



Number: 06

Date Published: 2020/03/30

Issue	Use of Dishwashing Detergent in Washing Fruits and Vegetables
Background	<p>Fruits and vegetable produce are important components of a healthy diet as these are rich sources of vitamins and minerals, dietary fiber, and essential nutrients [1]. However, the consumption of fruits and vegetables in raw form increases the risk of contracting foodborne illnesses associated with pathogens and toxic chemical residues [2]. It is well known that contamination of fruits and vegetables may occur before it comes to the market. Hazard contamination often occurs during production, harvesting, storage, and transport stages of the food chain.</p> <p>Hazards in fresh fruits and vegetables can be categorized as biological, chemical or physical. Biological hazards are the bacteria, viruses, and parasites which may come from the water used to irrigate the plants, or brought about by poor harvesting, storage, and transport practices. Raw vegetables can be contaminated with different microorganisms at populations of 10^3 to 10^7 CFU/g [3]. Chemical hazards are toxic substances that may arise from industrial pollution and improper use of agrochemicals. Physical hazards are glass, metal, wood fragments or other objects that may cause physical injury to the consumers when ingested [1]. Thus, it is important to ensure safe handling of fresh produce at any point in the food chain prior to consumption.</p> <p>While many people use tap water in washing fruits and vegetables, there are some who use vinegar, chlorine solution, dish detergent and commercial cleaning solutions in washing produce before food preparation or consumption as their sanitation treatments [4],[5].</p> <p>Consumers, however, do not realize that detergent and all other soap products are not recommended for cleaning fresh produce since residues can remain even after rinsing [4]. Many types of fresh produce are porous and could absorb the dishwashing detergent, which could affect their safety and taste [5].</p>
Food Hazard Identification and Characterization	<p><u>Dishwashing detergent</u></p> <p>Most detergents contain surfactants that remove dirt, stains, and soil from surfaces or textiles. Surfactants consist of a hydrophobic (nonpolar molecules that repel the water molecules) and a hydrophilic (molecules forming ionic or a hydrogen bond with the water molecule) component, and have the ability to change the surface properties of water. Surfactants are grouped according to their ionic properties in water. Consumer</p>



products such as laundry detergents, cleaning and dishwashing agents use non-ionic surfactants [6].

Since all chemicals are toxic under certain conditions of exposure, a number of factors should be considered. This includes duration and frequency of exposure to the ingredient, its concentration, and the route and manner in which the exposure occurs (e.g. ingestion). Unintended exposure may result from the misuse of dishwashing soap or detergent [7].

Although surfactants have low oral toxicity, it has an irritating effect on mucous membranes, and foaming is the predominant problem. Ingestion of surfactants may cause vomiting, abdominal pain, flatulence, and diarrhea. Rare cases in which formation of a considerable amount of foam in the mouth and involve an aspiration risk may also occur. Aspiration may have occurred if there are persistent cough and respiratory complaints [7].

Food Safety Mitigation

Washing fruits and vegetables can reduce food safety hazards. Prior to washing fruits or vegetables, it is recommended to start by properly washing hands with soap and water to minimize cross contamination.

While no washing method completely removes all the hazards which may be present on the produce, several studies have shown that the following are effective ways of reducing the number of microorganisms and removal of residual pesticides:

1. Rinse all produce thoroughly with running water and gently rub or scrub it with a clean scrub brush or hand while holding it under plain running water [8]. Studies showed that this washing method has significantly eliminated incurred residues of the organochlorine and pyrethroid residues in vegetables and fruits [9].
2. Dip fruits and vegetables in salt solution (2% salt) or hydrogen peroxide water solution (2% hydrogen peroxide) for a maximum of 10 minutes, followed by rinsing in tap water.
3. Soak fruits or vegetables in a solution of water and house vinegar (1% acetic acid) for 15 minute.

The three methods above will depend on the type of fruits and vegetables.

Aside from washing, peeling and blanching were found to have significantly reduced the amount of pesticide residues on fruits and vegetables [9].

Washing fruits and vegetables with soap, detergent or commercial produce wash are not recommended [8], [10], [11]. These were not evaluated by competent authorities for safe use in washing fruits and vegetables. A



study also showed that dishwashing liquid had no effect in reducing the burden of fecal coliform [12].

Researchers

Bureau of Agriculture and Fisheries Standards

Technical Services Division

Food Safety and Consumer Protection Section (FSCPS)

Reference/s

[1] World Health Organization. Increasing fruit and vegetable consumption to reduce the risk of non-communicable diseases. Available at: https://www.who.int/elena/titles/fruit_vegetables_ncds/en/

[2] Bhilwadikar T., Pounraj M. S, Rastogi N. K., Neg P. S. (2019) Decontamination of microorganisms and pesticides from fresh fruits and vegetables: a comprehensive review from common household processes to modern techniques

[3] Samadi, N., Abadian, N., Bakhtiari, D., Fazeli, M.R., &Jamalifar, H. (2009). Efficacy of detergents and fresh produce disinfectants against microorganisms associated with mixed raw vegetables. Journal of Food Protection.

[4] Li-Cohen, A. E., Bruhn, C.M. (2002). Safety of consumer handling of fresh produce from the time of purchase to the plate: a comprehensive consumer survey. Journal of Food Protection.

[5] Colorado State University. Guide to washing fresh produce. Available at: <https://extension.colostate.edu/docs/pubs/foodnut/09380.pdf>

[6] European Commission. 2011. Health and consumer scientific committee: products that resemble foods and appeal to children - potential risk of accidental ingestion. Available at: https://ec.europa.eu/health/scientific_committees/opinions_layman/products-resembling-food/en/l-3/4-products-dangerous-swallow.htm#2p3

[7] Canadian Consumer Specialty Products Association. Information about soaps and detergent. Available at: http://www.healthycleaning101.org/information_about_soaps_and_detergents/

[8] University of Kentucky. 2006. Fruits and vegetables: food safety. Available at: <http://www2.ca.uky.edu/hes/fcs/FACTSHTS/FN-JSK-159.pdf>

[9] Chavarri, M. J., Herrera, A., & Ariño, A. (2004). Pesticide residues in field-sprayed and processed fruits and vegetables. Journal of the Science of Food and Agriculture

[10] US Food and Drug Administration. Washing food: does it promote food safety. Available at: <https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/safe-food-handling/washing-food-does-it-promote-food-safety/washing-food>



[11] Australian Institute of Food Safety. Food safety: cleaning and sanitizing. Available at: <https://www.foodsafety.com.au/blog/food-safety-cleaning-and-sanitising>

[12] Pourzamani, H., kadkhodaei, N., Fadaei, S., Taheri, E., Bagheri, R., Manesh, R.M., Yusefi, H., Hatamzede, M., Majihi, S., Nahidan, M. (2018). Alternative disinfection methods use to control microbial quality and shelf life of raw eaten vegetables (case study). International Journal of Health Studies.