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南海柳珊瑚来源真菌Aspergillus hiratsukae SCSIO 7S2001的次生代谢产物及活性研究

Study on the secondary metabolites and activities of the fungus Aspergillus hiratsukae SCSIO 7S2001 derived from gorgonian coral in the South China Sea

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Fund Project:

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中文摘要:

目的 对一株采自南海柳珊瑚来源曲霉属真菌Aspergillus hiratsukae SCSIO 7S2001进行次级代谢产物及活性研究。方法 通过条件优化对菌株进行大规模发酵,采用硅胶柱层析、葡聚糖凝胶、半制备高效液相等色谱学方法对其大米发酵产物进行分离纯化,利用NMR、MS等波谱学技术,结合其理化性质及文献数据对比进行化合物的结构鉴定,并对化合物进行初步抗氧化和抗菌活性测试。结果 从菌株SCSIO 7S2001中分离鉴定9个单体化合物cristatumin F (1), , neoechinulin B (2), , cyclo (Trp-Ana) (3), , cyclo (D-Trp-L-Pro) (4), , cyclo (D-Pro-D-Phe) (5), , Phomoidene A(6), , β -adenosine (7), E-6-hydroxy-3-(4-hydroxybenzylidene)-benzo[b]furan-2-one(8a8), Z-6-hydroxy-3-(4-hydroxybenzylid-ene)-benzo[b]furan-2-one(8b9), 并对化合物进行抗菌活性、DPPH自由基清除活性以及乙酰胆碱酯酶抑制活性的测定。化合物1-89均为首次从该菌株中分离得到,化合物8和9为首次从海洋真菌中分离得到的新天然产物。所有化合物均无抗菌活性,化合物6表现出显著的DPPH自由基清除活性,其IC₅₀为8.50 μ M,几乎与阳性对照相当(阳性对照IC₅₀=5.58 μ M)。化合物1和2表现出微弱的乙酰胆碱酯酶抑制活性,在浓度为50 μ g./mL-1下,抑制率分别为16.44%和19.75%。

English Summary:

Objective To study the secondary metabolites and activities of Aspergillus hiratsukae SCSIO 7S2001 collected from the gorgonian coral of the South China Sea. Methods The rice fermentation products of this strain were isolated and purified by silica gel column, Sephadex LH-20, and semipreparative High Performance Liquid Chromatography (semi-HPLC). The structures of the isolated compounds were identified by nuclear magnetic resonance (NMR) and mass spectrum (MS), and compared with the published data. Results Nine known compounds were obtained and identified as cristatumin F (1), neoechinulin B (2), cyclo (Trp-Ana) (3), cyclo (D-Trp-L-Pro) (4), cyclo (D-Pro-D-Phe) (5), phomoidene A(6), β -adenosine (7), E-6-hydroxy-3-(4-hydroxybenzylidene)-benzo[b]furan-2-one (8a), Z-6-hydroxy-3-(4-hydroxybenzylid-ene)-benzo[b]furan-2-one (8b9). Their antioxidative, antibacterial and acetylcholinesterase inhibitory activities were evaluated by using Kirby-Bauer test, DPPH radical scavenging method, and Ellman's method, respectively. Compounds 1-8 9 were isolated from Aspergillus hiratsukae for the first time, and compound 8 and 9 is a new natural product from marine fungi. All compounds have no antibacterial activity. Compound 6 showed a strong DPPH free radical scavenging activity with the IC₅₀ values of 8.50 μ M, which was close to the positive control acarbose (IC₅₀ = 5.58 μ M). Compounds 1 and 2 showed weak acetylcholinesterase inhibitory activity. When the concentration was less than 50 μ g. mL-150 μ g/ml, the inhibition rates were 16.44% and 19.75%, respectively.

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