GMR Genetics and Molecular Research
Online Journal
ISSN:1676-5680

Improved thermostable α-amylase activity of *Bacillus amyloliquefaciens* by low-energy ion implantation

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Genet. Mol. Res. 10 (3): 2181-2189 (2011)
Received September 27, 2010
Accepted August 13, 2011
Published September 23, 2011
DOI http://dx.doi.org/10.4238/vol10-3gmr1081

ABSTRACT. Thermostable α-amylase is of great importance in the starch fermentation industry; it is extensively used in the manufacture of beverages, baby foods, medicines, and pharmaceuticals. *Bacillus amyloliquefaciens* produces thermostable α-amylase; however, production of thermostable α-amylase is limited. Ion-beam implantation is an effective method for mutation breeding in microbes. We conducted ion-beam implantation experiments using two different ions, Ar^+ and N^+, to determine the survival rate of and dose effect on a high α-amylase activity strain of *B. amyloliquefaciens* that had been isolated from soil samples. N^+ implantation resulted in a higher survival rate than Ar^+ implantation. The optimum implantation dose was 2.08×10^{15} ions/cm^2. Under this implantation condition, we obtained a thermally and genetically stable mutant α-amylase strain (RL-1) with high enzyme activity for degrading α-amylase. Compared to the parental strain (RL), the RL-1 strain had a 57.1% increase in α-amylase activity. We conclude that ion implantation in *B. amyloliquefaciens* can produce strains with increased production of thermostable α-amylase.

Key words: Ion implantation; *Bacillus amyloliquefaciens*; Thermostable α-amylase

