

POINT BLANK

Can Advanced Oxidation prevent fishkills

To arrest the recurring episodes of fishkill in Ulsoor lake, a method called Advanced Oxidation will be tried out. Bengaluru Development Minister K J George had announced recently that a private firm, EcoGenetech will conduct the pilot project. Simply put, the technique is designed to increase the Dissolved Oxygen (DO) levels in the lake by removing the algae that suffocates the waterbody.

G Selvam of EcoGenetech explains the process: "We have installed four diffusers (which he termed as lungs) in the lake to improve the oxidation level. At the moment, the DO level is 1.9 mg/L in the sediment tank and the minimum DO level should be around 4 to 5 mg/L for an aquatic life."

The oxidation, he adds, will increase the DO level up to desirable levels in the lake and decrease the BOD and COD levels. "It will eradicate the presence of blue green algae. Besides, the microbial population (coliform and e-coli) will also reduce considerably, resulting in decreasing the foul odour."

George has assured that if this method bears good results, it will be tried in other lakes.

"BWSSB officials would be testing the water quality before and after the oxidation process. If the firm is able to purify the lake, we will implement it in all the lakes," he had said.

Recommendations by IISc researchers

Sustained inflow of untreated sewage has been cited as the most critical factor in destroying the biodiversity of water bodies in Bengaluru, a telling symptom of which are the fishkills.

Reiterating this, a study by a team of Indian Institute of Science (IISc) researchers led by Dr TV Ramachandra has established that the sewage inflow increases the lakes' organic content enhancing biological activities. This is event from the higher Biological Oxygen Demand (BOD) and ammonia.

Introduction of exotic fish species such as African cat fish and Tilapia

aggravates the fish ecosystem. It gets only worse with the dumping of solid waste into the lake bed. A major proportion (70 to 75%) of solid waste is organic and the nutrients leaches to the water body, the study notes.

Bacteria and algae population increases with higher temperature and favourable conditions such as enhanced organic content. Once the oxygen demand from bacteria during day and from algae during night increases, the Dissolved Oxygen (DO) reduces, endangering fish lives.

Proposed solutions:

- Treat sewage and allow the treated water into the lake. Pass the treated sewage (secondary treatment) through constructed wetlands. This process will remove the nutrients, a model that has been working satisfactorily in Jakkur lake.
- Improve aeration in the lake through water fountains. This will enhance the DO levels. Introduction of ducks also helps in aeration.
- Penalize polluters who dump solid waste / construction waste.
- Remove all encroachments of drains connecting the lake and route the drain to integrated Sewage Treatment Plants (STPs) with constructed wetlands.
- Ban introduction of exotic fish species. The African Catfish, for instance, is a highly predatory fish.
- Assess the water quality in the lake regularly throughout the year. This can be achieved through the active participation of local educational institutions. Also conduct regular water sample analysis every month (before 8 am).



Freshwater fish, not so fresh

Every fishkill is a telling testimony of the high pollution in the city's lakes. But the dramatic death of fish in their thousands also raise serious questions linked to health hazards. A closer look at the fish food chain.

Recurring fishkills in lakes across Bengaluru have literally raised a stink. But the dramatic scenes of lakhs of dead, floating fish have brought to the fore the extreme pollution of these water bodies. At stake is not just the environment but a food chain dependent on a growing market for freshwater fish sourced from within the city. This delicate ecosystem is now under serious threat.

Reports that these dead fish, obviously contaminated and decayed, found their way to the markets for sales are shocking enough. But this also raises questions about the quality standards internalised by the network of fish breeders, suppliers and retailers. Is it safe to consume the fish grown in lakes fed by untreated domestic sewage and industrial effluents?

The fishkill in Hebbal lake recently and similar episodes in the Ulsoor and Devarabisanahalli lakes earlier have been attributed to asphyxiation due to sudden and considerable fall in the Dissolved Oxygen (DO) levels. Scientists have also blamed ammonia toxicity. To make it worse, most lakes have no Sewage Treatment Plants (STPs), and the few ones that exist are not fully functional.

Exotic fish factor

Analysing the fishkill in Ulsoor lake, an Indian Institute of Science (IISc) study had drawn attention to another cause: Indiscriminate introduction of exotic fish species such as African Catfish and Tilapia, threatening the survival of the fish native to a particular lake. The exotic species, the study had found, eliminates the native biota and affects the local biodiversity.

High density of fish beyond sustainable levels is another critical factor, say fisheries experts. Greedy fish farmers try to grow more in a limited space, drastically depleting the available DO. The sensitive ones die first, before the massive fishkill strikes. "The farmers have been reportedly asked not to do this, but they don't listen," complains a fisheries department official.

To understand why a conducive ecosystem is essential for fish culture, a closer look at the entire breeding process is critical. As the department official explains, fish could be grown either in lakes and tanks or in irrigation tanks that are 4-5 ft deep. "Up to 15-20 tons per hectare can be grown in this form of culture. Some species could go up to 40 tonnes."

In natural water bodies such as lakes, the fisheries department either leases out the rights or issues licences at a nominal price. The licence is

valid for a year, renewable every year up to a maximum of five. Fast growing fish seeds are sourced from different parts of the State or even Andhra Pradesh. Once harvested, most fish are sold in markets and fish outlets across Bengaluru.

By one estimate, the Rohu variety constitutes almost 60% of the freshwater fish retailed in the city. About 20% are Catla, while Mrigal Carp, Common Carp, Grass Carp and other smaller species make up the rest.

Discrete buyers

Fish harvested in the city lakes do find their way to hotels, retail outlets and some big markets. But many buyers are now discrete enough to spot the difference. "I look at the excretion point of the fish and can see the colour change.



High density of fish beyond sustainable levels is another critical factor for the fishkills, say fisheries experts. Greedy fish farmers try to grow more in a limited space, drastically depleting the available Dissolved Oxygen levels in the lake

Fresh fish are reddish," notes Rohijit Sinha, an IT executive from Murugeshpalya. He frequents the HAL fishmarket for his weekly purchase.

Fish retailer, SA Rasheed notes that freshwater species sourced from the city lakes do not retain their freshness beyond a day. "The decay starts from the intestine and quickly

spreads to the entire body. We don't stock them. Our fish comes from Nellore in Andhra Pradesh and Tamilnadu," he explains.

Freshwater fish is much sought after by Bengalureans of Bengali, Odisha and Assamese origins. But most Keralites and Kannadigas from coastal areas such as Man-

galuru prefer marine fish even if it is much more costly than the freshwater variety.

A kilogram of the marine fish Pomfret costs about Rs 650 to 700 and the marine Seer fish could get as expensive as Rs 1,200 a kg.

The cheapest marine fish, Sardine now costs about Rs 160/kg. In comparison, fresh-

water species such as Rohu and Catla can be bought at Rs 160. But the big picture is this: The consumer has greater choice, a factor that has boosted fish consumption in the city. All the more reason for the fish to be fresh and hygienic, not a health hazard!

Rasheed Kappan



Bengaluru doesn't fish in its troubled waters

In a cosmopolitan city like Bengaluru, which absorbs people and their cultures seamlessly into its fold, nothing exemplifies and celebrates diversity as much as the plethora of cuisines available to the palate. Food is central to the survival of the scores who move to the city every year and to the locals who have seen different tastes grow, clash, merge and evolve.

As the city continues to expand to make more room for its populace, it is crucial to ponder if we have been hacking away at the sources of food that have sustained us thus far. The recent incidences of fish kill in Ulsoor and Hebbal are a part of this debate. While the situation is indeed alarming, fish consumers and dealers, however, seem unfazed.

Shobha Manival Raju, a civil services aspirant, steers clear of freshwater fish altogether. A Mangalorean, she prefers to eat marine fish bought from the Jayanagar 4th Block market. "The fish are caught in Mangaluru coastal belt. These frozen fish may not always be fresh, but they are good for consumption. They are better than freshwater fish, which have a muddy taste and smell to them," she says.

Taher Ahmed, an editor at a web portal, concurs. "Not many people eat the fish that come from lakes in Bengaluru.

However, when they do, they are bought by people of low-income groups from small time fishermen. For big dealers in main markets, their reputation matters a lot," he says.

And, so it does. For Ansar Pasha, a freshwater fish dealer from 30 years at Russell Market, fish from Bengaluru lakes are a big no-no. "They smell bad due to all the ingested pollutants. It's been 20 years since I stopped buying fish from the city's lakes," he says.

This, then, seems to be the

Check before you buy fish

- Gills:** Lift them and check the colour. If it is red, it is fresh goods. If it is dark, it is old.
- Flesh:** The body must be firm and plump when you touch it. If it is goeey or pulpy, it is stale.
- Scales:** Must be uniform and silvery, with an oily sheen to it.
- Odour:** If the fish smells rancid, it is decaying.
- Eyes:** They must be stark clear; if they have turned murky, then the fish has gone bad.

issue. While more Bengalureans prefer marine fish, even among those who do eat freshwater species, there is wariness about the catch from the city's lakes.

Anil Harris, who co-owns New Frosty's, a fresh food retailer at Indiranagar and Whitefield, says, "Aside of the fact that freshwater species can't be stored for long, fish bred in our lakes here do not offer much variety. There are very few dealers, too." He adds, "In Andhra, there is better maintenance and careful and vigilant breeding."

This is precisely why Ansar transports a variety of fish from the freshwaters at Hospet, Nellore, Ananthapur and Bellary.

Deep freeze container trucks carrying Rohu, Catla, Hilsa, Grass Carp, Roopchand etc reach the city by 5 am. By late morning, everything is sold. On the rare occasion that something remains, it is packed in ice containers and stored for a day. Beyond that, it is disposed of.

But for people like Moumita Dutta, who hail from Kolkata, marine fish just doesn't cut it. "I'm habituated to freshwater fish. Wherever I go, that is what I buy. And I don't fret much

over where it comes from. As long as it looks fresh, I'm okay," she says.

For others like Vimal, a techie from Kerala, fish kills are a warning bell. "I usually buy marine fish from HAL market and trust those who sell it. But whenever a fish kill is reported, I just don't buy fish for a month," he says.

To prevent stale or toxic fishes from landing on our plates, regulation of its sale along with awareness is crucial, some believe. Most people are poorly

equipped with the tools for a good purchase, whereas some just want to get a big fish for a good, cheap deal.

"Regulating the sale of contaminated fish at the local level is crucial," says Shobha. Ansar agrees, but the scepticism persists. "The city's lakes have reached a point of no return. Even if they are cleaned and rejuvenated in future, I would never buy fish from there," he says with finality.

Nalme Nachiyar

SHOBHA M RAJU
Civil Services aspirant

Fishkill is a result of ecological abuse, such as immersion of idols, disposal of industrial effluents etc, that end up polluting lakes. So, we don't eat freshwater fish.



TAHER AHMED
Web Editor

Whenever fishkill occurs, about 4-5 stalls spring up on the roadside selling huge quantities. Such a haul is not possible daily, unless they have died due to other reasons.



ANSAR PASHA
Fish Dealer

Instead of giving a free reign, designated spaces must be built for small-time sellers. This may help curb the sale of stale fish by enabling better supervision and checks by authorities.



ROHIJIT SINHA
IT Executive

Before buying, I usually look under the scales of the fish to check if there is any colour change. Fresh fish are usually reddish underneath, but with ice even that is masked by sellers.

