

StartSmart Reduces Fish Mortality During Transport

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This study was conducted by the India College of Fisheries, Professor Jayaraj (principle investigator). The purpose of the study was to evaluate the ability of StartSmart with aerated prep tank dosing (procedures outlined at the end of this document) in reducing fish mortality during transport.

The study included evaluation of spawn, fry, and fingerlings. In all cases, the fish were placed in 18 liter bags at stocking densities comparable to those used in fish transport in India. StartSmart was added to test bags, while no StartSmart was dosed to the control bags. The spawn, fry, and fingerlings were examined in the laboratory setting, and the time to 50% mortality was recorded.

Results – Spawn Transportation

Spawn loading information:

- Mean length of spawn: 0.52cm
- Mean weight of spawn: 0.0015g
- Packing density: 10,000 spawn/bag
- 8 liters medical oxygen

Test spawn received 250 ml StartSmart aerated prep tank product, control spawn did not. Bags were observed under laboratory conditions until 50% mortality was reached

Control reached 50% mortality in 2 days and 22 hours (70 hours)

Test reached 50% mortality in 7 days and 5 hours (173 hours)

Addition of StartSmart Probiotic extended the time to 50% mortality by 2.5 times from 70 hours (control) to 173 hours (test)

Results – Fry Transportation

Fry loading information:

- Mean length of fry: 1.72 cm
- Mean weight of fry: 0.0296g
- Packing density: 600 fry/bag
- 8 liters medical oxygen

Test fry received 250 ml StartSmart aerated prep tank product, control fry did not. Bags were observed under laboratory conditions until 50% mortality

Control reached 50% mortality in 8 hours

Test showed ZERO mortality at 8 hours

Test showed ZERO mortality at 24 hours

Without StartSmart Probiotic, control mortality of fry reached 50% in 8 hours. With addition of StartSmart bioreactor product, ZERO mortality was exhibited at 8 hours, and also at 24 hours.

Results – Fingerling Transportation

Fingerling loading information:

- Mean length of fingerlings: 6.30 cm
- Mean weight of fingerlings: 2.13 g
- Packing density: 250 fingerlings/bag
- 8 liters medical oxygen

Test fingerling received 250 ml StartSmart aerated prep tank product, control fingerling did not. Bags were observed under laboratory conditions until 50% mortality

Control reached 50% mortality in 5 hours and 30 minutes (330 minutes)

Test showed 50% mortality in 1 day, 14 hours, and 30 minutes (2310 minutes)

StartSmart Probiotic dosing increased the fingerling time to 50% mortality by a factor of 7 (2310 minutes compared to 330 minutes).

Results – Fingerling Transportation – No Pure Oxygen Added

Fingerling loading information:

- Mean length of fingerlings: 6.30 cm
- Mean weight of fingerlings: 2.13 g
- Packing density: 250 fingerlings/bag
- 8 liters ATMOSPHERIC oxygen

This test was conducted to assess the performance of StartSmart aerated prep tank dosing with just atmosphere, compared to control but with pure oxygen

Control, with pure oxygen, reached 50% mortality in 5 hours and 30 minutes (330 minutes)

Test, with atmospheric oxygen, showed 50% mortality in 6 hours and 30 minutes (390 minutes)

StartSmart aerated prep tank product and just atmospheric oxygen outperformed the control with pure oxygen addition by about 20%.

In areas without available pure oxygen, use of StartSmart Probiotics is an excellent substitute. StartSmart Probiotic with just regular air, outperforms pure oxygen!

Procedures for Operating StartSmart Probiotics Aerated Prep Tank

(The following instructions assume a commercial scale application and are showed for example)

Initial set up of 200 liter, open top drum (or other similar open top, aerated tank)

- 16 liters of StartSmart (4 gallons)
- 600 grams StartSmart Activator (1 and 1/3 pounds)
- Into 200 liter drum (55 gallon drum), filled with water
- Maintain temperature at 27 C (80 F) using 100 watt tank heater
- Aerate 14 days
- Use half (dose up to one half of this drum to fish transport vehicles)

Ongoing batches

- Refill with 4 liters StartSmart (one gallon)
- 600 grams StartSmart Activator (1 and 1/3 pounds)
- Top off tank with water
- Aerate 7 days
- Dose half of batch to fish transport vehicles
- Repeat

The dose used during the India fish transport evaluation and as recommended for commercial fish transport vehicles is 1 part StartSmart aerated prep tank product per 20 parts fish transport volume

EXAMPLE:

For a 500 gallon fish transport vehicle, given the 1/20 ratio, 25 gallons of StartSmart Probiotic from an aerated prep tank are required transport.

Once the aerated prep tank is going, the actual StartSmart Probiotic and Activator contained in 25 gallons of aerated prep tank liquid is

Typical Product Requirement Per 500 Gallon Fish Transport Load:

500 ml StartSmart Probiotic (liquid)
75 grams StartSmart Activator (powder)
Per 500 gallon fish transport load

Application of StartSmart Probiotic to fish transport per the directions above will eliminate or dramatically reduce mortality during fish transport