Title Influence of Longan Packed Bed Arrangement on Air Flow Pattern under Force-air Convection

Author S. Jaturonglamlert, J. Pimphimol and J. Varih

Citation Program and Abstracts, 3rd International Symposium on Longan, Lychee and Other Fruit Trees in Sapindaceae Family, August 25-29, 2008, Fuzhou, China. 132 pages.

Keywords longan; computational fluid dynamics

Abstract

Force-air convection for SO_2 fumigation is an effective tool to extend shelflife of fresh longan (*Dimocarpus longan* Lour.). This paper presents the experimental and numerical investigations of the influence forced-air convection system for SO_2 fumigation of fresh longan in pilot scale. Two different arrangements of longan packed bed to generate different air flow patterns were studied between forced-air and circulating-air convections. The computational fluid dynamics (CFD) approach was applied to simulate the air flow through longan packed beds to obtain a physical phenomena taking place inside the beds. It was found that the CFD simulation predicted the air flow pattern with the average error within 20% compared to the experimental values. Simulation indicates that forced-air convection yield better air penetration through the longan packed bed than the circulating-air convection. The 2×2×4 (column × row × stack) packed-bed arrangement exhibited better air-flow distribution than that of 1×1×4 arrangement. The SO_2 residue distribution on the fumigated longan corresponded well with the trend of CFD air-flow simulation. This work provided basic understanding well with the trend of CFD air-flow simulation. This work provided basic understanding on how forced-air convection affected the SO_2 fumigation and can be further extended to a simulation of SO_2 fumigation by forced-air convection on longan in industrial-scale.