

复合渗透液配方优化及其处理对绿豆芽真空冷冻干燥的效果

Optimization of compound osmoticum formula and its effects on the vacuum freeze-drying of mung bean sprouts

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英文关键词: mung bean sprout; vacuum freeze-drying; compound osmoticum; formula; effect

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中文摘要:

采用三因素二次正交回归组合设计试验方案,对绿豆芽真空冷冻干燥工艺的复合渗透液预处理效果进行试验,并建立相应的回归方程,优选复合渗透液配方并进行试验验证,同时考察优选的复合渗透液处理的冻干品相关品质指标,分析节能效果,显微观察冻干品细胞结构变化。结果表明:绿豆芽冻干工艺的预处理复合渗透液最优配方为麦芽糊精、羧甲基纤维素钠(CMC)、淀粉的含量分别是21.2%、0.16%、2.5%,试验验证显示绿豆芽经优选的复合渗透液预处理后能明显地改善冻干效果,同未经处理的相比,产量与质量的综合指标提高18.3%,维生素C保存率提高25.9%,冻干时间缩短36.9%,耗电节省19.9%;冻干品的安全水分可提高至10.0%,显微观察显示表皮细胞结构未受破坏。

英文摘要:

The pretreatment effects of compound osmoticum on the vacuum freeze-drying of mung bean sprouts were studied using quadratic orthogonal regressive experiments combined with three factors. Based on the result, the regressive equation was established, and the compound osmoticum formula was optimized and verified. Meanwhile, the quality indexes of the freeze-dried products were investigated with the optimized compound osmoticum, and the energy-saving effect was analyzed. The changes in epidermal cell architecture of the products were also examined under microscope. Results show that the optimum ratio of the compound osmoticum formula is maltodextrin:CMC:starch=21.2%:0.16%:2.5%. The pretreatment with the optimized compound osmoticum greatly improve the freeze-drying effects of mung bean sprouts. Compared to the untreated product, the comprehensive indexes of yield and quality are improved by 18.3%, the retention of vitamin C raises by 25.9%, the drying time is shortened by 36.9%, the electric energy is saved by 19.9%, and the safe humidity of the product raised up to 10.0%. Under the microscope, the epidermal cell architecture is not destroyed.

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