Genome Sequence of Microbacterium testaceum StLB037, an N-Acylhomoserine Lactone-Degrading Bacterium Isolated from Potato Leaves

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Received 8 February 2011/Accepted 11 February 2011

Microbacterium testaceum is an endophytic Gram-positive bacterium that resides within plant hosts. M. testaceum StLB037 was isolated from potato leaves and shows N-acylhomoserine lactone-degrading activity. Here, we present the 3.98-Mb complete genome sequence of StLB037, with an average GC content of 70.28%.

The genus Microbacterium belongs to the class of high-GC-content Actinobacteria. Microbacterium testaceum is an endophytic bacterium that resides within plant hosts without causing disease symptoms (12). In many Gram-negative bacterial species, N-acylhomoserine lactone (AHL) has been identified as a signal compound involved in the quorum-sensing system (2). Many Gram-negative plant pathogens produce AHLs and regulate their virulence by AHL-mediated quorum sensing (10). We have reported the isolation of AHL-degrading M. testaceum strains from the leaf surface of the potato (6). We also cloned the aiiM gene from the genomic library of StLB037, which has AHL-lactonase activity and shows high homology with the α/β hydrolase fold family from Actinobacteria (11). To our knowledge, the complete genome sequence of the genus Microbacterium has not been deposited in the DDBJ/EMBL/GenBank databases at this point in time. In this work, we determined the genome sequence of M. testaceum StLB037.

Single- and paired-end whole-genome shotgun sequencing of StLB037 was performed using Roche genome sequencer FLX Titanium pyrosequencing technology (5) provided by Operon Biotechnologies (Tokyo, Japan). We produced 584,678 reads, with an average read length of 287 bases. The total number of sequenced bases is 167,947,725, representing a sequencing depth with an average read length of 287 bases. The total number of sequenced bases is 167,947,725, representing a sequencing depth with an average read length of 287 bases. The genome contains 3,676 protein-coding genes, two rRNA operons, and 45 tRNA genes.

The complete genomic information for M. testaceum StLB037 is contained on a single circular chromosome of 3,982,034 bp with an average GC content of 70.28%. The genome contains 3,676 protein-coding genes, two rRNA operons, and 45 tRNA genes.

The aiiM gene, which has been identified from the genomic library of StLB037, was found as a single copy in the complete genome. Many AHL-degrading genes have been cloned and characterized from various bacterial species (8). We searched for the homologs of the reported AHL-degrading genes in the complete genome of StLB037. As a result, one predicted CDS (MTES_1124), which encoded 309 amino acids, showed 26.3% identity to the reported AHL-degrading enzyme, QsdA (9). QsdA is a phosphotriesterase-like AHL lactonase from Rhodococcus erythropolis W2, which belongs to the class of Actinobacteria as well as M. testaceum.

In summary, the AHL-degrading activity of M. testaceum StLB037 is effective for protection against plant pathogens. Therefore, the complete genome sequence of M. testaceum StLB037 will contribute to the development of biocontrol agents which quench quorum sensing in plant pathogens.

Nucleotide sequence accession number. The complete genome sequence of M. testaceum StLB037 has been deposited in the DDBJ/EMBL/GenBank databases under accession no. AP012052.

This work was supported by grants-in-aid from the Bio-oriented Technology Research Advancement Institution (BRAIN), Japan.

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Published ahead of print on 25 February 2011.


