

论文

弱化H⁺-ATPase的德氏乳杆菌乳酸亚种的生理特性研究

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摘要:

以德氏乳杆菌乳酸亚种(L5)为出发菌株,以新霉素为选择“压力”,获得了弱化H⁺-ATPase变异菌株5M1、5M6和5B1。与出发菌株L5(对照)相比,各变异株的H⁺-ATPase活力分别下降51.3%、27.7%和34.3%。对变异株5M1、5M6和5B1的形态及其生理特性研究表明,变异株的细胞较菌株L5细长。L5的ATP含量为0.63×10⁻¹⁸mol/个,明显低于变异菌株;变异株5M6和5B1的ATP含量分别为1.18×10⁻¹⁸mol/个和1.38×10⁻¹⁸mol/个;变异株5M1的ATP含量最高,约为1.60×10⁻¹⁸mol/个。当各菌株在MRS培养基中37℃培养12h后,变异株表现出较高的谷氨酸到γ-氨基丁酸的转化率,其中变异株5M6最高,为16.73%,变异株5M1和5B1谷氨酸转化率居中,分别为15.6%和15.4%,出发菌株L5的谷氨酸转化率最低,为13.91%。与出发菌株L5相比,变异株5M6、5M1和5B1的H⁺-ATPase活性下降导致其耐酸性和耐盐性降低。

关键词: 德氏乳杆菌乳酸亚种L5 弱化H⁺-ATPase 生理特性

Physiological characteristics of *Lactobacillus delbrueckii* subsp. *lactis* mutant strains with reduced H⁺-ATPase activity

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Abstract:

Three mutant strains (5M6, 5M1 and 5B1) obtained from *Lactobacillus delbrueckii* subsp. *lactis* L5 and grown in MRS medium, which contained a lethal concentration of neomycin sulfate, showed reduced H⁺-ATPase activity. The membrane-bound H⁺-ATPase activities of 3 mutant strains were reduced by 51.3% for 5M6, 27.7% for 5M1 and 34.3% for 5B1 respectively. Cell shapes of the mutant strains 5M6, 5M1 and 5B1 were slenderer than that of the parental strain L5. Physiological performance indicated that the ATP level of the parental strain (0.63×10⁻¹⁸mol/cell) was lower than that of the mutant strains. The conversion rate of glutamic acid (GA) to γ-aminobutyric acid (GABA) by parental strain L5 cultured in MRS at 37℃ for 12h was 13.91%. The conversion rates of GA to GABA were 16.73% in mutant strain 5M6, 15.6% in mutant strain 5M1 and 15.4% in mutant strain 5B1. The parental strain L5 transformed 13.91% GA to GABA. It was proved that the parental strain showed more acid and salt resistance than its mutant strains in an extended growth period.

Keywords:

Lactobacillus delbrueckii subsp. *lactis* L5 reduced H⁺-ATPase activity physiology characteristic

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