



## **MICROBE-LIFT® Technology Increases Survival of Ornamental Fish During Shipping and Transfer**

**Location:** Ecological-Asia, Singapore

**Background:** Exporters and trans-shippers of ornamental fish have always faced the problem of maintaining fish health and well being as fish are shipped around the globe in plastic bags.

During transport, the water in these closed containers may become oxygen-depleted asphyxiating the fish or it may accumulate excessive carbon dioxide reducing pH to toxic levels. Metabolic activity may lead to elevated ammonia levels sufficient to damage or kill fish. As the containers become more densely packed in an effort to save shipping costs, the greater the risk of injury or mortality.

Fortunately, some products have been developed to help maintain a healthier aquatic environment during containment and transfer.

**Objective:** A study was conducted to test several products versus a non-treated control in an effort to validate a cost-effective solution to improve conditions for increased fish viability. **MICROBE-LIFT®** technology was tested against another leading product designated "Product K" and both were compared to a non-treated control.

**MICROBE-LIFT®/Ammonia Remover** contains a patented molecule ClorAm-X, previously found in Product K, which was commonly used by trans-shippers. **MICROBE-LIFT®/Ammonia Remover** is a non-toxic product that is able to remove ammonia, chlorine, and chloramines from water in all types of fish and aquatic invertebrate cultures. This product can be used for the following applications:

- Condition new water for aquariums, tanks, ponds, and live haul containers.
- Condition water after or during water additions.
- To condition an aquarium for addition of new plants, invertebrates, fish or amphibians.
- Treatment of live haul containers for increased viability during shipment of fish, amphibians, or aquatic invertebrates.

**MICROBE-LIFT®/Special Blend** contains a mix of proprietary bacterial strains that help degrade organic waste, lower ammonia level, and biologically reduce nitrates, hence reducing the need for water changes in aquariums and transport containers. It allows new tanks to cycle immediately and is 100% chemical-free. Basically, it provides a complete, favorable ecosystem in a bottle.

This test was conducted on 25 April 2009 using four bags each containing 55 unpurged Dwarf Gouramis (*Colisa lalia*) in approximately 1.8 liters of water. The bags were treated as specified below, sealed, and kept at room temperature for 48 hours after which water samples were taken and compared.

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Bag	Treatment	Dosage
#1	MICROBE-LIFT®/Ammonia Remover	1 ml
#2	MICROBE-LIFT®/Special Blend	1 ml
#3	Product K	1 ml
#4	No additive control	None



**Fig. 1:** Table above defines the treatments used.

**Fig. 2:** Picture on left shows the preparation of test bags.

## Results Achieved:

In order to compare water quality, after 48 hours a sample was taken from each bag and examined. The sample from the control bag (#4) was very dark due to the feces of the unpurged fish. Fish activity in the control bag was very limited. The water quality in the bag treated with Product K (#3) was similar to the control. In both bags treated with MICROBE-LIFT® products (#1&2) the water was much cleaner with only traces of feces and there was significantly more fish activity compared to that in the other treatments. Unfortunately, due to equipment malfunction it was not possible to get ammonia assays. (See pictures below).



**Fig. 3:** Samples of water at 48 hours shows very dark, feces contaminated water in the control (far left), and dark water in the PK treated product (middle left), while the ML treated samples are much cleaner.

After taking the water samples, the fish were transferred to tanks with fresh water. The fish in ML treated bags resumed normal activity quickly while the fish in the PK treated bag required an additional 8 hours to regain full activity. The fish from the control bag failed to fully reactivate with most fish remaining on the surface gasping for air or at the bottom of the tank with little activity.

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**Fig. 4:** When fish were transferred to fresh water, the ML treated fish in the two tanks on the left were more active and ready to eat. Those in the Product K treated tank (middle right) recovered after an additional 8 hours but those from the control bag showed toxicity and died within 72 hours.



The fish in the tanks were fed at 53 hours. The ML treated fish started feeding immediately while the Product K treated fish started feeding about 30 minutes later. The control fish did not feed. At 72 hours the fish were examined again. All the fish in the control tank had died while those in the other tanks remained active, with no signs of stress, and they were feeding normally.

The tanks were then checked for mortality data. The ML treated tanks again fared best with significantly increased survival rates. The PK-treated fish showed a mortality rate of 7% which is higher than the 0-2% mortality for ML treated fish but much better than the 100% mortality of the control.

Additive	Dead/Total	% Mortality
MICROBE-LIFT®/Ammonia Remover	1/55	2%
MICROBE-LIFT®/Special Blend	0/55	0%
Product K	4/55	7%
No additive control	55/55	100%

**Fig. 5:** After 72 hours all control fish were dead indicating that it is necessary to use a water conditioner when shipping live fish. MICROBE-LIFT® provided superior results to Product K.

This test indicated that, above all, it is necessary to use a water conditioner to sustain viability when shipping live fish. MICROBE-LIFT®/Special Blend and MICROBE-LIFT®/Ammonia Remover were both superior to Product K in maintaining water quality and associated fish viability. The water was obviously cleaner in both the bags treated with MICROBE-LIFT® products while the water in the Product K treated bag appeared more similar to the control.

While the fish from the bag treated with Product K eventually recovered when they were released from the bag into fresh water, they were sluggish and did not respond to food immediately as did the fish in the bags treated with the MICROBE-LIFT®/Special Blend and MICROBE-LIFT®/Ammonia Remover. Both the MICROBE-LIFT®/Special Blend and MICROBE-LIFT®/Ammonia Remover treated fish were much healthier as evidenced by their continual activity and, unlike the Product K treated fish, they showed willingness to eat as soon as they were transferred to clean water.

All fish in the control appeared to die of ammonia poisoning. This test should be repeated to accurately test the ammonia level.

For more information on MICROBE-LIFT® Technology contact  
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