

Draft for Discussion

**Alliance for Sustainable Hydroponics
Clean Hydroponic Produce Standard - July 2020**

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Alliance for Sustainable Hydroponics (ASH)
Clean Hydroponic Produce Standard - July 2020

Introduction

The A.S.H. Clean Hydroponic Produce Standard was written to recognize and differentiate and develop hydroponic food production systems to:

- Reduce travel time and transportation costs for fresh food
- Improve nutrient density of hydroponic greens through rigorous scientific research
- Ensure non-seasonal supply of nutritious food less vulnerable to supply disruption
- Increase the diversity of produce varieties available to consumers
- Eliminate and control agricultural pests through non-toxic methods
- Grow leafy greens with no residues of toxic pesticide or dangerous pathogens
- Measure accurately energy and water use in controlled growing systems
- Provide opportunities for agricultural education and training
- Make fresh high-quality produce more affordable
- Reward workers and producers with fair compensation

Scope One of the CHiPS standard applies only to growing systems which:

- Do not grow plants with roots in soil in the ground and
- Do not use natural sunlight to support photosynthesis.

Scope Two of the CHiPS standard applies only to growing systems which:

- Do not grow plants with roots in soil in the ground and
- Expose crops to natural sunlight during daylight hours
- Are enclosed in a hoop house, green house or other light-permeable structure.

Scope Three of the standard applies only to growing systems which:

- Do not grow plants with roots in soil in the ground and
- Expose crops to natural sunlight during daylight hours and
- Are NOT enclosed in a hoop house, green house or other structure except for shade cloth or netting.

Note: the current standard only address requirements under Scope One.

Only operations holding a current certificate representing conformance to the Clean Hydroponic Produce Standard may display the CHiPS seal on their food and agriculture product packaging and promotional materials.

Recommended Best Practices for CHiPS Production

CHiPS Best Practices are recommendations to ensure the highest level of integrity regarding sustainable environmental management and improved nutrient density.

§1.1 Crop Selection and Trait Development Program

1.1.1 Hydroponic crop varieties should be suited to the system in which they are grown to ensure robust growth and sufficient nutrient diversity and density.

1.1.2 Seed development programs should recognize the unique effects of closed indoor environments, artificial light, and artificial nutrition not derived from roots interacting with soil.

1.1.3 All CHiPS certified operations must participate in nutrient density / diversity studies by providing sample produce on request. Samples must be collected and shipped according to established protocols. Results will be treated as confidential business information and anonymized.

§1.2 Safe Handling

1.2.1 Certified CHiPS facilities must follow current best practices for produce handling as established by the Federal Food and Drug Administration guidelines and other authorities.

1.2.2 Certified CHiPS facilities must comply with the Bioterrorism Act of 2002

§1.3 Land Use

1.3.1 CHiPS operations shall not encumber arable soil or replace in-the-ground agriculture.

1.3.2 The exterior area around and under a CHiPS facility shall be maintained in a sanitary condition without the use of pesticides except those listed by OMRI. Escalated pest control treatments and methods must be approved in advance by the inspector or inspection agency.

1.3.3 Existing wildlife and wildlife habitat around the facility should be protected and maintained.

§1.4 Water and Energy Use

1.4.1 CHiPS certified operations must disclose the sources and total quantity of energy used to grow CHiPS produce and the quantity and type of produce grown.

1.4.2 CHiPS certified operations must disclose the sources and total quantity of water used to grow CHiPS produce and the quantity of produce grown.

1.4.3 Water and Energy use must be reported at least once a year.

1.4.4 All water and energy information will be treated as confidential and anonymized.

§2.1 The Language Used in the Standards

The following words are used to convey requirements for use of specific standards within the Clean Hydroponic Produce Certification Program:

CHiPS: Abbreviation for Clean Hydroponic Produce Standard

“Must”: Implementation of the standard is required.

“Recommended” or “Should”: A best practice that should be adhered to, but other methods may be accepted if the goal is achieved.

“Prohibited”: The practice is not allowed.

Hydroponic Produce: The term hydroponic produce refers to all agricultural products grown with roots in liquid, air, or in medium/substrate that is not part of the soil in the ground.

Clean Hydroponic Produce and CHiPS Produce: CHiPS Produce is used to refer to fruits, vegetables and fungi that are marketed under the Certified CHiPS seal. CHiPS Greens refers to the edible leafy greens as a subset of CHiPS Produce varieties.

§2.2 Record Keeping

2.1.1 All required records must be in sufficient detail as to demonstrate compliance with CHiPS standards to the inspector/inspection agency.

2.1.2 Records must be kept to demonstrate all Clean Hydroponic Produce is raised to CHiPS standard from seed to sale.

2.1.3 Records shall be kept for five years in electronic or paper format.

2.2.4 At minimum, records will include:

1. seed, purchases, plantings, spoilage, harvest and sale of produce
2. pest control monitoring, inspection and treatment
3. problems and resolutions
4. purchases and use of all other inputs

2.2.5 Logs and checklists must be initialed and dated by the staff who performs the task.

2.2.6 Implementation of the CHiPS system plan will be overseen by a coordinator responsible for all aspects of compliance.

§3.1 Nutrients and Materials

3.1.1 All production inputs, nutrients, pH conditioners, sanitizers, cleaners and other materials *that may come into contact with or contaminate crops* must be OMRI Listed or USDA NOP compliant.

3.1.2. CHiPS is not endorsed by OMRI and reference to OMRI and OMRI Listed materials is not intended to imply any relationship between CHiPS and OMRI.

§3.2 Indoor Environmental Management

3.2.1. All Certified CHiPS facilities will have in place a written environmental management plan that ensures CHiPS Greens will not be exposed to or contaminated by prohibited substances or pathogens.

3.2.2 A written prescriptive Integrated Pest Management (IPM) program must be included as part of the required CHiPS system management plan. Plan must be approved by the inspector/inspection agency and made available at the time of inspection.

3.2.3 The IPM may be self-administered by the facility staff unless a third-party service provider is required due to pest pressure or other circumstances. In inspector or inspection agency must approve the pest control service provider, protocols and materials.

3.2.4 A third party pest control provider must comply will all aspects of the IPM plan.

3.2.5 The use of **synthetic chemical pesticides** is prohibited, with these exceptions:

- When potentially dangerous mold, algae, insect or pathogenic conditions exists, or
- The facility is scheduled for a full preventive maintenance cleaning / sanitizing as required by the System Plan, statute or regulation, or
- A competent government authority orders remediation.
- Under no circumstances may CHiPS produce come into contact with these materials.

A written remediation plan must be approved by the inspector or inspection agency prior to start.

3.2.6 If the conditions of 3.2.5 above are met and synthetic chemical pesticides are used these conditions must also be met:

1. Avoid application on exterior of facility if near streams and wildlife habitat.
2. Pesticides must be mixed and applied according to manufacturer recommendations and application rates for enclosed indoor organically managed environments.
3. All plants, growing media and non-cleanable materials must be *permanently* removed from the facility prior to application
4. Cleaning staff and applicators must be protected from exposure to toxic substances

5. All points and areas of entry and pest accumulation and harborage must be cleaned and permanently closed or sealed
 6. All surfaces and equipment must be cleaned and rinsed after application
 7. Complete records must be kept showing product used, mixture of product, date of use, and application area.
 8. Records must be retained for five years and provided to the inspector/inspection agency at the time of inspection.
 9. Inspector or inspection agency may require testing for residues of materials applied.
- 3.2.7 Entry to the CHiPS facility must be restricted to trained, authorized and responsible personnel.
- 3.2.8 [reserved]
- 3.2.9 Use of BioEngineered or GMO seeds or starts is prohibited whether or not a replacement seed or start is commercially available.

§3.3 Promoting Nutrient Density and Diversity

- 3.3.1 CHiPS produce may only be removed from the facility using methods and materials that maintain the crop's nutritional integrity and prevent contamination and adulteration.
- 3.3.2 Clean Hydroponic Produce must receive adequate nutrition, light and air to equal or exceed the nutritional density and makeup of the same crop grown in soil.
- 3.3.3 Clean Hydroponic Produce Allowed Inputs: See Appendix A for approved Clean Hydroponic Produce inputs.
- 3.3.4 [reserved]
- 3.3.5 [reserved]
- 3.3.6 [reserved]
- 3.3.7 [reserved]
- 3.3.8 [reserved]
- 3.3.9 Receipts, ingredient lists, labels and/or tear tags must be provided to the inspector for all inputs.
- 3.3.10 A record of inputs used in Clean Hydroponic Produce production must be kept including type of input, timing and amounts used. Log must be made available to inspector.
- 3.3.11 The use of seeds, inputs or materials derived from genetically modified organisms/ bioengineering/synthetic biology to produce Clean Hydroponic Produce is prohibited and may result in loss of certified Clean Hydroponic Produce status.

§3.4 Marketing CHiPS Produce

- 3.4.1. Clean Hydroponic Produce produced in an inspected facility under an approved plan may be marketed as Clean Hydroponic Produce if the greens were under the control of the facility from seed to sale.
- 3.4.2. The CHiPS certification seal may not be amended or changed in any way except size. The size of the CHiPS logo must allow all text to be readable in a typical shopping environment.

§3.5 Crop Health

- 3.5.1 All crop production methods and management must promote plant health, produce safety, and nutritional density and diversity.
- 3.5.2 CHiPS producers must have a written system plan with standard operating procedures and recordkeeping for crop production.

3.5.3 [reserved]

3.5.4 [reserved]

3.5.5 CHiPS seeds, growing media, nutrient solutions or substrates treated with antibiotics, antifungals or antimicrobials are prohibited.

3.5.6 Sick or injured CHiPS produce unsuitable for human consumption must be removed from the facility. A record of each event must be kept for inspection.

3.5.7 Clean Hydroponic Produce fed or treated with any products not listed in Appendix A are prohibited and will result in loss of the facility's Certified CHiPS status.

3.5.8. [reserved]

3.5.9 [reserved]

3.5.10 [reserved]

3.5.11 [reserved]

3.5.12 [reserved]

3.5.13 [reserved]

3.5.14 Genetically modified or cloned crops are prohibited

§3.7 Crop Identification, Sourcing and Trace-Back

3.7.1 CHiPS produce must be grown only from USDA Organic or EU Biologique certified seed unless:

1. a specific variety is commercially unavailable AND
2. the certified facility establishes a program to cultivate organic seed of that variety.

3.7.2 CHiPS produce must be traceable by written or electronic record throughout its entire life cycle from seed to sale. Complete and up-to-date records must be maintained to identify all inputs purchased and all greens culled, harvested and sold and as part of the CHiPS produce program.

3.7.3 Certified CHiPS facilities must comply with the traceback and recall provisions of the Food Safety Modernization Act administered by the FDA.

3.7.4 Purchase of seedlings: seedlings not grown in the CHiPS facility may be purchased from outside sources that are certified organic producers holding a current valid organic certificate for seedling (bedding plant) production using an allowed hydroponic substrate.

3.7.4 All records must be maintained for a minimum of 5 years after the produce is harvested.

Clean Hydroponic Produce Standards Definitions

Clean Hydroponic Produce Standard (CHiPS): a certification program to promote fair, safe and responsible hydroponic crop production.

CHiPS Produce : Any produce marketed as Certified CHiPS produce.

Growing Media / Growing Medium / Growing Substrate. Any material used to anchor plant roots to provide adequate physical stability and to facilitate exposure to Nutrients in Nutrient Solutions. Media may include coir, gravel, pebbles and similar materials. Media may be enclosed in a container, tube, pipe, tray, trough, fabric, plastic, or other construction. Media may contain soil as a component of the media. Soil in the ground is *not* considered a growing medium for the purposes of certifying CHiPS systems and is out of scope for the certification program.

Nutrient. A mixture of macronutrients such as nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), sulfur (S), magnesium (Mg), carbon (C), oxygen (O), hydrogen (H) and micronutrients (or trace minerals) such as: iron (Fe), boron (B), chlorine (Cl), manganese (Mn), zinc (Zn), copper (Cu), molybdenum (Mo), nickel (Ni) intended to mimic the functions of naturally occurring elements and compounds in biologically active soil.

Nutrient Solution: Nutrients dissolved in water so they can be delivered to hydroponically grown plants via spray and drip systems.

Buffer Solution or pH solution: an aqueous solution consisting of a mixture of a weak acid and its conjugate base used to adjust a Nutrient Solution to optimize water and nutrient uptake to promote plant growth.

Commercially Available: the ability to obtain a seed stock in an appropriate form, quality or quantity at or before the time it is needed for planting. Exceptions for commercial availability do not apply to other CHiPS inputs, only seeds.

Coir: Strands of fiber from coconut pods that are compressed and formed into plant growing media. Coir allows crop roots to grow and spread to increase surface area available to absorb nutrients.

De Minimis: Amount too trivial or minor to merit consideration.

Plant Nutrition: The nutrients regularly provided to crops in a hydroponic system.

Extenuating circumstances: include but are not limited to fire, medical emergencies, federal or state mandated conditions, etc. CHiPS production does not allow extenuating circumstances to justify the adulteration or contamination of CHiPS crops. They may not be sold under the CHiPS seal.

Produce: produce refers to all fruits, herbs, vegetables and fungi customarily in the food supply.

Greens: types of produce with edible leafy greens such as lettuce, herbs, and the leaves of root vegetables.

Genetically modified organism: refers to any plant subjected to methods used to influence the growth or development of organisms by means that are not possible under natural conditions or processes. Such methods include cell fusion, microencapsulation and macro encapsulation, recombinant DNA technology (including gene editing, gene deletion, gene doubling, introducing a foreign gene and changing the position of genes when achieved by recombinant DNA technology). Such methods do not include the use of traditional breeding, conjugation, fermentation, hybridization, in vitro fertilization, or tissue culture. BioEngineering, Synthetic Biology and Synbio techniques all result in GMOs.

Seed: A seed is an embryonic plant enclosed in a protective outer covering. CHiPS production requires that crops be started from seed. Cloned crops are prohibited.

Residue: that which remains of any substance on or in the root, coir, body, stalk or leaves of produce.
CHiPS production does not allow the use of toxic inputs so as to avoid toxic residues.

Water Quality: Observable or measurable indicators of the physical, chemical, or biological condition of water / nutrient solution, including the presence of environmental contaminants.

Appendix A - Approved CHiPS Materials

Approved Materials for CHiPS Produce:

Nutrients: Organic Materials Review Institute (OMRI) Listed materials.

Growing Media/Substrate:

- Organic Materials Review Institute listed products.
- Mycotoxin/molds should not be present in the material being used as growing medium.
- Inert media must be FDA food grade

Buffer pH Solution:

- Organic Materials Review Institute listed products.

Cleaning and Sanitation Products:

- Must comply with the USDA National Organic Program National List
- Cleaners and sanitizers for food contact surfaces must be FDA approved

Pest Control:

- Materials must comply with the USDA National Organic Program National List

Water disinfectant:

- Inline Ozone generation
- Food grade filters for recirculating water.
- Approved source of raw water per FDA Produce Safety Rule
- Quarterly testing for common pathogens

Pest Control: [in process]

Appendix B – Banned Products

CHiPS Banned Products

Feeding or administering any of the products listed below to CHiPS crops will result in loss of Clean Hydroponic Produce certification status.

Appendix C – CHiPS Prohibited Materials and Practices

The following list of prohibited ingredients and feeds is not an exclusive list. The CHiPS Certification Committee may review and amend this list periodically

