

球形食品真空冷却过程中参数分析

Parametric analysis of spherical foods during vacuum cooling

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英文关键词：vacuum cooling； heat and mass transfer； precooling； shelf life

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中文摘要：

建立了描述球形食品在真空冷却中传热、传质的数学模型。通过数值求解得到真空压力、产品质量、产品温度(表面温度、中心温度、质量平均温度)随时间的变化曲线。实验装置中高精度的数据采集系统能够在线测定和记录真空室压力、产品质量、产品不同位置的温

英文摘要：

A mathematical model is developed for the heat and mass transfer of spherical foods during vacuum cooling. Variation histories of total pressure of the vacuum system, product mass as well as product temperature(including surface temperature, center temperature and mass-average temperature) are achieved by numerical calculation. Data collecting system with high accuracy can test and record the vacuum pressure, product mass, and product temperatures at different positions. The experiment was carried out on the vacuum cooling of spring-harvested head lettuce. The maximum difference between the simulated pressure and tested pressure is less than 100 Pa when the pressure ranges from 10000 Pa to 600 Pa. The maximum difference between the simulated temperature and tested temperature is 1°C. The simulated water loss ratio of head lettuce is 3.32%, while the tested water loss ratio is 2.97%, the difference is 0.35%. The research results provide some basic rules for flow and heat transfer about the characteristics of evaporation heat transfer of product during vacuum cooling.

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