**SOP for Tank Cleaning for lily’s**

1. Before tank cleaning, ensure tank cards are removed and passed to the lab manager for fish count and checks. Leftover fishes who are sick/damaged/listless/dead are to be cull/removed/moved/disposed into a bag or container. Labelled with supplier, date and section.
2. Take a picture of the bag and send it to the lab contact. Lab manager will reduce/increase order for the next batch of arrival depending on situations.
3. Starting tank cleaning, place the sponge that is used in the tank on the top left or right side of the tank to indicate to be cleaned. Catappa leaves are to be disposed of in a bag. Sponge can be removed once cleaning starts and weighted holder can be reused.
4. Prepare items used for cleaning - Scoop, brush, long brush, fish net.
5. Open outlet valve to drain out the water and use the long brush to scrub the resided ammonia faeces on the partitioned glass as the water drains out. Close the inlet water valve to prevent water from entering.
6. Once most of the water is drained, scrub using the scrubber with the leftover water on all four sides and base of the tank.
7. Once done, use the scooper to scoop out the excess water and wastes to remove and ensure most of it is removed.
8. After cleaning is done, age the water. Prepare by opening the inlet water valve and close the drain valve so the water fills up.
9. Replace the dirty sponge with a new sponge that has been disinfected and place it with the weighted holder - connect the air inlet tube into the weighted holder. Place a new pair of catappa leaves as well.
10. Lastly, place a QT holder - Quarantine.

**Theory on Tank Cleaning for Lily’s**

Lily’s are a type of ornamental fish, part of section F3, which are fishes I take care of. Tank cleaning is important as it can clean off many parasites and bacteria that remain in the tank. This is to prevent the harmful organisms from destabilizing the water that will be used for the new incoming fishes. Leftover fishes are removed as we do not want to mix with the new or previous incoming as part of the audit as it may cause a mixup in stock count and microbiological incident. We do not want to introduce a set of organisms that can be harmful, which could result in having more DOA of fishes - combining new and old.

Tank cards are used as part of stock count and data for audit. Pictures sent to the lab for the manager are also part of an audit which aids in what orders should be placed for the next incoming. Placing used sponges on top as an indicator is a good practice as it is efficient and can tell which tanks are to be cleaned. As for catappa leaf being disposed of, we do not want to reuse it again to prevent cross contamination as well. Feces and waste will naturally reside on the side partition glass in the tank as the outlet water valve to drain are located on that end. With the help of a partial vacuum, feces are bound to reside on the side. We will need to scrub as the wastes can get stuck or are too sticky and sticks well to the bottom of the tank. Scrubbing the 4 sides and bottom is also a preventive method for the microbiological growth of organisms such as lice. Lice is a prime example as they cause itchiness to the fish which can potentially cause a loss in color and pigment of the fish's color as ornamental fish are hard to take care of. We also want to eliminate most parasites like Ichthyophthirius multifiliis caused by a protozoan which can cause the freshwater fishes to suffocate if the growth of parasites is strong where it takes effect on the gills of fish.

To further minimize growth, we should always remove the excess water as this will help in the prevention of mixing of new and old water. The diluted concentration of water will be better and have a much better chance of reducing DOA. After the main cleaning is done, we should age the water as this is crucial for the fish. The purpose of aging water would be to increase stability in temperature and remove potential chlorine residue that may be present through manual removal. Other factors include dissolved gases which can occur when high-pressure water flows into the tank. Dissolved gases like carbon dioxide affect the pH range which can be lethal to the fish. High carbon dioxide means higher pH. As water is being aged the day before shipment incoming, we should replace new sponges with clean ones which have been disinfected with a disinfectant. The disinfectant used is environmentally friendly and biodegradable for aquaculture biosecurity. Requires a low dosage and is potent against viruses, bacteria, and fungus which is safe for bacteria culturing after usage. The weighted holder is paired with the disinfected sponge as a support system to ensure it reaches the bottom of the tank which will then be connected to an air inlet tube to introduce aeration.

The use of catappa leaves is primarily a factor and part to ensure the healthy growth of Lily. They are often used in fish tanks to release/excrete necessary compounds that can benefit the fish and make out a certain type of water. The main function of the leaf is to soften the water as lily are sensitive to hard/salty/brackish water. Lily carries a ton of viruses and bacteria hence a good use of leaves can help mitigate the number of parasites and protozoans that can cause damage to the lilies. Catappa leaves aid in lowering the pH level, reduce stress, and have antibacterial and antifungal properties which is a much healthier way than using chemical concentrated kits which are not environmentally friendly. How this works is with the help of some chemical compounds that are present in the leaf. For example, tannins are excreted out from the leaves themselves. Though it causes discoloration of the tank water, it is very beneficial. It carries bioloads which is the breakdown of the organic materials which will then cause a buildup of detritus thus causing various things to happen in the water.

Lastly, placing a QT card holder is a practice to indicate that the tank is under quarantine as it is a new shipment. Fishes are to be quarantined as they could carry potential viruses and may be sick so if there were to be a new order, we should not be taken from the newly arrived fishes. This is to reduce sickness of the fish and prevent any fatality when we ship new fish.