Guide for Washing and Crisping Whole Raw Fruits and Vegetables at Food Establishments

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Prepared for submission to:

2020 Biennial Meeting of the Conference for Food Protection

I. Disclaimer

(Need CFP legal review)

The guidance in this document does not create or confer any rights for, or on, any person and does not operate to bind public health officials or the public. This guide does not have the force and effect of law and thus is not subject to enforcement. This guide encourages food establishments to use the general recommendations in the guidance to tailor food safety practices appropriate to their operations.

II. Preamble

In response to Issue #2018-III-013 presented at the 2018 Conference for Food Protection (CFP) Biennial Meeting, Council III voted, and it was subsequently approved, to recreate the Produce Wash Water Committee. The following charges were given to the Committee:

1. Develop a Produce Washing and Crisping Guidance document for Retail Food Establishments which includes the following:
    a. Detail the handling, cleaning, and sanitation practices related to washing and crisping of produce.
    b. Describe the criteria for produce crisping vs. produce washing.
    c. Clarify the types of chemicals and their use for washing and crisping.

2. Report findings and recommendations back to the 2020 Conference for Food Protection Biennial Meeting.

III. Introduction

Fresh fruit and vegetable risk control measures, such as those detailed in the Food Safety Modernization Act (FSMA), the Produce Safety Rule, Food and Drug Administration (FDA) Guidance Documents and industry best practices guides, have enhanced the implementation of preventive controls during growing, harvesting, packing, holding and processing. However, despite these efforts, since there is no kill step for pathogens on whole, raw fruits and vegetables they may be contaminated when they enter commerce. Food establishment operators should be aware of potential risks associated with fruits and vegetables that may be washed at retail and consider appropriate risk control steps when handling fresh produce.

In food establishments, "… raw fruits and vegetables shall be thoroughly washed in water to remove soil and other contaminants before being cut, combined with other ingredients, cooked, served, or offered for human consumption in READY-TO-EAT form" as per the 2017 FDA Food Code 3-302.15(A). [1]

As per the FDA Food Code Annex #3, "It was assumed that washing removes the majority of organisms and/or chemicals present; however, more recent studies have demonstrated washing to fall short of their complete removal." [2]

In food establishments, different methods are used to wash different types of produce, including submersion, spray, rinsing, or a combination of these. Each method has advantages and risks that should be considered.

Spraying or rinsing with water, rather than submerging in water, may be less likely to cross-contaminate produce or result in infiltration of water. However, care must be taken with spray washing to prevent contamination by splashing or by aerosol. In a food establishment, this method may not be practical for large quantities of product.

Submersion in water is a common method used for washing whole, raw fruits and vegetables in food establishments. This method can present a risk of cross-contamination if pathogens present on the surface of the produce subsequently contaminate the water. Studies have shown that under certain conditions, pathogens washed off the produce surface into the water may be internalized into the produce via water infiltration. [3, 4, 5]

Regardless of wash method used, retail food establishments should be aware of the potential risks and control measures to minimize those risks. This guide seeks to assist food establishments that wash whole, raw produce by providing risk control steps for washing methods when using water alone, chemical treatments, and/or antimicrobial treatments. In practice, the differences in methods and treatments are not always understood or well differentiated. This guide provides information that should be considered when selecting a method for washing produce.

IV. Definitions

Antimicrobial Pesticide (Treatment): An antimicrobial pesticide [also called an antimicrobial treatment] is intended to disinfect, sanitize, reduce, or mitigate growth or development of microbiological organisms or protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime. [6]

Antimicrobial products are divided into two categories based on the type of microbial pest against which the product works:

- **Public health antimicrobial pesticide products** are those products that bear a claim to control pest microorganisms that pose a threat to human health, and whose presence cannot readily be observed by the user, including but not limited to, microorganisms infectious to humans in any area of the inanimate environment, including water. [6]

- **Nonpublic-health antimicrobial pesticide products** are those products that bear a label claim to control microorganisms of economic or aesthetic significance, where the presence of the microorganism would not normally lead to infection or disease in humans. [6] Examples include fungi or lactic acid bacteria that can cause spoilage.

Food Additive: Any substance the intended use of which results or may reasonably be expected to result, directly or indirectly, either in their becoming a component of food or otherwise affecting the characteristics of food. Includes any substance intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food; and including any source of radiation intended for any such use if such substance is not GRAS or sanctioned prior to 1958 or otherwise excluded from the definition of food additives. [7]

Fresh-Cut Produce: Any fresh fruit or vegetable or combination thereof that has been physically altered from its whole state after being harvested from the field (e.g., by chopping, dicing, peeling, ricing, shredding, slicing, spiralizing, or tearing) without additional processing (such as blanching or cooking). [8]

Infiltration (Internalization): As it relates to fresh produce, the process of a liquid, usually water, permeating the internal structure by penetrating its pores [stoma], cut surfaces or other openings. [5] Infiltration of microorganisms can occur through stem scars, cracks, cuts, or bruises in certain fruits and vegetables during washing. [2] Microorganisms in water have been shown to enter produce through various pathways available due to the natural structure of certain produce. Various factors such as type of commodity, age, condition of the item (e.g., wounds, cracks, stem removal), water temperature, time in the water, and hydrostatic pressure can play a role in the internalization of microorganisms into fruits and vegetables. [4]

On-Site Generators: Devices that produce antimicrobial pesticides (chemicals), and which are located at the retail facility. On-site generators produce the antimicrobial chemical (usually a gas or liquid) via a chemical reaction and should not be confused with equipment that mixes, dilutes, or delivers chemicals that have been manufactured elsewhere. Refer to the FDA Food Code for details on using antimicrobials generated by on-site devices. [9]

- Whole, raw fruits and vegetables can be washed using antimicrobial treatments generated on-site.
- The EPA does not require the registration of the chemicals produced on-site from generating devices.
- The device must be manufactured in a registered establishment.
- Because there is no EPA registration of solutions generated and used on-site, the user of the equipment should look to the equipment manufacturer for data to validate the efficacy of the solution as well as the conditions for use.

Potable Water: Water that meets criteria as specified in 40 CFR 141 National Primary Drinking Water Regulations; referred to in the 2017 FDA Food Code as *drinking water*.
(2017 FDA Food Code 1-201.10) [1]

Produce: Any fruit or vegetable (including mixes of intact fruits and vegetables) and includes mushrooms, sprouts (irrespective of seed source), peanuts, tree nuts, and herbs. A fruit is the edible reproductive body of a seed plant or tree nut (such as apple, orange, and almond) such that fruit means the harvestable or harvested part of a plant developed from a flower. A vegetable is the edible part of an herbaceous plant (such as cabbage or potato) or fleshy fruiting body of a fungus (such as white button or shiitake) grown for an edible part such that vegetable means the harvestable or harvested part of any plant or fungus whose fruit, fleshy fruiting bodies, seeds, roots, tubers, bulbs, stems, leaves, or flower parts are used as food and includes mushrooms, sprouts, and herbs (such as basil or cilantro). [10]

Raw Agricultural Commodity (RAC): Any food in its raw or natural state, including all fruits that are washed, colored, or otherwise treated in their unpeeled natural form prior to marketing. [11] Certain activities such as refrigeration, washing, trimming, and waxing do not transform a RAC into a new or distinct commodity. Transforming a RAC into a processed food involves altering the general state of the commodity, sometimes referred to as transformation of a RAC. Examples of activities that may be manufacturing/processing without transforming a RAC into a processed food include coloring, washing, and waxing. Examples of activities that change a RAC into a processed food include chopping, cooking, cutting, homogenization, irradiation, and pasteurization.

Ready-to-Eat (RTE) Food: Food that is in a form that is edible without additional preparation to achieve food safety. (2017 FDA Food Code 1-201.10) [1] For this Guide, RTE includes raw fruits and vegetables [RACs] that are washed as specified under FDA Food Code § 3-302.15. [1]

Risk Factors: Food preparation practices and employee behaviors most commonly reported to the Centers for Disease Control and Prevention (CDC) as contributing factors in foodborne illness outbreaks. Risk factors include: Food from Unsafe Sources, Improper Holding Temperatures, Inadequate Cooking, Contaminated Equipment, and Poor Personal Hygiene. (2017 FDA Food Code, Annex 7, Guide 3-B) [1]

Sanitizer: Product [or substance] used to reduce, but not necessarily eliminate, microorganisms from the inanimate environment to levels considered safe as determined by public health codes or regulations. [12] Sanitizers can be designated for use on food-contact and/or nonfood-contact surfaces.

V. Information to Assist the User

(A) Scope

- This guidance is specific to whole, raw fruits and vegetables (also called raw agricultural commodities or RACs) that are washed at food establishments.
- This guidance does not apply to further processed fruits and vegetables, such as fresh-cut produce.
- In addition to washing, another common retail practice, known as crisping, involves produce-to-water contact. Therefore, this guide also provides information regarding the risks and controls that should be considered when selecting a method for crisping produce. (See Section VII)

(B) Understanding/Clarifying Sanitizers and Disinfectants

The words cleaner, sanitizer, disinfectant, pesticide and antimicrobial treatment are often misused, which can lead to confusion. This section attempts to provide an explanation and clarification of these terms as used by the US Environmental Protection Agency (EPA) and FDA.

Pest, Pesticide, and Antimicrobial Pesticide

The term "pest" means: "(1) any insect, rodent, nematode, fungus, weed, or (2) any other form of terrestrial or aquatic plant or animal life or virus, bacteria, or other micro-organism (except viruses, bacteria, or other micro-organisms on or in living man or other living animals)…." [13]

A "pesticide" is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating pests. A product is likely to be a pesticide if the labeling or advertising "makes a claim to prevent, kill, destroy, mitigate, remove, repel or any other similar action against any pest." [14]

Antimicrobial pesticides [also referred to as antimicrobial treatments] are substances or mixtures of substances used to destroy or suppress the growth of harmful microorganisms such as bacteria, viruses, or fungi on inanimate objects and surfaces. [12] Antimicrobial pesticides are intended to disinfect, sanitize, reduce, or mitigate growth or development of microbiological organisms; or protect inanimate objects, industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime. [12]

Sanitizers and Disinfectants

Food-contact surface sanitizers are EPA-registered products that are used to reduce, but not necessarily eliminate, microorganisms from the inanimate environment to levels considered safe as determined by public health codes or regulations. [12] They may not totally eliminate

microorganisms from hard, nonporous inanimate surfaces, but they reduce them to levels considered safe from a public health standpoint.

The FDA Food Code 1-201.10 describes sanitization as the "…application of cumulative heat or chemicals on cleaned food-contact surfaces that, when evaluated for efficacy, is sufficient to yield a reduction of 5 logs, which is equal to a 99.999% reduction, of representative disease microorganisms of public health importance. [1]

Disinfectants are also EPA-registered products that can be used on hard, non-porous surfaces to destroy or irreversibly inactivate infectious bacteria and fungi, but not necessarily their spores. [12]

The efficacy testing, performance standards, and label claims required by EPA for food-contact surface *sanitizers* are different than those of hard surface *disinfectants*, as well as the intended purpose for these two types of products.

Likewise, the efficacy testing, performance standards, and label claims required by EPA for *surface sanitizers* are different than those required for *produce antimicrobial treatments*. EPA registered antimicrobial produce washes (treatments) must demonstrate antimicrobial efficacy in the wash water, but not on the produce surface. There are also different requirements for the substances allowed for treatment of food-contact surfaces vs. produce treatments. Not all substances approved as hard surface sanitizers can be used for produce wash antimicrobial treatments. For example, quaternary ammonium compounds (Quats) are commonly used as active ingredients for food-contact surface sanitizers but currently they are not allowed for use as produce antimicrobial wash treatments.

> Substances for use as produce treatments are listed in 21 CFR §173 as additives permitted for human consumption [15] and in 21 CFR §184 as substances Generally Recognized As Safe. [16]
>
> Substances cleared for use in antimicrobial formulations as hard surface sanitizers are listed in 40 CFR 180.940. [17]

VI. Methods and Risk Controls for Washing Whole Raw Fruits and Vegetables

The following general principles apply to all the methods for washing whole, raw produce in food establishments included in the following chart titled:

WASHING Whole Raw Fruits and Vegetables – Methods and Risk Reductions

In general:

- This guidance is specific to whole, raw fruits and vegetables (RACs) and does not apply to processed produce.
- Use only potable water when washing produce.
- All chemical treatments should meet the requirements of the FDA Food Code, Section 7-204.12. [1] Unless otherwise stipulated in 21 CFR 173, chemicals used to wash or peel fruits and vegetables should not exceed the minimum amount required to accomplish the intended effect, need to be accurately tested for proper concentration, and must adhere to any indications as dictated on the product label. (2017 FDA Food Code Annex 3-302.15) [1]
- A food establishment should consider developing a written procedure (such as a Standard Operating Procedure, job aid, or instructional wall chart) for washing produce. Controls for risk factors such as sourcing, receiving, holding temperatures, product handling, cleaning and sanitizing surfaces and equipment including the sink where produce will be washed, employee health, and personal hygiene can be found in the FDA Food Code and may be considered as part of the procedure or as pre-requisites prior to produce washing.
- This guide does not provide specific recommendations for how to comply with the FDA Food Code or state/local requirements. Because this guide does not repeat the full text of all requirements, users should familiarize themselves with the applicable requirements.

Different methods are used for washing whole, raw fruits and vegetables at food establishments. The following chart lists recommended risk reductions for each of the most commonly used produce washing methods.

WASHING Whole Raw Fruits and Vegetables – Methods and Risk Reductions		
Method	**Risk Reductions**	**Comments**
(W1) Washing fruits and vegetables by rinsing or spraying under continuous running and draining water	• Rotating produce items so that all surfaces are washed/rinsed thoroughly • Providing sufficient water velocity to loosen soil and particles from the surface • Washing individual pieces or small batches of produce	• When produce is not submerged in water the risk of cross-contamination and microbial infiltration may be reduced. • This method could cross-contaminate if multiple pieces are rinsed at the same time. • Do not allow water to splash onto other product or food-contact surfaces. • This method may not be practical for large volumes of produce.
(W2) Washing fruits and vegetables by rinsing or spraying in a container under a continuous stream of running water with a continuous overflow	• Maintaining water temperature warmer than the pulp temperature of the produce to reduce potential infiltration • Providing sufficient water velocity to loosen soil and particles from the surface and to float off loose particles in the overflow • Stirring the produce in the container to ensure equal exposure to the water flow • Washing small batches of produce	• The use of continuously flowing and draining water may reduce the potential risk of cross-contamination. • This method could cross-contaminate if multiple pieces are rinsed at the same time. • Do not allow water to splash onto other product or food-contact surfaces. • This method may not be practical for large volumes of produce.

Method	Risk Reductions	Comments
(W3) Washing fruits and vegetables by submerging or by spraying or rinsing under running water using an EPA registered antimicrobial treatment in the water Note: The treatment may be provided in a concentrated form that has to be diluted for use as per label instructions.	• Following all manufacturer's instructions and the registered EPA label instructions for use • Using the concentration of the antimicrobial indicated by the manufacturer's use directions included in the EPA registered label • Agitating the produce to loosen soil and surface contaminants and to ensure all produce is exposed to the treated water	• Consult the EPA registered product label to determine if the product controls pathogens in the wash water, e.g., a 3-log reduction of *Salmonella, Listeria monocytogenes*, and *E. coli* O157:H7. • By reducing pathogens introduced into the water by contaminated produce, the risk of cross-contamination via the water and pathogen infiltration is reduced. • When it is not practical to reduce the temperature differential between the water and the produce, using an antimicrobial product in the wash water helps to mitigate the risk of pathogen contamination from wash water via infiltration. • Decreasing produce soaking time has been shown to reduce water infiltration rate. • The treated water should be prepared, and the concentration verified, following manufacturer label instructions.
(W4) Washing fruits and vegetables by submerging in water using a produce wash that is an approved food additive, or generally recognized as safe (GRAS), or is the subject of a food contact notification (FCN) as per FDA Food Code 7-204.12, but is not registered as an antimicrobial by EPA	• Following the manufacturer's instructions • Maintaining water temperature warmer than the pulp temperature of the produce to reduce potential infiltration • Developing a policy for the frequency of changing the water • Agitating the produce to loosen soil and surface contaminants	• These wash products may help loosen and remove soil and other contaminants on the surface of produce, but they have limited antimicrobial properties on pathogens introduced into the water by contaminated produce. • These wash products are not EPA registered, and do not make any pathogen kill or reduction claims. • Decreasing produce soaking time has been shown to reduce water infiltration rate. • The treated water should be prepared, and the concentration verified, following manufacturer label instructions.

Method	Risk Reductions	Comments
(W5) Washing fruits and vegetables by submerging in water without adding anything to the water	• Maintaining water temperature warmer than the pulp temperature of the produce to reduce potential infiltration • Developing a policy for the frequency of changing the water • Agitating the produce to loosen dirt and contaminants	• This method provides the fewest preventive controls. • Water may loosen soil and some pathogens from the surface but will not reduce pathogens in the water; this increases the risk of pathogen cross-contamination and infiltration of pathogens via the water. • Decreasing produce soaking time has been shown to reduce water infiltration rate.

VII. Methods and Risk Controls for Crisping Whole Raw Fruits and Vegetables

Certain types of whole, raw fruits and vegetables may come in contact with water during a process known as crisping. Other terms used for this practice are re-crisping, hydrating, re-hydrating, and conditioning. Because washing and crisping may use the same produce-to-water contact methods, this guide also provides information regarding the risks and controls that should be considered by food establishments when selecting a method for crisping produce.

Crisping is the process of rehydrating produce with water for the primary purpose of maintaining quality and appearance. The process of crisping may also incorporate a method for chilling such as holding the produce under refrigeration. "Crisping typically involves the submersion of commodities in water (with or without sanitizers) followed by refrigeration, which gives products a fresh look and crisp texture." [18] Crisping may also have the added benefit of contributing to sustainability initiatives such as reducing food waste and maintaining the produce quality appearance.

A primary risk factor that needs to be considered when crisping certain types of produce is internalization of pathogens. "Enteric pathogens have been shown to enter plant tissues through natural apertures (stomata, lateral junctions of roots, flowers), damaged tissue (wounds, cut surfaces)," [5] and purposeful openings such as stem trimming. Studies have shown that under certain conditions, pathogens washed off the produce surface may be internalized into the produce via water infiltration. [4, 5, 8] Pathogen internalization can occur at any time including pre-harvest, post-harvest processing and food establishment handling. Various factors such as type of commodity, age, condition of the item (e.g., wounds, cracks, stem removal), water temperature, time in the water, and hydrostatic pressure can play a role in the internalization of water which could contain pathogens if microbiological water quality is not maintained.

Crisping and washing have different objectives, however they share similar risks and controls. Washing is performed to clean produce surfaces and to remove surface soil and potential contaminants. The 2017 FDA Food Code 3-302.15(A) states "… raw fruits and vegetables shall be thoroughly washed in water to remove soil and other contaminants before being cut, combined with other ingredients, cooked, served, or offered for human consumption in ready-to-eat form." [1] Crisping is an optional practice, intended to maintain the quality and appearance of raw fruits and vegetables, and is not addressed in the FDA Food Code.

The information in this Guide regarding crisping reflects industry practices, published references (see Section IX), and input from subject matter experts. Because the FDA Food Code does not address crisping, this Guide is for use at the sole discretion of the food establishment and State/local regulators.

The following general principles apply to all the methods for crisping whole, raw produce in food establishments included in the following chart titled:

CRISPING Whole Raw Fruits and Vegetables – Methods and Risk Reductions

In general:

- This guidance is specific to whole, raw fruits and vegetables (RACs) and does not apply to processed produce.
- Use only potable water when crisping produce.
- When used, all chemical treatments should meet the requirements of the 2017 FDA Food Code 7-204.12. [1]
- A food establishment should consider developing a written procedure (such as a Standard Operating Procedure, job aid, or instructional wall chart) for crisping produce. Controls for risk factors such as sourcing, receiving, holding temperatures, product handling, cleaning and sanitizing surfaces and equipment, employee health, and personal hygiene can be found in the FDA Food Code and may be considered as part of the procedure or as pre-requisites prior to produce crisping.
- This guide does not provide specific recommendations for how to comply with the FDA Food Code or state/local requirements. Because this guide does not repeat the full text of all requirements, users should familiarize themselves with the applicable requirements.

Different methods are used for crisping whole, raw fruits and vegetables at food establishments. The following chart lists recommended risk reductions for each of the most commonly used crisping methods.

CRISPING Whole Raw Fruits and Vegetables – Methods and Risk Reductions		
Method	**Risk Reductions**	**Comments**
(C1) Produce is submerged in water containing an EPA registered antimicrobial Note: The treatment may be provided in a concentrated form that has to be diluted for use as per label instructions.	• Following all manufacturer's instructions and the registered EPA label instructions for use • Using the concentration of the antimicrobial indicated by the manufacturer's use directions included in the EPA registered label • Minimizing the time produce remains in the water • Holding the produce under refrigeration to complete the crisping process	• Consult the EPA registered product label to determine if the product controls pathogens in the wash water, e.g., a 3-log reduction of *Salmonella, Listeria monocytogenes,* and *E. coli* O157:H7. • By reducing pathogens introduced into the water by contaminated produce, the risk of cross-contamination via the water and pathogen infiltration is reduced. • When it is not practical to reduce the temperature differential between the water and the produce, using an antimicrobial product in the wash water helps to mitigate the risk of pathogen contamination from wash water via infiltration. • The treated water should be prepared, and the concentration verified, following manufacturer label instructions.
(C2) Produce is submerged in water with an added treatment that is an approved food additive, or generally recognized as safe (GRAS), or is the subject of a food contact notification (FCN) as per FDA Food Code 7-204.12, but is <u>not</u> registered by EPA as an antimicrobial	• Following the manufacturer's instructions • Maintaining water temperature warmer than the pulp temperature of the produce to reduce potential infiltration • Developing a policy for the frequency of changing the water • Minimizing the time produce remains in the water • Holding the produce under refrigeration to complete the crisping process	• These treatments are <u>not</u> EPA registered, and do not make any pathogen kill or reduction claims. • These treatments have limited antimicrobial properties on pathogens introduced into the water by contaminated produce; therefore, there is a risk of cross-contamination and pathogen infiltration. • Decreasing produce soaking time has been shown to reduce water infiltration rate. • The treated water should be prepared, and the concentration verified, following manufacturer label instructions.

Method	Risk Reductions	Comments
(C3) Produce is submerged only in water, without adding anything to the water	• Maintaining water temperature warmer than the pulp temperature of the produce to reduce potential infiltration • Developing a policy for the frequency of changing the water • Minimizing the time produce remains in the water • Holding the produce under refrigeration to complete the crisping process	• This method provides the fewest preventive controls. • Pathogens on the surface of produce may be introduced into the water which can then cross-contaminate other produce items in the same water. • It has been shown that submerging some produce in water that is colder than the produce can increase the risk of pathogen infiltration. • Decreasing produce soaking time has been shown to reduce water infiltration rate.
(C4) Produce is submerged in water in a container under a continuous stream of running water with a continuous overflow.	• Maintaining water temperature warmer than the pulp temperature of the produce to reduce potential infiltration • Crisping small batches to minimize cross-contamination • Minimizing the time produce remains in the water • Holding the produce under refrigeration to complete the crisping process	• The use of continuously flowing and draining water may reduce the potential risk of cross-contamination. • This method may not be practical for large volumes of produce.

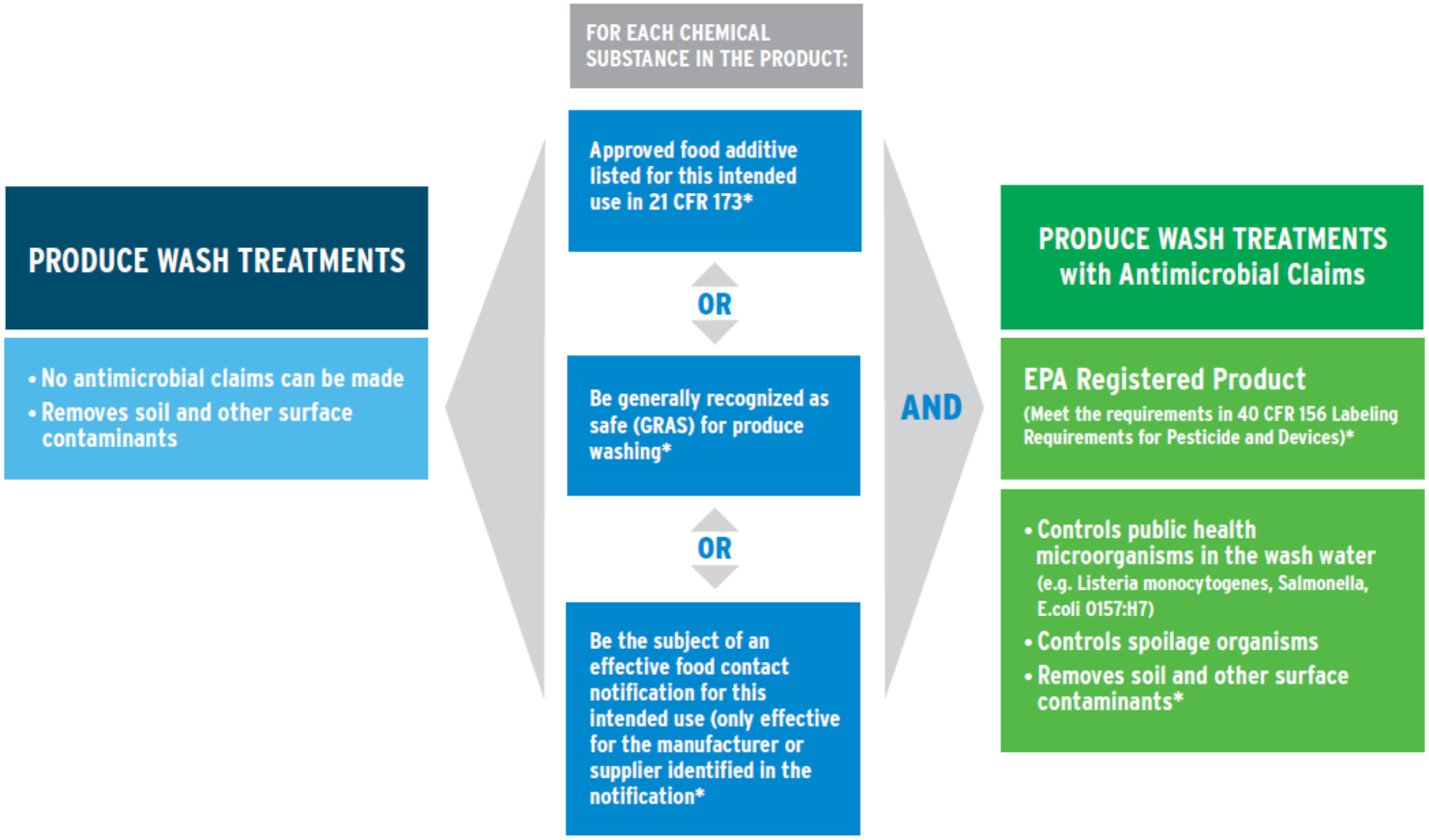
VIII. Chemical Use and Regulations

Chemicals used for washing and crisping produce and/or to reduce microbial cross-contamination via wash water should be formulated from ingredients that are approved for this application and must be used in accordance with FDA and EPA regulations.

The following charts describe the approval process for chemicals, with and without antimicrobial claims, used for washing or crisping whole, raw fruits and vegetables.

Antimicrobial pesticide products are categorized by EPA as either "public health" or "non-public health," depending on the specific claims made on each product's labeling. Registrants of public health antimicrobial pesticide products must submit efficacy data to EPA to support their application for registration or amendments to add public health claims. The chemical producer or supplier is responsible for obtaining the appropriate approvals and assuring that the label provides instructions on proper use of the chemical for the intended purpose.

WASHING WHOLE RAW FRUITS AND VEGETABLES (RACS) USING CHEMICALS



*Reference Food Code §7-204.12

Note: This diagram does not include chemicals designed for the treatment of further processed produce

Washing Whole Raw Fruits and Vegetables (RACs) Using Chemicals

All chemicals used for washing fruits and vegetables should meet Food Code 7-204.12 requirements

Treatment Types	Intended Use	Food Code Compliance	Comments
Antimicrobial EPA registered chemicals	To control pathogens or spoilage organisms in wash water.	Could be used for Washing Fruits and Vegetable as specified in FDA Food Code 3-302.15	Consult the product label to determine if the chemical controls pathogens in the wash water (e.g., a 3-log reduction *of Salmonella, Listeria monocytogenes, E. coli O157:H7*) and/or reduces non-public health organisms (e.g. spoilage organisms).
Chemicals with no antimicrobial claims (not EPA registered)	To help loosen soil from the produce surfaces.	Could be used for Washing Fruits and Vegetable as specified in FDA Food Code 3-302.15	No antimicrobial efficacy claims are made. Cross-contamination via water is not addressed.

This table does not include chemicals designed for treatment of further processed produce

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X. Acknowledgements

Prepared by the Produce Wash Water Committee created at the CFP 2018 Biennial Meeting.

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Vice-Chair: Jaime Hernandez
Working group members: Amanda Garvin; Erich Hess; Jaime Hernandez; Janet Buffer; Jill Hollingsworth; Kris Zetterlund; Rick Barney; Todd Rossow
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Council III chair: Keith Jackson
Council III vice-chair: Christine Applewhite

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