

### 大丽轮枝菌菌体对链霉菌胞外蛋白酶活性及抑菌效果的影响

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### Influence of *Verticillium dahliae* Mycelium on Extracellular Proteases and Antifungal Activity of *Streptomyces*

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摘要

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**摘要** 为研究拮抗链霉菌对棉花黄萎病原大丽轮枝菌 (*Verticillium dahliae* Kleb.) 的抑菌机理, 以大丽轮枝菌菌体为唯一碳氮能源, 采用液体培养法及生长速率法研究供试病原菌菌体对4株拮抗链霉菌胞外蛋白酶合成的诱导作用及抑菌活性物质产生的影响。结果表明: 大丽轮枝菌菌体可以诱导供试链霉菌合成蛋白酶; 诱导粗酶液对病原真菌菌丝有溶解作用; 当菌体添加量为10 g·L<sup>-1</sup>, 28℃培养7 d时菌株Z13蛋白酶活性高达4.24 U; 以大丽轮枝菌菌体为碳氮能源时供试链霉菌能产生活性较强的抑菌物质; 当菌体添加量为20 g·L<sup>-1</sup>, 发酵液稀释5倍时菌株B49所产抑菌活性物质的最大抑菌率达95.7%。

**关键词:** 链霉菌 大丽轮枝菌 胞外蛋白酶 抑菌活性 生物防治

**Abstract:** We investigated the antifungal mechanism of antagonistic *Streptomyces* on *Verticillium dahliae* Kleb, using pathogenic mycelium as the sole carbon source. The inducing effects of *V. dahliae* on extracellular proteases and antifungal active substance synthesis were examined in four tested *Streptomyces* isolates in liquid cultures. *V. dahliae* induced *Streptomyces* synthesis of extracellular protease and active antifungal substances, whereas an associated culture filtrate induced disintegration of *V. dahliae* mycelium. Optimal fermentation conditions for extracellular proteases synthesized by isolate Z13 involved addition of 10 g·L<sup>-1</sup> of fungal mycelium at 28 °C for 7 d. The highest extracellular protease activity of this isolate was 4.24 U. With the addition of 20 g·L<sup>-1</sup> of fungal mycelium, *V. dahliae* was 95.7% inhibited by a 5-fold dilution of a culture filtrate of isolate B49.

**Keywords:** *Streptomyces* *Verticillium dahliae* extracellular protease antifungal activity biological control

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