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棉花黄萎病拮抗细菌DS45-2菌株在土壤和棉花根内的定殖

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Colonization of Antagonistic Strain DS45-2 Against *Verticillium dahliae* in Soil and Cotton Roots

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摘要

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摘要 通过盆栽试验, 对棉花黄萎病拮抗细菌DS45-2菌株在土壤和棉花根际、根内的定殖情况进行了分析。结果表明, 在自然条件下, 拮抗细菌DS45-2菌株能够在土壤及棉花根际、根内定殖。拮抗菌株DS45-2施到土壤中的45 d内, 其定殖数量在开始25 d内显著下降, 但随后下降缓慢并逐渐趋于稳定, 维持在 10^6 个 \cdot g $^{-1}$ 土左右。接菌后45 d, DS45-2在棉花根内的定殖菌量达 2.35×10^4 个 \cdot g $^{-1}$ 根, 在棉花根际的定殖菌量达 97.4×10^6 个 \cdot g $^{-1}$ 土, 且重新分离出的拮抗菌株保持较高的拮抗活性。DS45-2菌株在灭菌土中的定殖数量高于自然土中的数量。随土层深度的增加, 定殖菌量呈下降趋势, 但变化不明显。

关键词: 棉花黄萎病 大丽轮枝菌 拮抗细菌 DS45-2菌株 定殖

Abstract: The ideal antagonistic strain requires not only high antagonistic activity, but also for the colonization capability with hosting in plant roots and rhizosphere soil. Antagonistic bacterium DS45-2 has inhibitory activity against *Verticillium dahliae* and high potential biological control value. Colonization of biocontrol strain DS45-2 in soil, rhizoplane and endophytic of cotton were studied against *V. dahliae* in a growth chamber. In this paper, we considered control, seed dressing, all soil bacteria, some soil bacteria, inoculating of pouring as treatments, and the colonization characteristics in natural soil and sterilized soil were analyzed. The results showed that antagonistic strain DS45-2 can colonize with strong antagonism activity against *V. dahliae* in soil and the root of cotton. When applied to the seed of cotton and inoculated in soil, the population of strain DS45-2 balanced gradually, and the numbers maintained about 10^6 cfu \cdot g $^{-1}$ in the soil. After 45 days, the population was 2.35×10^4 cfu \cdot g $^{-1}$ in the endophytic of cotton, and was 97.4×10^6 cfu \cdot g $^{-1}$ in the rhizoplane of cotton. The numbers in the natural soil were less than those in the sterilized soil, the trends are identical in both varieties, as a result of weak nutrition and space resources competition in the sterilized soil with a single microorganism. With the increasing of depth of the soil the population of strain DS45-2 declined, but was not obvious. Which indicated that the deeper soil factors, including the dense structure, poor ventilation, larger humidity, relative poor nutrition, and so on, had affected the colonization capability of biocontrol strain DS45-2. According to this experiment, it is suggested that the colonization capability of biocontrol strain related to their own genetic characteristics, the ability to use root secretions and the soil environment.

Keywords: cotton *Verticillium wilt* *Verticillium dahliae* antagonistic bacteria strain DS45-2 colonization

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