Sick Yamuna is newsy, but not for long?

Manoj Misra

Agog with frothy Yamuna in Delhi, it is as if the first time that media has discovered it. The excitement has raised manifold with political blame game at a high pitch amidst the backdrop of visuals of chhath devotees' standing knee deep in it.

Come October-November and notwithstanding a brief respite - thanks to plentiful monsoon rains - from its polluted status, the river Yamuna in Delhi soon returns to its familiar smelly sewage canal status.

The 'Chhath' festival observed over four days and popular amongst the electorally significant '*purabias'* in Delhi, from the eastern region of the country (eastern UP, Bihar and Jharkhand) falls at a time post Deepawali when the monsoon in north India has withdrawn for good. The festivities including fasting and offering of prayers to the sun god, *Surya* is performed primarily by the womenfolk on a water body, which by default is Yamuna in Delhi. It is perhaps one of the most environment friendly festivities.

The visuals of devotees standing, some even bathing in foamy Yamuna has been an annual feature that briefly bristles the sensibilities of Delhiites. This year seems kind of special when the political tug of war and blame game has escalated significantly.

Why does Yamuna foam so much in winter months?

It is a question that the much active and effective although since prematurely demised, Yamuna Monitoring Committee (YMC) of NGT had put to the pollution control agencies in July 2020.

The two culprits identified for visible frothing of river at the ITO and Okhla barrages by the Central Pollution Control Board (CPCB) and the Delhi Pollution Control Committee (DPCC) were the abnormally high levels of 'surfactants' and 'phosphates' in the river water.

According to DPCC against the permissible drinking water levels of 0.2mg per litre of Surfactants and 5mg per litre of Phosphates in case of detergent bars, set by the Bureau of Indian Standards (BIS), the levels in Yamuna in Delhi ranged from .27 – 1.28 mg per litre of Surfactants and 6.5 – 13.42 mg per litre of Phosphates.

With such high levels of causative factors and almost 'nil' dissolved oxygen (DO), winter generated low ambient temperatures leading to subdued biochemical activities, the conditions become ripe for the formation and retention of foam on any water surface. Add to it a good churning of river water as it falls from a height downstream of the barrages at ITO and Okhla and it becomes a perfect frothy spectacle for all to witness.

Surfactants

'Surfactant' name is a combination of surface-active-agent. These are long molecules that reduce interfacial tension that normally exists when two liquids, or a liquid and a solid or a liquid and a gas comes in contact. Soap is a classic example of a surfactant. These molecules have a head and a tail. The Head is hydrophilic (loves water) and the tail is hydrophobic (fears water) and is thus attracted to grease and dirt. This helps clean any 'soiled' surface including our skin of oil and dirt.

In the dyeing industry, surfactants help the dye to spread and penetrate the fabric evenly. Surfactants have found key role in several industries like detergents, soaps, fabric softeners, motor oils, paints, adhesives, paper, agrochemicals, laxatives and several personal care products like cosmetics, shampoos, toothpastes etc. No wonder millions of tonnes of surfactants are used globally on an annual basis.

Surfactants have been known to cause skin irritation and damage to humans on touch and if ingested these could damage enzyme activities and disrupt normal physiological functions.

Phosphates

It is common knowledge that it is difficult to do any kind of washing using soap or detergent if the water is 'hard'. Hardness of water is the result of high mineral contents especially the presence in it of dissolved salts of magnesium and calcium.

To overcome this problem Phosphorous (P) in phosphate form is added to most detergents manufactured and used in India to 'soften' the hard water. But once it reaches via sewage open waters like a river it begins to work as a devil in disguise by catalyzing rapid growth of aquatic vegetation like algae and water hyacinth. This process utilizes most of the oxygen dissolved in water and results in a state called 'eutrophication'. If the waters are already listless, full of muck, industrial pollutants and organic content like in the river Yamuna in Delhi then the frothy toxic soup is made to order.

Way forward

It is again a tragedy that hardly anyone in authority it seems has bothered to peruse and follow up on the excellent report on the matter, prepared and submitted to the NGT on 7.12.2020 by the Yamuna Monitoring Committee (YMC).

World over there is a strong move to replace phosphate by suitable alternatives in 'detergents'. Even the BIS in its preamble to the 2020 revision make a mention of 'zeolite' and 'tri-sodium citrate' as potential phosphate replacements, being more environment friendly. But strangely do not prescribe it?

Obviously the way forward not just for river Yamuna but for all other water bodies in the country is an urgent replacement of phosphate by environment friendly alternatives in 'wash' formulations. Then there are natural products like *reetha* (soap nut) which deserve much better clientele than synthetic detergents and soaps currently available across the counter.

As for the use of Surfactants, while it has a very wide use base but at least in the case of personal care products a conscious alternation in our lifestyle patterns and choices can reduce its use.

For the river Yamuna to not froth yet again in Delhi during Chhath puja in October –November 2022 there is no other way but to ensure efficient functioning of STPs in the city, zero discharge of any industrial effluent into the river and presence of wholesome flow in it. Did I hear tall order?