Stellar Unity
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Technical Information Sheet

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Fruit and Vegetable Processing

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Product Category	• FDA certified fruit sanitizing agent, Peracetic Acid • FDA certified vegetable sanitizing agent, Peracetic Acid • CIP and OPC for fruit and vegetable processing equipment and line
Application	• Fruit process decontamination • Vegetable process decontamination • Food equipment decontamination
Key Function(s)	• Eliminate pathogenic microorganism • FDA compliance for food factory • Food safety

Chemical sanitizers are important to the quality and safety of minimally processed food products, such as fresh and fresh-cut fruits and vegetables. While chlorine remains the most widely used chemical sanitizer in the fresh produce industry, the drawbacks of chlorine have been studied and pressured with high health concerns. Therefore, other equally effective and cost-efficient alternatives that are more environmentally and worker friendly are needed. Peracetic acid (PA), an equilibrium mixture of hydrogen peroxide and acetic acid, has been approved by the US Food and Drug Administration (FDA), EU, and also approved by FDA Thailand, where most of the Thai regulations for food safety are following developed countries. PA can be used to sanitize food contact surfaces of equipment and direct washing of fruits and vegetables, with guided dosage control. The PA shows potential as an alternative sanitizer because it has strong oxidizing capabilities, does not produce harmful by-products or does not leave behind toxic residues, and is accepted for use in organic production. The use of and research on PA in postharvest disinfection of fruits and vegetables is described here, highlighting its mechanism, composition and efficacy, potential toxicity and sensory effect, along with its regulatory status.

What is Fruit and Fruit processing?

Fruits are a high-moisture, generally acidic food that is relatively easy to process and that offers a variety of flavor, aroma, color, and texture to the diet.

Food processing aims to make food more marketable and attractive to potential consumers, often giving the processed food a longer shelf-life. Fruit can go through numerous types of processing, including canning, drying, and juicing. Some types of processed fruit are fruit preserves, canned fruit, and fruit juices. Processed fruit is generally not as healthy as fresh. However, raw fruit washing, drying, and packaging fruit is usually not considered processing. Processing begins when the fruit is turned into something other than raw fruit by cooking or preserving it. Even if this process is as simple as cutting an apple and drying it to preserve it, that

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apple is no longer raw fruit. Sometimes additives, preservatives, and sugar are added to processed fruit to make it look and taste better than it normally would when a customer finally opens the product to consume it. After fruit is washed multiple times, the processing begins. As an example, if the fruit is to be turned into fruit preserves, it is first cooked until soft. A sugary syrup and sometimes additives and preservatives are added. The fruit is then sealed into a jar, or in some cases, placed in a squeeze bottle. As another example, the fruit is dried and packaged, sometimes with sugar added depending on how sweet the fruit is naturally.

Ensuring proper disinfection of surfaces in contact with food to avoid microbiological contamination is one of the main concerns of the food industry.

Low environmental impact

The high reactivity of PA ensures that it decomposes rapidly into acetic acid and water, having a very low impact on wastewater and a high level of biodegradability. Especially when compared to other widely used disinfectants such as sodium hypochlorite (which in contact with organic matter and wastewater produces harmful by-products such as chloramines, chlorophenols or trihalomethanes) or quaternary ammoniums (which are an important source of nitrogen and do not decompose as quickly as peracetic acid).

Disinfection of food surfaces with peracetic acid

All these advantages have led, in recent years, to a significant increase in the use of peracetic acid as a first choice disinfectant in the food industry. The active ingredient is registered as a biocidal active substance (according to Biocidal Products Regulation (EU) 528/2012) for application on both veterinary surfaces (PT3) and food surfaces (PT4). Consequently, the most common types of application are: Recirculation in CIP cleaning (Clean in Place)– This is the most common and widely used application in the food industry. The most usual concentrations of PA in the concentrated product are 5 and 15 %, with it being possible to use some tracer to facilitate its automatic control by conductivity. Or without tracer, using PA probe reading.

Open surface cleaning (OPC) – By means of foam projection. These are products with a lower concentration of foamed PA than that used in circuits, around 1.5%, in order to reduce the discomfort caused by the characteristic odour of the product. PA can be used after detergent cleaning for all fruit and vegetable cleaning equipment, proper dosage is highlighted and suggested.

Disinfection of food with peracetic acid

The advantageous characteristics of peracetic acid (low toxicity, efficacy at low doses, rapid decomposition into harmless substances…) make it an ideal food adjuvant for applications such as fruit and vegetable disinfection. In Thai FDA scope, this PA category is registered as a food additive. Although sodium hypochlorite is still the most widely used disinfectant for this application for its very cheap cost, the advantages offered by peracetic acid are leading to its progressive introduction in the market. The countries of the European Union benefit from the principle of mutual recognition provided for in the EU treaty. In France, PA was approved for use as a food technological adjuvant for the disinfection of spinach and vegetables prior to the packaging process. This approval is extended to the rest of the countries of the Union.

Conclusions

Considering the high level of efficacy at low doses, combined with the good ecological profile and low application cost, Stellar Unity can conclude that PA is a particularly suitable disinfectant for a wide variety of disinfection processes in the fruit and vegetable industry.

In order to respond to all these applications, Stellar Unity has sanitizing products based on peracetic acid, all duly registered. Stellar Unity has provided all cleaning products, legally registered by Thai FDA and DLD (department of livestock development), and labor services for all kinds of food processing industry. Stellar Unity has combined chemical products, especially Peracetic Acid, with engineering tools and dosing equipment for all their services.