

专论

*Lactobacillus helveticus* |ND-01高密度培养条件的优化及冻干发酵剂的制备

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摘要:

瑞士乳杆菌*Lactobacillus helveticus* ND-01是一株分离、筛选自新疆酸马奶中的乳酸菌,并且在发酵牛乳的过程中能产生较高的ACE- I 抑制活性和γ-氨基丁酸。实验通过对*L.helveticus* ND-01培养基的组分进行优化,从而得出*L.helveticus* ND-01优化培养基配方为:乳糖25 g/L,大豆蛋白胨14.1 g/L,酵母粉14.1 g/L,醋酸钠15.3 g/L,柠檬酸钠6.5 g/L,K<sub>2</sub>HPO<sub>4</sub>2.2 g/L,MgSO<sub>4</sub>·7H<sub>2</sub>O 2 g/L,MnSO<sub>4</sub>·5H<sub>2</sub>O 25 mg/L,吐温-80 1 g/L,L-半胱氨酸盐酸盐750 mg/L,维生素B<sub>9</sub> (VB<sub>9</sub>) 20 mg/L。*L.helveticus* ND-01在此培养基中经42℃,18 h培养,其活菌数可达到4.2×10<sup>8</sup>cfu/mL,比MRS中(8.2×10<sup>7</sup>cfu/mL)提高近5倍。将此优化培养基作为基础培养基,在5 L发酵罐中,经优化发酵条件,其活菌数可达到3.1×10<sup>9</sup>cfu/mL,发酵液离心收集菌体,加入保护剂,冷冻干燥后活菌数可达到2.5×10<sup>10</sup>cfu/g。冻干菌粉经90 d的低温贮藏,其存活率为81.20%。

关键词: 瑞士乳杆菌 培养基 发酵 冻干

Optimization of Fermentation Conditions for *Lactobacillus helveticus* |ND-01 and Preparation for Freeze-dried Starter

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Abstract:

*Lactobacillus helveticus* ND-01 is a lactic acid bacteria isolated from Koumiss in Xinjiang. It can produce higher inhibitory activity against ACE- I and γ-aminobutyric acid during the fermentation process. The medium components for *L. helveticus* ND-01 were optimized by response surface methodology, which contained lactose (25 g/L), soy peptone (14.1 g/L), yeast extract (14.1 g/L), sodium acetate (15.3 g/L), sodium citrate (6.5 g/L), K<sub>2</sub>HPO<sub>4</sub> (2.2 g/L), MgSO<sub>4</sub>·7H<sub>2</sub>O (2 g/L), MnSO<sub>4</sub>·5H<sub>2</sub>O (25 mg/L), tween-80 (1 g/L), L-cysteine (750 mg/L), Vitamin B<sub>9</sub> (VB<sub>9</sub>) 20 mg/L. After cultivation in optimization medium for 18h at 42℃, the viable count of *L. helveticus* ND-01 was 4.2 × 10<sup>8</sup> cfu/mL, which was about 5 times higher than that in MRS (8.2 × 10<sup>7</sup> cfu/mL). Fermentation conditions were optimized using this enrichment medium as the basal medium culture in the 5L fermentor, the viable count of *L. helveticus* ND-01 reached 3.1 × 10<sup>9</sup> cfu/mL. After centrifugal separation of the cell from fermentation broth and freeze drying, a viable count of 2.5 × 10<sup>10</sup> cfu/g was obtained. After 90 days storage, survival rate of the freeze drying starter reached 81.20%.

Keywords: *Lactobacillus helveticus* ND-01 medium fermentation freeze drying

收稿日期 2008-08-18 修回日期 2008-11-24 网络版发布日期

DOI:

基金项目:

国家863计划项目(2006AA10Z345,2007AA10Z353)资助.

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