

GroFish Application Procedures

Species	Treatment Age	# per bag	Percentage Size Larger Compared to Normal
White Shrimp	PL 10-15	50,000	+58%
Salmon	1-5 Day Fry	10,000	+38%
Tilapia	1-3 Day Fry	10,000	+33%
Freshwater Prawn	PL 10-15	25,000	+51%

1. Species needs to be determined as above.
2. Age and availability of species needs to be assigned for treatment to be determined.
3. Source of water needs to be identified for treatment to be optimized.
4. Filtration methodology used for aquacultured water needs to be defined.
5. Chemical parameters of the water need to be given in advance. On-site analysis is available for additional assessment and discussion for culturing improvements.

OPTIMAL CHEMICAL PARAMETERS	
pH	Freshwater: 6.0-7.0 Saltwater: 8.0-8.2
ammonia	Freshwater: 0 Saltwater: 0
nitrite	Freshwater: 0 Saltwater: 0
nitrate	Freshwater: <50 Saltwater: <50
dissolved oxygen	Freshwater: 8-12 Saltwater: 8-12
temperature	Freshwater: optimal for species being treated Saltwater: optimal for species being treated
alkalinity	Freshwater: 50-150 nominal values Saltwater: 50-150 nominal values

6. Presence of toxins in water needs to be determined. For example, copper, chlorine, heavy metals, etc.
7. Establishment of treatment area: aquatic species will be aggregated and placed into a plastic bags for treatment. Maximum number of animals per bag is determined based on species and ages of individuals to be treated.
8. GroFish provides the treatment product based upon the number of animals to be treated
9. The treatment takes 1.5 hours from the time the animals are given to the GroFish personnel to the time the animals are returned to the aquaculture personnel.
10. Initial evaluation of species and species procedures takes up to four hours, during which time the GroFish personnel need to be sequestered with a small representative sample of the aquatic species to be treated at least 10 litres of aquaculture system water, 500 mL of pure ethanol (minimum 160 proof necessary), glass beakers (Two 100mL; Two 500mL), electronic balance, plastic graduated cylinders (2 liter preferred), oxygen cylinder with regulator, access to electricity and an open flame. In the case of coldwater species to be treated, ice is requested to be provided for maintaining appropriate water temperatures.
11. Feed may be treated with spray-applied nutritional additives.
12. Special ion exchange resin impregnated filter material will be provided by GroFish personnel to decrease initial ammonia levels as well as providing colorimetric information regarding chemical impurities in the water. For shrimp species treated, immediate molting is noted and a collection of exoskeletons is recommended in order to avoid nitrogen overload in the system.
13. Aquatic species returned to normal metabolism within 1-2 hours after treatment and feeding needs to commence immediately afterwards.
14. Dissolved oxygen needs to be maintained at a 8-11 mg/L as well as other optimal water chemical parameters of the aquaculture system.
15. GroFish personnel will visit the day after treatment to confer with facility staff and review effects of treatment. Ion exchange resin filters will show a trace of ammonia residues the first day after treatment.
16. GroFish treated aquatic specimens are more rapid to feed versus non-treated groups.
17. Stocking Density: standard stocking density for each species are necessary for treatment to be optimized.