

SEP-ART

THE NEXT GENERATION OF ARTEMIA

SEP-Art Overview

SEP-Art maximizes value and yield by delivering a pure suspension of clean and very active nauplii without shell material of any kind. SEP-Art is environmentally friendly with no chemicals or physical stress, as happens with the double sieve technique.

SEP-Art is a patented technology which provides a magnetic coating on the cysts, adding a new and unique feature to the shell: complete separation of the nauplii

from the shell at the time of harvest by means of passive magnets. The separation itself is a simple and straightforward process achieved by utilizing one of these separation tools:

- **HandyMag** – manual tool for small jobs.
- **CystTM2.0** – semi automated for medium to large hatcheries.
- **AutoMag** – for complete automation for those large jobs and daily.

The collection of the nauplii is fast and independent of the hatching quality of the cysts.

SA DS 09 19 2021

SEP-Art Handling Instructions

- Package should be kept closed and sealed.
- For optimal storage keep in cool, dry place.
- Temperatures above 4°C can influence the quality of the product.
- Once opened, the product should be used immediately or stored at or below 4°C.

Artemia Hatching Instructions

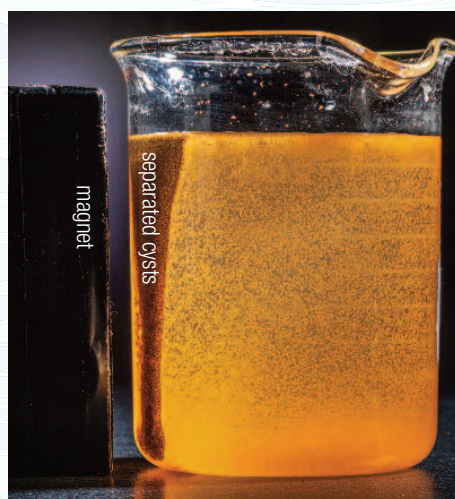
Tank Preparation

1. Take out all removable parts (pipes etc.) and clean them separately with soap, rinse and disinfect by immersion in chlorine solution (150ppm) or other commercial products such as Virkon, Sanocare PUR, etc., as directed.
2. Brush the tank thoroughly with soap after rinsing.
3. Repeat exercise with bleach solution.
4. Rinse extensively with water and fill the tank with filtered sea water. Make sure that all cysts and cyst shells are removed (e.g. remaining in outlet and in valves of the tank)
5. Disinfect the hatching water with e.g. 10 ppm active chlorine and aerate gently for ±1 hour.
6. Deactivate any remaining chlorine by adding 8 ppm sodium thiosulphate (Na₂S₂O₃).

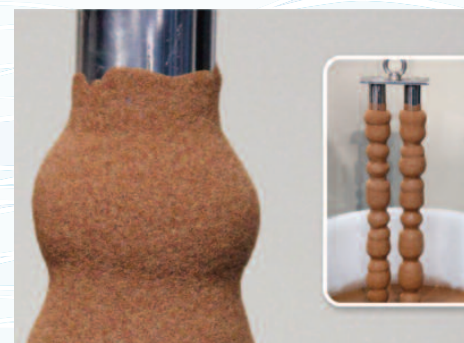
Hatching with SEP-Art Artemia

DO NOT disinfect or decapsulate the cysts.
DO NOT wash or rinse the cysts prior to incubation.

1. Hatching tank: 1.000-L
2. Volume: 800-L



3. Diluted seawater at 25–35 ppt salinity
4. Hatching density: 2.5g/L
5. TEMPERATURE: 28°C to 31°C. **DO NOT exceed 31°C**
6. pH > 8.0 – pH should be 8 – 8.5 during the entire hatching process.
7. If necessary, add dissolved sodium bicarbonate or carbonate (preferably add bicarbonate half an hour before incubation)
 - a) Immediately before adding the cysts add also 120ppm of NaOH
 - b) In general, a second dose of 120ppm of NaOH will be necessary at T12
8. Continuous aeration (D.O. > 4 mg/L)
9. Continuous light (artificial or natural) – minimum 2,000 lux at water surface
10. Once hatching is complete allow the contents of the hatching tank to run through the separator and to collect the outflowing Artemia nauplii in a submerged net
11. After harvesting rinse the nauplii



SEP-Art Tools HandyMag

SEP-Art HandyMag is specially developed for the harvest of Artemia hatched out of SEP-Art cysts. It is very efficient and handles small to relatively large hatching volumes, allowing for a fast and complete separation of pure nauplii from empty shells and full cysts, regardless of the hatching quality.

Handle With Care

Some parts of the SEP-Art HandyMag contain strong permanent magnets and must be handled with appropriate care. The magnets are protected by a smoothly polished stainless steel housing. Rough contact can damage the housing and can cause irreversible corrosion and destruction of the magnets. Never leave magnets unattended.

Application

- The SEP-Art HandyMag is specially developed for the harvest of Artemia hatched out of SEP-Art cysts.
- The SEP-Art HandyMag meets the most stringent requirements and has a smoothly polished stainless-steel housing.



- The SEP-Art HandyMag is easy to clean: after withdrawal from the Artemia suspension the attached cysts and shells are removed from the surface of the magnets with a gentle water flow.

Construction

Before opening the packaging, select a flat surface and remove all iron objects within a distance of 2 meters.

Note:

- Height of the Magnetic tube is 400 mm.
- Magnetic quality N50 (Neodymium).
- 400 x 100 x 40 mm (without handle).
- 2 magnetic rods.
- Magnetic field: 12,000 Gs.
- Polished finish.
- Materials are stainless steel SS316

Instructions for Use

SEP-Art cysts are hatched in exactly the same way as regular cysts. At harvest, the hatching medium (containing nauplii, cysts and cyst shells) is concentrated in a reduced volume using a submerged screen or net. Subsequently, shells and full cysts are attracted to the magnets and can be separated from the hatching water by removing the magnets and cysts from the Artemia suspension. Cleaning the device and repeating the handling allows the user to separate all cysts from the nauplii, obtaining a pure nauplii concentrate. The harvested and pure nauplii are further treated according to the hatchery's normal protocols (rinsing, disinfection, cold storage, enrichment...)

Harvesting methods

Method 1: direct harvest

Suitable for small hatching volumes

1. Small tanks can be harvested without any specific preparation.

SEP-Art Tool Chart

	SEP-Art HandyMag	SEP-Art CysTM 2.0	SEP-Art AutoMag
Volume Range	Small to Large	Moderate to Large	Large to Very Large
Separation Time	Dependent on # of HandyMags & tank size	< 1 hour	< 1 hour
Manpower Time	Based on size of tank	15 minutes	0

2. Simply separate the cysts from the nauplii by inserting the SEP-Art HandyMag tool into the hatching tank to allow magnets to separate cysts from live nauplii.

3. Withdraw the loaded SEP-Art HandyMag from the Artemia suspension and remove the attached cysts and shells from the surface of the magnets with a gentle water flow (collect in a separate net for later disposal).

4. Repeat the handling until all cysts are collected and a pure nauplii suspension is obtained.

Method 2: after concentration

Suitable for small to relatively large hatching volumes

- 1 Discontinue the aeration upon completion of the hatching. Preferably cover the tank.

2. Allow the empty shells to rise in the hatching suspension for around 5 minutes. Simultaneously, the nauplii and the full and unhatched cysts will accumulate near the tank's outlet.

3. Harvest the hatching tank (excluding empty shells floating at the surface) in a net or other collecting device.

4. Transfer the collected nauplii and unhatched cysts to a concentrator-tank and add clean seawater to about 10% of the initial hatching volume, applying strong aeration.

5. Submerge the SEP-Art HandyMag for about 1 minute in the concentrated suspension (until fully loaded with cyst shells and empty cysts).

6. Withdraw the loaded SEP-Art HandyMag from the Artemia suspension and remove the attached cysts and shells from the surface of the magnets with a gentle water flow (collect in a separate net for later disposal).

7. Apply steps 5, 6 and 7 until the Artemia nauplii suspension is free from cysts and a pure Artemia nauplii suspension is obtained.

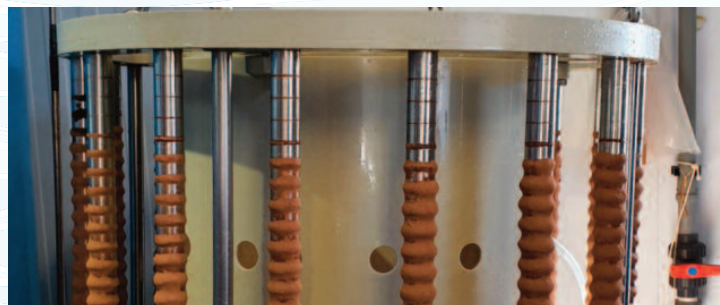
SEP-Art Tools CysTM 2.0

SEP-Art Tools were developed especially for the harvesting pure Artemia nauplii from SEP-Art cysts whilst completely removing all shells material (empty shells and full, unhatched cysts). The tools are highly efficient and can handle both small and large volumes of hatching suspension (up to 2.4 billion nauplii).

The SEP-Art Tools guarantee maximum profitability, as every nauplius is collected. No chemicals are used, nor are the collected nauplii subject to physical stress. The result is a suspension of clean and very active nauplii, free from empty shells.

Handle with Care

Some parts of the SEP-Art HandyMag contain strong permanent magnets and must be handled with appropriate care. The magnets are protected by a smoothly polished stainless-steel housing. Rough contact can damage the housing and can cause irreversible corrosion and destruction of the magnets. Never leave magnets unattended.



Application

The SEP-Art CysTM 2.0 is specially developed for the harvest of Artemia that hatched out of SEP-Art cysts.

For large capacities

Harvesting clean and pure Artemia from large volumes of SEP-Art cysts using the SEP-Art CysTM 2.0 is a highly automated process. Whilst emptying the hatching tank into the CysTM 2.0 at a fast rate, the tubular rare earth

magnets will capture the magnetized cysts and empty shells.

Maximum labor efficiency

The nauplii are simultaneously concentrated and rinsed. The system allows fast harvesting. In a very short time, the whole hatching tank will be reduced to a dense, clean suspension of pure nauplii only. Typically, a 5 ton hatching tank (10 kg of SEP-Art240 cysts incubated at a density of 2 g/l), is handled in less than an hour, of which only 15 minutes requires human intervention.

Increased robustness and efficient handling and cleaning

The CysTM 2.0 meets the most stringent requirements. Its magnets are protected in a stainless steel housing that prevents physical damage and corrosion and thus prolongs their shelf life.

Construction

1. Before opening the packaging, select a flat area and remove all iron objects within a distance of 2 meters.
2. Open the packaging.
3. Mount the filter screen, standpipe and magnetic drum in the tank.
4. Close all valves and fill completely with clean sea water.
5. Verify proper functioning of the aeration system (all opening should be positioned upwards).
6. Connect the lifting cables to the lifting bolts and winch.
7. The SEP-Art CysTM 2.0 is ready to use.

Note:

The magnetic drum consists of 16 magnetic tubes:

- Height of the magnetic tube is 650 mm, diameter is 32 mm.
- Magnetic quality N50 (Neodymium).
- Magnetic field: 12,000 Gs.
- Magnets are protected by a smoothly polished stainless-steel housing.
- Weight: ± 135 kg (SEP-Art Drum weighs ± 90 kg).

Instructions for Use

SEP-Art cysts are hatched in exactly the same way as regular cysts. At harvest, the nauplii are simultaneously concentrated and rinsed, whilst shells and full cysts are attracted to the magnets allowing the user to separate all cysts from the nauplii, obtaining a pure nauplii

concentrate. The harvested and pure nauplii are further treated according to the hatchery's normal protocols (rinsing, disinfection, cold storage, enrichment...)

Collection of the nauplii

1. Discontinue the aeration upon completion of the hatching, preferably cover the tank.
2. Allow the empty shells to rise in the hatching suspension for around 5 minutes. Simultaneously, the nauplii and the full, unhatched cysts will accumulate near the tank's outlet.
3. Start draining the hatching tank into the SEP-Art CysTM 2.0 and apply strong aeration at the bottom of the filter screen.
4. Simultaneously rinse the contents of the CysTM 2.0 with abundant clean and disinfected sea water.
5. Continue draining the hatching tank until only a small volume of concentrated, floating empty shells is left behind.
6. During the harvesting process, the color of the suspension will turn from brown (nauplii+shells) to bright orange (pure nauplii).
7. Continue rinsing until the discharged water is crystal clear (regularly check the outflow).
8. Lower the aeration and wait until the last cysts and shell fragments are removed from the suspension by the magnets (regularly check the suspension).
9. Remove the large central standpipe inside the filter screen to concentrate the pure nauplii suspension and slowly drain through the central valve.
10. Remove the small standpipe near the wall of the tank.
11. Harvest the pure nauplii through the valve.

Note:

- The use of pure oxygen is advised, especially towards the end of the rinsing process and during emptying of the tank.
- It may be necessary to clean the magnets during the rinsing process when cysts of low hatching % are being used.
- Cysts detaching of the magnets whilst emptying the tank can be captured by using a SEP-Art HandyMag device.

Cleaning After Use

- Lift the magnetic drum from the tank and rinse all magnets with a strong water flow. Collect the cyst material and dispose of as regular cysts.
- Rinse the filter screen, standpipe and drain pipes/valves with a strong water flow.
- Disinfection of the SEP-Art CysTM 2.0 is done all at once. After all the individual elements have been cleaned and repositioned, the tank is filled with fresh or sea water to which the proper concentration of disinfectant is added. Disconnect the used aeration lines and submerge into the tank.

SEP-Art Tools

AutoMag

The SEP-Art AutoMag is specially developed for the automated harvest of large quantities of pure Artemia nauplii from SEP-Art cysts whilst completely removing all shells material (empty shell and full, unhatched cysts). It is highly efficient and handles large volumes of



hatching suspension (equivalent to 2.5 billion nauplii).

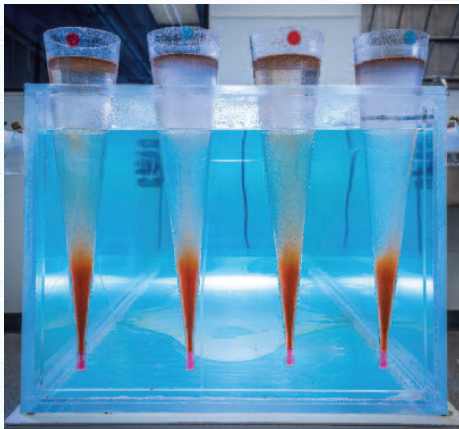
The AutoMag ensures maximum profitability, as every nauplius is collected. No chemicals are used, nor are the collected nauplii subject to any physical stress. The result is a suspension of clean and very active nauplii, without any cysts or empty shells. The superior activity of the nauplii results in excellent nutritional and enrichment values.

Handle with Care

Some parts of the SEP-Art AutoMag contain strong permanent magnets and must be handled with appropriate care.

The magnets are protected by a smoothly polished titanium housing. Rough contact with hard objects can damage the housing and cause irreversible corrosion and destruction of the magnets. Never leave magnets unattended.

The electrical control panel has IP55 protection. If the local conditions are not suited for the IP55 specification, it is important to pro-



test the panel, following local regulation. The voltage and frequency of alternating current. The SEP-Art AutoMag filter has a complete backwash system, piping and spray assembly. *For large capacities*

When emptying the hatching tank into the AutoMag at a fast rate, the magnets will capture the magnetized cysts and empty shells. The self-cleaning system of the AutoMag continuously cleans the magnets and evacuates the collected cysts.

Fully automated process

The nauplii are simultaneously concentrated and rinsed. The AutoMag allows fast harvesting and in a very short time the entire hatching tank will be reduced to a dense clean suspension of pure nauplii only. Typically, a 5 ton hatching tank (10 kg of SEP-Art240 cysts hatched at a density of 2 g/l), is handled in less than an hour.

Increased robustness, efficient handling and cleaning

The magnets are protected in a stainless-steel housing that prevents physical damage and corrosion and thus prolongs their shelf life. All components of the AutoMag are easy to clean.



Construction

Legend:

- 1: Motor
- 2: Valve for backwash
- 3: Air control panel
- 4: Rotor with tubular magnets
- 5: Filter
- 6: Security outlet
- 7: Harvesting valve
- 8: Drain and rinsing valve

Note:

Magnetic quality N50 (Neodymium).

8 tubular magnets installed on a rotor.

- Magnetic field: 12,000 Gs.
- Materials used are poly and stainless steel SS316.
- Weight dry: 120 kg.
- Weight in operation: 550 kg.
- Volume water: 400 l.
- Design according to EC standards directive, 2006/42/EC.

Instructions for Use

SEP-Art cysts are hatched in exactly the same way as regular cysts. At harvest, the nauplii are simultaneously concentrated and rinsed, whilst shells and full cysts are attracted to the magnets allowing the user to separate all cysts from the nauplii, obtaining a pure nauplii concentrate. The harvested and pure nauplii are further treated according to the hatchery's normal protocols (rinsing, disinfection, cold storage, enrichment...).

Machine setup

1. Connect all fittings to the machine: hatching tank, clean sea water, fresh water for backwash, air and oxygen.
2. Open aeration line underneath the magnetic rotor. This regulation is VERY IMPORTANT; air flow needs to be very low; this

operation is needed to maintain large gear wheels clean. It's important to avoid any strong turbulence underneath the magnetic system to avoid detachment of particulates from magnets.

3. Open the aeration line connected to the ring outside the filter screen. Control the flow to prevent the turbulence interfering with the magnets.
4. Open the aeration from the 2 diffusers placed inside the filter screen. Provide sufficient aeration to avoid clogging of the filter.
5. Oxygen can be provided in the suspension by connecting the oxygen pipes through the spare hole on the left side of the air distribution panel.
6. Close all valves and fill the machine with sea water.
7. Start backwash system (nozzles) and open main discharge valve.
8. Turn the main switch to ON to start the magnetic rotor in the AutoMag.

Collection of the nauplii

9. Discontinue the aeration in the hatching tank upon completion of the hatching, preferably cover the tank.
10. Allow the empty shells to rise in the hatching suspension for around 5 minutes. Simultaneously, the nauplii and the full, unhatched cysts will accumulate near the tank's outlet.
11. Start draining the hatching tank into the SEP-Art AutoMag and apply strong aeration at the inside of the filter screen.
12. Simultaneously rinse the contents of the AutoMag with abundant clean and disinfected sea water.
13. Continue draining the hatching tank until only a small volume of concentrated, floating empty shells is left behind.
14. During the harvesting process, the color of the suspension in the AutoMag will turn from brown (nauplii+shells) to bright orange (pure nauplii).
15. Continue rinsing until the water coming out of the outflow of the drain of the AutoMag is clear (regularly check the outflow).
16. Wait until the last cysts and shell fragments are removed from the suspension by the magnets (regularly check the suspension).
17. Harvest the pure nauplii through the valve.

Cleaning After Use

- Rinse the magnetic rotor, filter screen,

standpipe and drain pipes/valves with a strong water flow.

- Disinfection of the SEP-Art AutoMag is done all at once. After all the individual elements have been cleaned and repositioned, the tank is filled with fresh or sea water to which the proper concentration of disinfectant is added. Disconnect the used aeration lines and submerge into the tank.

Quality and Testing

Harvesting and Processing

Our products are harvested using proprietary, state of the art harvest equipment to ensure our freshly harvested cysts are treated properly and maintain optimal hatching.

Cysts are immediately treated at our pre-processing facilities located on the shores of Great Salt Lake, where they are cleaned and conditioned. Subsequently our cysts are transferred to freezer facilities for further conditioning, acclimatization and subsequent processing using proprietary processing techniques. These techniques are specifically tailored to every batch of cysts taking into account the time of harvest, level and stage dormancy and ecological parameters.

Quality & Testing

Throughout this process, our batches are carefully sampled and tested multiple times in order to properly time each phase of production and maximize the hatching quality and shelf life of our products. After final processing and packaging, our batches undergo additional testing using proprietary imaging technology to ensure all hatching characteristics comply with our stringent quality standards.

Great Salt Lake Artemia applies a scientific approach to testing which ensures we can deliver a top-quality product with reliable hatching.

Our scientists have more than 100 years of combined experience researching and testing lake ecology, Artemia biology, and Artemia harvesting and processing. As such, our team developed the most sophisticated testing and production techniques based on the biological and ecological characteristics of the live Artemia embryo.

Our proprietary imaging technology developed by our team of scientists permits us to test each batch multiple times using large samples sizes in order to guarantee accurate and precise determination of hatching quality parameters.

Finally, we use an industry appropriate statistical approach to assign a final grade to a batch of cysts. We do not apply average hatching quality to determine the appropriate grade for a batch of cysts. Rather, we use statistical lower confidence limits at the 99% level. This ensures that our cysts hatch at or above the certified rates. In short, if you buy 80% grade GSLA Artemia, you will experience hatch rates above 80%.

Artemia QA Testing

Great Salt Lake Artemia is committed to the biosecurity of our customers' operations and, to support that, we thoroughly test all our product. GSLA is proud to say we have over 14 years of testing and never had a positive test for any pathogen. We attribute this success to our commitment to Quality Control and our geographic isolation.

We Test:

WSSV

White spot disease
White spot syndrome virus

IHHNV

Runt-deformity syndrome
Infectious Hypodermal and Haematopoietic Necrosis Virus

TSV

Taura syndrome
Taura syndrome virus

YHV

Yellow head disease
Yellow head virus

IMNV

Infectious myonecrosis disease
Infectious myonecrosis virus

PvNV

Penaeus vannamei nodavirus disease
Penaeus vannamei nodavirus

MrNV

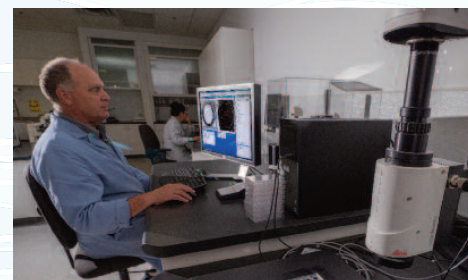
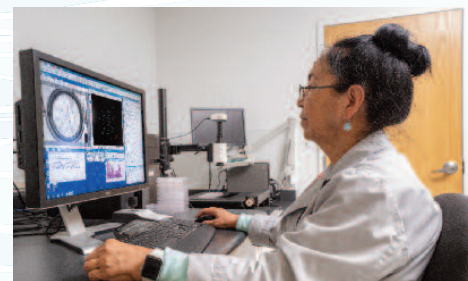
White tail disease
Macrobrachium rosenbergii nodavirus

DIV1

Shrimp hemocyte iridescent virus disease (SHIV) 1
Decapod iridescent virus 1

MBV

Bacculovirus disease
P. monodon baculovirus



Other Testing

- Bacterial testing
 - Salmonella
 - E. coli
 - Bacillus cereus
 - Vibrio harveyi
 - AHPND/EMS
 - NHP-B
- Fungal testing
- Test for chemicals, contaminants and heavy metals
- Overall, 82 tests for potentially harmful or disruptive agents



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