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A. Kamalii, S. Meenatchi and B. Ahilan

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# INDIAN ALMOND LEAVES A BOON FOR ORNAMENTAL FISH FARMERS

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**A. Kamalii**

*Dr. MGR Fisheries College and Research  
Institute, Ponneri, Tamil Nadu (601 204),  
India*

**S. Meenatchi**

*Central Institute of Fisheries Education,  
Mumbai, Maharashtra (400 061), India*

**B. Ahilan**

*Dr. MGR Fisheries College and Research  
Institute, Ponneri, Tamil Nadu (601 204),  
India*

## INTRODUCTION

In tropical areas of Asia, People used to come across the scenario of the dried tropical almond tree leaves scattered around in parks, roadways, and in walk paths. And the litters of the almond tree leaves were swept heaps by the street sweepers. Unknowingly we neglect the hidden valuable properties of almond tree leaves in the aquaculture industry. Presently Aquaculture industry is facing many challenges and problems that are overlooking the new advancement and innovations which prospers the sector. The discussion in this article is about the benefits gained by the aqua farmers through almond leaves litter in many ways and also overlooking many pieces of research and publications for the utmost utilization of the almond leaves in the upcoming years.

## COMMON PROBLEMS FACED BY FISH FARMERS

The common problems faced by the fish farmer in the aquaculture industry include

- High cost of feed and fertilizers
- Disease mortality rates and cost of medications
- Management of water quality in ponds due to fluctuating parameters
- Breeding in captive conditions
- Problems related to the intensification of culture.

## SOLUTIONS THROUGH ALMOND LEAF LITTERS

### HIGH COST ON FEED AND FERTILIZERS

Extracts of the Indian Almond leaves (IAL) are an excellent source of nutrient that has a high degree of organic materials, tannins (punicalagin, punicalin, terflavin A and B, tergalagin, tercatatin, chebulagic acid, geranin, granatin B, corilagin) several flavonoids, isovitexin, isoorientin, rutin and triterpenoids, and humic acid. The cost of fertilizers can be reduced by leaf litter by taking up carbon dioxide from the atmosphere, converting the gas into organic carbon compounds, and when trees shed their leaves, leaving them to decompose in the soil as they are eaten by microbes.

Leaves litter, when decomposes houses many tiny organisms such as zooplankton, infusorians, and insect larvae to colonize, which is indirectly utilized by the fish as natural feed thus, the reduction of cost in the supplemental feed will take place. Darkening of rearing water by decomposing leaves also provided a good contrast background for the larvae to visualize and



efficient capturing of its prey, thus contributing to better feeding success. Unlike other types of leaves, Indian Almond leaves decompose slowly, allowing them to reap their benefits for more extended periods.

### **DISEASE MORTALITY RATES AND COST OF MEDICATIONS**

In post-larvae rearing of black tiger shrimp, IAL(Indian Almond Leaf) extracts provide significant improvements in the survival of fish as well as of tiger shrimp (*Penaeus monodon*) (Ikhwanuddin et al.,2014). In conclusion, 3.0 mg mL<sup>-1</sup> concentration of *T.catappa* leaf extract has a positive effect on the survival rate and growth performance of *P. monodon* PL, but higher concentrations become toxic and can cause high mortality.

IAL acts as an anticancer, antioxidant agent, antifungal, and anti-inflammatory agent against bacterial and fungal infections. It also reduces stress in fish which is the primary driver of disease and disorders. Stress reduction in fish is achieved by IAL extracts which create a blackout effect for darker environments and make the fish feel safer and in natural environments. The chelate-like siderophore is toxic to the membrane of microorganisms. When tannins form a chelate complex with ions, there will be no ion available for microbes to grow under aerobic conditions. Therefore, the energy can be used more on growth than the immune system against harmful bacteria.

The methanolic extracts of *T.catappa* leaf inhibited the growth of *Bacillus subtilis* and *Staphylococcus aureus* but had no inhibitory effects on *Pseudomonas aeruginosa*, *Salmonella typhi*, and *E.coli*(Babayi et al.,2004). Ectoparasite *Trichodina* was eradicated from tilapia at 800 ppm concentration of ground leaves, while

the growth of *Aeromonas hydrophila* was also inhibited at a concentration of 0.5 mg/ml leaves. The extracts were also observed to reduce the fungal infection in tilapia eggs. Meanwhile, unpublished data at SEAFDEC/AQD show that the effect of *T.catappa* crude ethanolic extracts on the survival of mangrove crabs is similar to that of usage of antibiotics at the zoea five and crab instar 1 stages. This further supports the possible replacement of antibiotics with this natural product. The leaves extract also cures the fin rot and tail rot and also heal the wounds caused by ulcers.

### **MANAGEMENT OF WATER QUALITY FROM FLUCTUATING PARAMETERS**

Maintaining the water quality in ponds daily or weekly is the biggest task for fish farmers. Analyzing the quality parameters to check that everything is in normal condition is vital for pond management and fish survival. In water quality management, IAL plays a major role in conditioning and stabilizing water quality parameters. Extracts of the plant were known to be able to reduce water pH and heavy metal toxicity. They will lower hard water to a pH of 6.0 while soft water can be reduced to a pH of 5.0.

Tannins in IAL leaves are responsible for changing the colour of the water to yellowish brown colour which is preferred by the fishes to hide. Total ammonia and nitrogen are efficiently reduced by the leaves of IAL; other than this, it also removes the turbidity in water(Bryan, 2017). This plant-based coagulant could be used as water treatment agent in culture tanks.

### **BREEDING IN CAPTIVE CONDITIONS**

Healthy and stress-free fish is a major criterion for the selection of fish for breeding





which is managed by IAL leaves extracts. IAL is utilized for the whole process from breeding to rearing. From healthy broodstock to larval survival rates are all positively influenced by IAL. Wide varieties of fish species love dark environments because they believe that darkness will help them protect their eggs and make them feel less exposed to predators; without the dark environment, they won't even attempt to reproduce. IAL leaves serve as a nest-building substrate for betta fish and also protect the fry after breeding by maintaining a good amount of infusoria in the tanks. Settling leaves in the base of the tank reduces the water motion and allows larvae to conserve their energy instead of going against the flow of the current. The effects of *T.catappa* leaf extract on the breeding activity of Siamese gourami (*Trichogaster pectoralis*), also known as snake gourami, were determined by (Lee et al., 2016) by controlling the water pH using the extracts from *T.catappa* leaves. The results indicated that after exposing the fish to various pH using the extracts, the best environment to breed the Siamese gourami was at pH 6.5. Such findings could help the fish farmers in breeding the fish instead of harvesting the seeds of the fish from the wild for culturing.

In the aquarium industry in Thailand, betta breeders use the extracts from *T.catappa* as it helps them in creating vibrant colors in betta fish and is also used after betta fights to heal wounds. The spawning capacity is also increased by the IAL leaves extracts in betta.

## PROBLEMS RELATED TO INTENSIFICATION OF CULTURE

In an intensive culture of shrimp, the shrimp farmers suffer a lot from high losses due to high mortality rates and decreased

growth rates. Most farmers have been using chemical hypochlorite (with 60% active substance in the pond and antibiotics to treat the shrimp pathogens to increase the growth rate. The use of antibiotics was reported not only to be ineffective but they create more resistant bacterial strains, which worsen the situation in shrimp culture (Vici et al., 2000) as well as environmental risks while released.

Although the use of probiotics has proved to be effective. It increases the production cost, which therefore does not interest farmers or hatchery owners. Tannic acid binds strongly to metal ions and calcium, inhibiting intestinal bacterial growth (Chansue and Assawawongkasem, 2008). Therefore, a such property of the extract will prevent the shrimp post larvae (PL) from dangerous metal ions in water.

## CONCLUSION

Dried almond leaf abundance and their broad beneficial properties should be considered and utilized at the utmost level in aquaculture industries. Research and many scientific findings are to be encouraged in the coming days. As the leaves are scattered away everywhere, the research will be cost-effective. So, the IAL leaves scattered in the land will shift from ground to lab.

## REFERENCES:

- Chansue, N. and Assawawongkasem, N., 2011. The in vitro antibacterial activity and ornamental fish toxicity of the water extract of Indian almond leaves (*Terminalia catappa* Linn.). *KKU Veterinary Journal*, 18(1), pp.36-45.
- Chansue, N. and Tangtrongpiros, J., 2005. Effect of dried Indian almond leaf (*Terminalia catappa*) on monogenean



- parasite of gold fish (*Carassius auratus*). Wetchasan Sattawaphaet.
- Ikhwanuddin, M., Moh, J.H., Hidayah, M., Noor-Hidayati, A.B., Aina-Lyana, N.M. and Juneta, A.S., 2014. Effect of Indian almond, *Terminalia catappa* leaves water extract on the survival rate and growth performance of black tiger shrimp, *Penaeus monodon* post larvae. *Aquaculture, Aquarium, Conservation & Legislation*, 7(2), pp.85-93.
- Sung, Y.Y. and Abol-Munafi, A.B., 2020. *Terminalia catappa* leaf extract is an effective rearing medium for larviculture of gouramis. *Journal of Applied Aquaculture*, 32(2), pp.175-185.
- Nugroho, R.A., Manurung, H., Saraswati, D., Ladyescha, D. and Nur, F.M., 2016. The effects of *Terminalia catappa* L. leaves extract on the water quality properties, survival and blood profile of ornamental fish (*Betta* sp) cultured. *Biosaintifika: Journal of Biology & Biology Education*, 8(2), pp.240-247.
- Dianala, R.D.B., 2019. Utilization of the tropical almond tree leaves in aquaculture. *Fish for the People*, 17(3), pp.41-43.
- Vici, V., Bright Singh, I.S. and Bhat, S.G., 2000. Application of bacterins and yeast *Acremonium dyosporii* to protect the larvae of *Macrobrachium rosenbergii* from vibriosis. *Fish and Shellfish Immunology*, 10(6), p.559.
- Lee, S.W., Farhan, R., Wee, W., Wan Zahari, M. and Ibrahim, C.O., 2016. The effects of tropical almond *Terminalia catappa* L., leaf extract on breeding activity of Siamese Gourami, *Trichogaster pectoralis*. *International Journal of Fisheries and Aquatic Studies*, 4(4), pp.431-433.
- Bryan, M.N., 2016. *Terminalia catappa* (Talisay) leaves for preliminary surface water treatment: An eco-friendly approach. *Natural Products Chemistry and Research*, 5(249), p.2.
- Babayi, H., Kolo, I., Okogun, J.I. and Ijah, U.J.J., 2004. The antimicrobial activities of methanolic extracts of *Eucalyptus camaldulensis* and *Terminalia catappa* against some pathogenic microorganisms.