



BioNovations Inc.

*Wet Storage & Depuration
Solutions for Live Bivalves*

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BioNovations Inc.

*Wet Storage & Depuration
Solutions for Oysters, Clams,
Mussels and Other Live Bivalves.*

WET STORAGE

Wet storage is the short-term holding of live oysters, mussels, clams, etc. harvested from approved water sources, in a closed-loop recirculating BioNovations Traystor® Crate Holding System. The system maintains taste, quality, and extends the post-harvest shelf-life.

The primary cause of degradation and mortality of live seafood is stress. The most common issues are emersion, excess handling, poor water quality and temperature control, exposure to heavy metals, pesticides, viruses, bacteria, etc., as well as proximity to other seafood (packing density). By developing a system which works to mitigate these stress inducing factors, BioNovations strives to provide suppliers with the facilities necessary to maintain the highest product quality possible. This maximizes consumer satisfaction and ultimately increases supplier profitability.

ADVANTAGES:

- Can be kept for months at a time with no loss of quality, significantly extending the shelf-life after harvest
- Sales ready inventory for weather events and seasonal closures
- Allows for consistent supply and saves time by reduced handling, while giving the ability to fulfill smaller retail orders
- Harvest the shellfish when the time is right instead of harvesting to fill orders before they are fully matured
- Consistent taste, quality, and size



TRAYSTOR CRATE HOLDING SYSTEMS

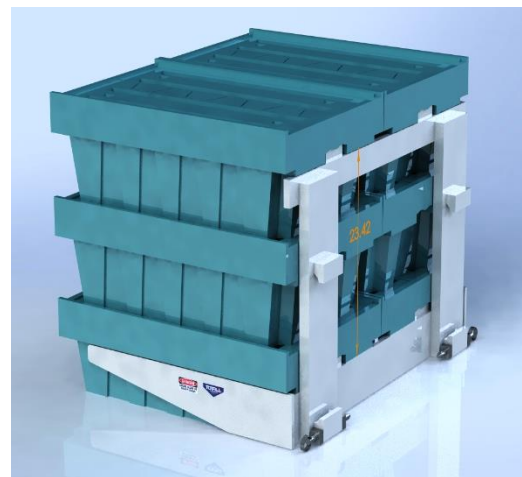
The Traystor® Crate was designed and developed by BioNovations and is the keystone of the Live Seafood Holding and Transport Systems. Each crate has specially engineered vents and water flow channels to allow even circulation and oxygenation throughout the entire crate while retaining water, effectively making the crate the holding system itself. Through internal channels, the circulating water continually removes all ammonia and other waste excreted by the product.



An environmentally controlled room is all that is needed to facilitate a BioNovations Traystor® Crate Holding System, as all plumbing is above-floor and included in the design of the system. This allows the Holding System to be easily installed into pre-existing rooms in warehouses, restaurants, and holding facilities, etc. without the need for new buildings, significant renovations, or additional construction. Stacks of BioNovations Traystor® Crates are placed over a food-grade, above or in-floor catch basin, or within a large food-grade tank, such as the Traystor® II tank (3500 lbs per Traystor® II tank). From there a recirculation pump is utilized to return the water to the Integrated Water Treatment System (IWTS) to maintain optimal water quality and temperature. The IWTS is composed of activated carbon filtration, particle filtration, protein filtration, biological filtration, UV filtration, and titanium chiller barrels. Our holding systems allow control of both the air and water temperature separately, making them the most energy efficient and sustainable system on the market.

The Traystor® Crates hold 100 lbs. of product and can be stacked seven high, providing a product capacity of approximately 154 lbs./ft²/stack. The Traystor® Crate is more efficient than conventional systems as it uses significantly less water due to a robust filtration system and maximizes floor space with vertical stacking. Additionally, the Traystor® Crate was engineered so that it could also be used in the depuration of bivalves. By placing a false bottom inside the crate, it provides the live bivalves with the proper water circulation and product spacing required for controlled relaying and depuration as required by regulations under the Shellfish Sanitation Program in different countries. Also, the facility can be designed such that wet storage area is split into multiple smaller zones allowing the operator to run as little or as much volume as is required making the system more economical to operate.

To further simplify operations, BioNovations offers a specialized forklift attachment and pallet jack to handle the Traystor® Crates. This eliminates the need for pallets and makes it easy to move the fully loaded or empty crates around. The forklift attachment comes either as a single or double attachment that can lift a stack one or two wide, from one to seven crates high (i.e. up to 14 crates can be moved at one time).



This system enables the seafood industry to effectively hold live product throughout the entire year, in any location using either fresh seawater or artificial seawater made to suit the specific species being held. By controlling temperatures and reducing toxins, the health and vitality of the seafood is maximized by minimizing stress to ensure the highest possible economical return.

TRAYSTOR CRATE FEATURES:

- Dimensions: 32" x 20¼" x 12¼" (L x W x H)
- Wet Storage: Crate holds 750+ bivalves (3" size) or 100-115 lbs. capacity
- Depuration: Crate with false bottom holds 325+ bivalves or 50-65 lbs. capacity
- Stacked 7 high to save floor space
- High packing density 154-175 lbs./ft²
- Nested together when empty: 15 crates/stack
- Engineered for even water flow and oxygenation throughout the crate
- Made of food-grade polypropylene and meets all the HACCP, CE, and FDA requirements
- Crates are self-draining and the system is constructed to allow easy access for cleaning



TRAYSTOR CRATE ADVANTAGES:

- Can be kept for months at a time with no loss of quality, significantly extending the shelf-life after harvest
- Sales ready inventory for weather events and seasonal closures
- Allows for consistent supply and saves time by reduced handling, while giving the ability to fulfill smaller retail orders
- Harvest the shellfish when the time is right instead of harvesting to fill orders before they are fully matured
- Consistent taste, quality, and size
- Can be split into zones allowing the operator to run as little or as much volume as is required, making the system more economical to operate during the off-season
- Can be expanded to any size to grow with your business
- Engineered to use gravity water drops wherever possible to minimize and/or eliminate water pumps, degassers, and air blowers

MANAGING FOOD SAFETY RISKS

Measures must be taken to manage food safety risks, such as controlling the risk of *Escherichia coli* (*E. coli*), *Vibrio parahaemolyticus* (*Vp*) and other viruses, bacteria, and pathogens in live bivalves being prepared for raw consumption. BioNovations accomplishes this by adding high intensity Ultraviolet Filtration (UV) and high water flowrate to the Integrated Water Treatment System (IWTS). The IWTS is engineered to operate at very low temperatures and high salinities to further inhibit the growth of unwanted organisms.

The primary cause of degradation and mortality of live seafood is stress. The most common issues are emersion, excess handling, poor water quality and temperature control (due to outdated and insufficient infrastructure), exposure to heavy metals, pesticides, viruses, bacteria, etc., as well as proximity to other seafood (packing density). By developing a system which works to mitigate these stress inducing factors, BioNovations strives to provide suppliers with the facilities necessary to maintain the highest product quality possible. This maximizes consumer satisfaction and ultimately increases supplier profitability by ensuring the health, freshness, and taste of the live product while reducing handling, mortality rates, packaging costs, and thereby increasing the overall market value of the seafood and providing transparency to the industry.

COMPANY OVERVIEW

BioNovations manufactures technologically advanced systems designed for handling, holding, and transporting live seafood. We are a locally owned and operated company based out of Antigonish, Nova Scotia, Canada. Our core business is providing solutions for the live seafood industry that are safe, reliable, and sustainable at all points along the supply chain. Our systems allow fresh live seafood to be distributed globally with greatly reduced mortality and shipping costs, so that the seafood industry can achieve its fullest value potential. Additionally, our systems are adaptable to a wide variety of aquaculture uses which is a fast-growing industry worldwide.

Product design at BioNovations is guided by our deep understanding of live seafood. We have designed our Traystor® Systems to replicate the natural conditions and cycles found in the aquatic ecosystem of each species. Our focus has been on both existing product improvement and proof of concept for new applications resulting in numerous proprietary components in our systems such as our particle filters, protein skimmers and biofilters. This has resulted in the development of a new innovative second generation of Live Holding Systems as well as the proof of concept for the BioNovations Live Seafood Transport and Container Systems.

BioNovations Traystor® brand of products minimize stress from catch to plate ensuring the health, freshness, and taste of the live product while reducing handling, mortality rates, packaging costs, and thereby increasing the overall market value of the seafood and providing transparency to the industry.

BioNovations holding systems have lower water and energy requirements than traditional holding facilities, are more efficient and environmentally sustainable, and are designed to allow for easy expansion as your business grows. Whether you are a big or small operation, buyer, distributor, or retailer, if you deal with live seafood products BioNovations has a product that can be of benefit to you.