

Physical and Chemical Alternative Methods of Fresh Produce Disinfection

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Abstract : Fresh produce is an essential component of a healthy diet. However, it can also be a potential source of pathogenic microorganisms that can cause foodborne illnesses. Traditional disinfection methods, such as washing with water and chlorine, have limitations and may not effectively remove or inactivate all microorganisms. This has led to the development of alternative/new methods of fresh produce disinfection, including physical and chemical methods. In this paper, we explore the physical and chemical new methods of fresh produce disinfection, their advantages and disadvantages, and their suitability for different types of produce. Physical methods of disinfection, such as ultraviolet (UV) radiation and high-pressure processing (HPP), are crucial in ensuring the microbiological safety of fresh produce. UV radiation uses short-wavelength UV-C light to damage the DNA and RNA of microorganisms, and HPP applies high levels of pressure to fresh produce to reduce the microbial load. These physical methods are highly effective in killing a wide range of microorganisms, including bacteria, viruses, and fungi. However, they may not penetrate deep enough into the product to kill all microorganisms and can alter the sensory characteristics of the product. Chemical methods of disinfection, such as acidic electrolyzed water (AEW), ozone, and peroxyacetic acid (PAA), are also important in ensuring the microbiological safety of fresh produce. AEW uses a low concentration of hypochlorous acid and a high concentration of hydrogen ions to inactivate microorganisms, ozone uses ozone gas to damage the cell membranes and DNA of microorganisms, and PAA uses a combination of hydrogen peroxide and acetic acid to inactivate microorganisms. These chemical methods are highly effective in killing a wide range of microorganisms, but they may cause discoloration or changes in the texture and flavor of some products and may require specialized equipment and trained personnel to produce and apply. In conclusion, the selection of the most suitable method of fresh produce disinfection should take into consideration the type of product, the level of microbial contamination, the effectiveness of the method in reducing the microbial load, and any potential negative impacts on the sensory characteristics, nutritional composition, and safety of the produce.

Keywords : fresh produce, pathogenic microorganisms, foodborne illnesses, disinfection methods

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