

Title Improved sulfur dioxide fumigation of fresh longan using a vertical forced-air technique
Author J. Phimphimol, J. Varith, S. Jaturonglumlert, P. Chommuang and K. Kubnop
Citation ISHS Acta Horticulturae 880:415-422. 2010.
Keyword fresh longan; sulfur dioxide; vertical forced-air technique

Abstract

The problem of high sulfur dioxide (SO₂) residues on fresh longan (*Dimocarpus longan* Lour.) remains persistent in Thailand because of inefficient fumigation technology. An improved SO₂ fumigation process has been developed for longan by applying a vertical forced-air technique to reduce usage of SO₂. An experiment was conducted using a vertical forced-air column at three air flow rates of 0.6, 0.8 and 1.0 m³/s, with two types of basket, (rectangle and trapezoidal shaped baskets), capable of holding 550 and 660 kg of longan per batch, respectively. During the fumigation process, SO₂ with an initial concentration of 10,000-12,000 ppm was circulated through the forced-air column inside the fumigation chamber for about 60 min. After being absorbed by longan fruit, the SO₂ concentration decreased to the final concentration of 4,000 ppm, at which time the fumigation process was terminated. Quality and shelf-life of fresh longan were determined every fifth day during storage at 2°C and 95%RH. Forced-air fumigation at all air-flow rates effectively prevented postharvest diseases and browning of fresh longan for at least 20 days. Air-flow rate and basket type were not significant factors ($p \geq 0.05$) affecting SO₂ residue on longan peel and pulp, which was within the range of 1,600-1800 mg/kg and 5 mg/kg immediately after fumigation respectively. The SO₂ concentration used in this work was 3 to 5 times lower than the official recommendations commonly practiced by longan processors. It is suggested that a minimum air flow rate of 0.6 m³/s (or 3.27 m³/h/kg-produce) should be applied to obtain minimal SO₂ residues with this vertical forced-air technique. Vertical forced-air SO₂ fumigation offers enhanced effectiveness for commercial practice with a trapezoidal shaped basket where the SO₂ flow-thru is much weaker than the tunneled or horizontal forced-air technique.