

研究报告

小麦内生细菌及其对根茎部主要病原真菌的抑制作用

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摘要

对小麦植株不同生育期、不同器官的内生细菌进行了分离和数量变化分析.结果表明,根、茎、叶及未成熟籽粒等器官中存在大量的内生细菌,鲜组织中平均约含内生细菌 5.0×10^5 CFU·g⁻¹,其中根系中内生细菌数量达 7.8×10^5 CFU·g⁻¹,而茎秆、叶片和未成熟籽粒中内生细菌数量分别为 4.8×10^5 、 3.2×10^5 和 2.8×10^5 CFU·g⁻¹.内生细菌数量在不同生育期也存在差异,幼苗期平均约为 3.1×10^5 CFU·g⁻¹、拔节期和灌浆期分别为 5.7×10^5 和 7.0×10^5 CFU·g⁻¹.不同小麦田块之间存在明显差异,长武县一田块植物鲜组织中内生细菌的数量为 6.1×10^5 CFU·g⁻¹,而大荔县一田块约为 3.9×10^5 CFU·g⁻¹.试验结果发现,对小麦全蚀病菌具有拮抗作用的内生细菌有51株、对小麦纹枯病菌具有抑制作用的内生细菌有45株.用平板对峙法测定,有71株对两种病原真菌均有拮抗作用,对小麦全蚀病菌抑菌圈直径大于10 mm的有23株,其中来源于根系、茎秆、叶片和籽粒的分别为6株、7株、9株和1株;对小麦纹枯病菌抑菌圈超过10 mm的有20株,其中来源于根系、茎秆、叶片和籽粒的分别为7株、5株、7株和1株,说明从小麦叶片诱捕分离的内生细菌中,对小麦全蚀病菌和纹枯病菌抑菌作用较强的分离株比率最高,其次为茎秆,而根部和未成熟籽粒中比例明显较低.

关键词 [抑菌圈](#) [菌落形成单位](#) [诱捕分离](#) [小麦全蚀病菌](#) [小麦纹枯病菌](#)

分类号

Endophytic bacteria isolated from wheat and their antifungal activities to soil-borne disease pathogens

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Abstract

In this paper, endophytic bacteria (EB) were isolated from the roots, stems, leaves and immature seeds of wheat at its different growth stages. The EB populations in fresh wheat tissues reached 5.0×10^5 CFU·g⁻¹ on average, with a significant difference among different tissues, growth stages and fields. The EB count was 7.8×10^5 in wheat roots, 4.8×10^5 in stems, 3.2×10^5 in leaves, and 2.8×10^5 CFU·g⁻¹ in immature seeds, and was estimated as 3.1×10^5 , 5.7×10^5 and 7.0×10^5 CFU·g⁻¹ at seedling, elongation and filling stages, respectively. A total of 51 antifungal EB isolates were trapped by the wheat pathogenic fungus *Gaeumannomyces graminis*, and 45 by *Rhizoctonia cerealis*. Among them, 78 isolates showed antifungal activities in vitro. A total of 23 isolates from roots (6), stems (7), leaves (9) and immature seeds (1) were highly inhibitory to the mycelial growth of *G. graminis* var. *tritici*, with the diameters of their inhibition zone exceeding 10 mm. The other twenty isolates from different plant parts were also active against *R. cerealis*. It was revealed that higher ratios of EB isolates with high antifungal activities were found in leaves, as compared with stems, roots and immature seeds.

Key words

扩展功能

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