activity. Antiviral activity against influenza viruses using the allantois on the shell-test system according to Ref. [8].

Used micro-organisms. Influenza viruses A/Brazil/11/78 (H1N1), A/Hongkong/1/68 (H3N2) and B/Singapore/222/79 adjusted to a titer of 10^{-5} or 10^{-6} EID₅₀ (EID=egg infection dose).

Results. Reported in Table 1.

Conclusions. Ethanolic extracts of fruit bodies and mycelial cultures from *I. hispidus* showed interesting antiviral activity against influenza virus type A and B. The activity might be due to the presence of hispolon and hispidin in the extracts.

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