

Atchara Sankom 2012: Application of Oxidizing Agents on Washing Process to Reduce Organophosphate Residue on Fresh Vegetables. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Assistant Professor Warapa Mahakanchanakul, Ph.D. 192 pages.

In 2010-2011, Thai fresh vegetables faces the problem of detention from overseas customers due to the higher pesticide residues over the regulation limit, especially organophosphate pesticides (OPs). Thus, the objective of this study was to compare the efficiency of three type of oxidizing agents in order to reduce OPs to enhance the safety of exported products. In preliminary study Chinese kale was used as the vegetable model to demonstrate the appropriate washing conditions of each oxidizing agents in washing process, then five kinds of fresh vegetables (Chinese kale, Coriander, Hot chili, Chinese cabbage and Cabbage) were tested in washing conditions. The experiment were divided into 3 sections; the first and second were to investigate the efficiency of oxidizing agents in laboratory scale, and field trials which samples were analyzed for pesticide residue by acetylcholinesterase-bioassay (GT test kit). The third section was to apply the appropriate washing conditions for exported fresh vegetables, which then analyzed by Gas chromatography. Spike fresh vegetables with profenofos or chlorpyrifos solution which had residue content under maximum residue levels of EU-MRL 10 times, were washed with 1.0 ppm ozonated water for 10 min and found profenofos and chlorpyrifos on spike vegetables decreased 70-86% and 67-85%, respectively. Washing with 10 ppm ClO_2 reduced profenofos and chlorpyrifos on fresh vegetables by 60-73% and 56-70%, respectively, while 70 ppm EO-water reduced profenofos by 57-74%. However, washing Chinese kale with EO-water could not determine the amount of chlorpyrifos by GT test kit. Results from field trials study revealed that after sprayed Chinese kale with profenofos and harvested at Pre-Harvest Interval (PHI) 3 and 10 day compared to spray with chlorpyrifos (PHI 3 and 14 day) found that washing Chinese kale with ozonated water had the highest efficiency. This condition could reduce profenofos residue of 18.6-21.6 ppm (PHI 3 day) by 57-59% and of 1.3-2.0 ppm (PHI 10 day) by 55-58%, whereas could reduce chlorpyrifos of 17.9-20.4 ppm (PHI 3 day) by 58-60% and of 1.7-1.8 ppm (PHI 14 day) by 62-73%. ClO_2 reduced profenofos and chlorpyrifos residue on Chinese kale (PHI 10 and 14 day) by 40-46% and 43-56%. Later washing with EO-water could reduce profenofos by 41-52%. After applied the appropriate conditions, washing fresh vegetables with ozonated water (1 ppm) EO-water (70 ppm) and ClO_2 (10 ppm) for 10 min, could reduce organophosphate pesticide (profenofos chlorpyrifos dicrotofos and ethion) residues on exported fresh vegetables (Chinese kale, Coriander, Hot chili and Chinese cabbage). If the pesticide residues has amount equal or less than 5 fold of EU-MRL, washing with oxidizing water could reduce the pesticide residues to achieve the EU-MRL limits and thus increased the potential of fresh produce export to EU.

Student's signature

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