

Harvesting Food Grade Seaweed in New York

This guide was developed to help New York's seaweed industry ensure seaweeds harvested from New York Waters are safe for human consumption. It is important for farmers to keep in mind that they are producing a food and adhere to best practices for sanitation including the good manufacturing practices (GMPs) where applicable at the farm level. For more information on GMPs, sanitation, and best practices for handling seaweeds, see NYSG [seafood guide 4](#) (GMPs), [seafood guide 5](#) (Sanitation), and [seaweed guide 2](#) (Maintaining Quality).

Food Safety Hazards

There are three main types of food safety hazards. Biological, chemical, and physical, which can be categorized as species related or process related. **Species hazards** are specific to the type of seaweed and the waters in which it is grown or harvested. **Process hazards** are those introduced during handling, transport, or processing.

Biological: Biological hazards include bacteria, viruses, yeast, mold, and parasites. Biological hazards can be species specific, based on growing/harvest waters, or process related. Biological hazards including bacteria and viruses can be introduced during processing within a facility.

Chemical: Chemical hazards can be naturally occurring, such as natural toxins, or environmental contaminants such as heavy metals, pesticides, herbicides, and other industrial pollutants. Chemical hazards are most commonly associated with coastal waters.

Physical: Physical food safety hazards are typically process related and introduced during harvest or processing. Physical hazards typically include glass, metal, and plastic. If the likelihood of physical contamination is high, based on historical occurrence and the condition of facilities and equipment, controls to prevent contamination should be in place.

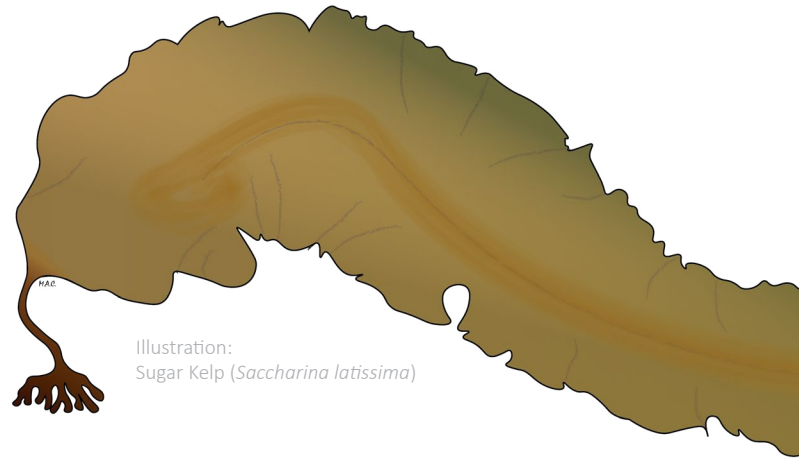


Illustration:
Sugar Kelp (*Saccharina latissima*)

The remainder of this guide will focus on controls for the potential food safety hazards that have been associated with seaweeds.

Controlling Biological Hazards

Biological hazards are controlled by proper sourcing of seaweeds. Waters open/certified for shellfish production are monitored for the presence of microbial contamination. Seaweeds destined for food should be grown/harvested from approved waters to reduce the likelihood of microbial hazards. Microbial hazards could also be reduced or eliminated through post harvest processing. GMP's including sanitation control procedures should be in place to prevent contamination post-harvest.

Controlling Physical Hazards

Inclusion of glass, metal and plastic during harvest and transport is not likely but the best way to ensure it is excluded is to maintain proper equipment and remove/replace any aging equipment, which is more likely to break. There should be no glass used on or around the harvest, landing, and transport operations. If using highly automated systems or equipment with nuts, bolts, and small pieces, a plan should be in place to regularly check the equipment to ensure nothing is broken or missing after harvest or transport. Plastics used should be in good condition and replaced when aging and brittle to avoid breakage.



Controlling Chemical Hazards

While biological hazards can be controlled through environmental testing and monitoring for bacteria in growing waters and good sanitation practices within a facility, coastal waters are not regularly tested for chemical hazards. The best way to control for the presence of potential chemical hazards is to test products prior to harvest. The table below lists those chemical hazards that have been identified as major or moderate contaminants of concern by the [Food and Agriculture Organization \(FAO\) of the United Nations and the World Health Organization \(WHO\)](#) as well as known [contaminants in NY waters](#). Testing for these potential contaminants prior to harvest and ensuring they are not present, or present at low levels that do not pose a public health risk, is key to controlling this hazard. Since these potential contaminants are so dependent on growing waters, regular testing will be important to ensure safety for consumption.

Product Testing

The [US FDA website](#) has more information on potential chemical contaminants in foods. While there are currently no standardized testing procedures for contaminants in seaweed specifically, the National Institute of Standards and Technology (NIST) is exploring the development standardized testing.

Contaminant	Tolerance	Reference
Inorganic Arsenic	3 mg/kg	ANSES
Cadmium	0.5 mg/kg	ANSES
Iodine	2000 mg/kg	ANSES
Mercury	1 ppm	US FDA CPG
Lead	5 mg/kg	ANSES
Aluminum	400 mg/kg	WHO PWTI*
Pesticide Residue***	0.05 ppm	40 CFR 180 Sub. C
PCBs	2 ppm	21 CFR 109
Dioxins**	3,500 pg/kg	WHO PMTI*
PFAS	0.0028 mg/kg	CDC MRL*

*Tolerance was calculated to ensure no more than 1/4 the tolerable daily intake was consumed per 15 g (dry) serving, assuming 1 serving per day.

**and dioxin-like compounds

***Tolerances for different pesticides vary, determining specific pesticides of concern in your area can help identify more targeted testing and tolerances.

Allergens- Seaweed grown in coastal waters is subject to biofouling and acts as a nursery for a variety of larval and microscopic aquatic species including some species of crustaceans. Since crustacean shellfish are one of the major food allergens in the US, allergen labeling should be considered to prevent serious allergic reactions.

Natural Toxins (biotoxins) - Like shellfish, seaweeds are susceptible to biotoxins produced by other organisms, typically microalgae, in their growing waters. In NY, the biotoxins of most concern are those produced during harmful algal blooms (HABs). Blooms are regularly monitored and producers should be cognizant of any waters closed to harvest due to toxic blooms. This is especially relevant to warm-waters species grown in the summer months. [NYS Department of Environmental Conservation](#) monitors NY waters for such toxins.

If you are aware of, or suspect other hazards may be present that are not mentioned here, you should include controls for those hazards in your food safety plan. Producers should be sure to work with federal and local agencies to identify any additional potential hazards that may be associated with the growing/harvest waters.

Transport and Processing

The same sanitation and temperature controls implemented at harvest and during processing should be in place during transit. See [FDA's sanitary transportation rule](#) for more information on transport.

Seaweed processed in New York must be produced in accordance with a [scheduled process](#) (Process Review) developed by a processing authority. The Association of Food and Drug Officials maintains a list of processing authorities at www.afdo.org/directories/fpa/.

Additional Resources

Additional Seaweed resources are linked below:

- » [Seaweed Production and Processing in Connecticut](#)
- » [Alaska Seaweed Handling and Processing Guidelines](#)
- » [Australian Safe Seaweed Purchasing Guide](#)
- » [New York Seaweed Resources](#)