

莲子淀粉品质对莲子汁流变特性和保质期影响的研究

Effect of lotus-seed starch quality on lotus-seed juice's rheological property and shelf life

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中文摘要:

淀粉品质是影响淀粉类食品品质的主要因素, 优选低含量直链淀粉的莲子为原料是确保莲子产品品质的关键。本研究收集了中国具有代表性的22个野生及栽培莲子品种, 并测定各品种直链淀粉含量(AC), 按AC梯度从中选择7个莲子品种为原料分别制作莲子汁, 研究莲子汁的流变特性和贮存过程中淀粉返生所致的流变性质变化, 利用逐步回归法, 建立莲子汁返生沉淀量与直链淀粉含量、贮存时间之间的数学模型。结果表明: 莲子直链淀粉含量品种间差异较大, 莲子汁为假塑性流体, 淀粉在返生过程中黏度呈下降趋势, 直链淀粉含量越高, 黏度在贮存初期下降越快。莲子汁返生沉淀量与直链淀粉含量、贮存时间之间的数学模型为: $Y=0.5107\exp(0.020T-7.562\times 10^{-5}T^2+9.955\times 10^{-8}T^3+0.05C-0.001C^2)$, 该模型为莲子汁保质期预测和莲子优质育种目标提供理论依据, 同时对淀粉质食品深加工开发也具有重要的参考价值。

英文摘要:

Starch quality is one of the important factors of starchy food quality. In order to ensure the quality of lotus-seed products, optimizing lotus-seed with low-content amylose content is the key to the processing of lotus-seed products. Twenty-two representative wild or cultivated varieties of lotus-seed in China were collected and their amylose contents(AC) were determined, then seven varieties of lotus-seed were chosen to produce lotus-seed juice according to AC. Rheology of lotus-seed juice and its changes in the storage were studied. The mathematical model of the AC, shelf life of lotus-seed juice and the retrogradation deposition content of starch was constructed by stepwise regression analysis. The results were as follows: AC of lotus-seed differed largely among all varieties, lotus-seed juice belonged to pseudoplastic liquid, starch viscosity decreased during retrogradation, and the viscosity decreased faster at the beginning of storage while the AC was bigger. The mathematical model was: $Y=0.5107\exp(0.020T-7.562\times 10^{-5}T^2+9.955\times 10^{-8}T^3+0.05C-0.001C^2)$, in which Y was the starch retrogradation deposition content; T was storage time; and C was amylose content. The model provided basis for forecasting the shelf life of lotus-seed juice and high-quality breeding of lotus-seed, meanwhile the study offered valuable reference for the processing of starchy products.

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