

## "The Four Day Rule" and the "Spin Cycle Method"

We have observed over the last 48 years that we've been in the saltwater retail market, that the number one reason for failure and discouragement with especially Reef Aquariums is the high build-up of nasty looking green micro-algae and/or red slime (cyanobacteria) and dead or dying coral (especially SPS corals). This is commonly called "old tank syndrome" The cause of "old tank syndrome" is mostly from the slow build-up of nutrients (mostly phosphate based) in the "particle filter" (polyester filter floss, carbon, filter socks, and especially the SAND under the rock work. (Resulting in low-oxidizing (Reductive environment) We teach our customers not to allow this build up in anything-anywhere by adhering to what we call the "4-DAY-RULE". By changing the polyester filter fiber and/or socks (no carbon) at least every 4 to 7 days. And to not allow any detritus (loaded with phosphates) to accumulate under the rock work and/or in the sand. After 4 to 7 days heterophic bacteria break it down into types of waste that protein skimmers can't get out (easily), but hairy, slimy algae can use it as fertilizer. All food and wastes imported into an aquarium must have a way to be exported out to result in a highly OXIDATIVE environment. (Rock sitting on sand is analogous to a beautiful house with no out going septic system and all the commode waste are flushed under the living room rug; it is out of sight and out of mind but sooner or later something is going to happen)!

A way to virtually automatically eliminate the detritus build-up under the rock work is with what we call the "Spin Cycle Method". We raise the rock work up off the bottom glass by 2 ½" to 3", with small 1 ½" pieces of flat sandstone or coral rubble. Then, with no sand placed directly under the rock work (maybe a little sand ½" to 1" depth placed out from the rock work to the front glass). Then, for instance with a 48" long by 18" wide tank, we use at least 1 to two (2) 800 gph propeller (wave) pumps up high to the left (pumping left to right and parallel to the flow of the sump return pump 24/7) and at least two (2) 800 gph at the back bottom right. (The number of pumps and power of pumps depends in proportion mostly on length and width of the tank) pumping right to left 24/7). The water literally spins from top to bottom keeping light detritus suspended so that it will eventually be eaten by corals, sponges, or be sucked out into the overflow and or intake strainer to be trapped and discarded by the polyester-filter-fiber/sock (usually 200 micron) by remembering to use the "4 Day Rule". Also the extra fine detritus (usually less than 200 micron), dissolved wastes and bacteria can then be taken out of circulation by a good protein skimmer.

If too much algae or cyanobacteria occurs or when adding new fish and to help prevent micro-parasites, then we dose with an easy to use, inexpensive and fairly-safe-to-use oxidizer: Potassium permanganate. (KMnO<sub>4</sub>, i.e. Kent Poly Ox). These two (2) supplemental oxidizers (ozone and KMnO<sub>4</sub>) break-down (oxidize) virtually all organic (reductive) compounds. Oxidizers break down (oxidize) long-chain organic (carbon) compounds (poisons) into short-chain carbon compounds (and trace elements) that can now be consumed by bacteria that are in turn consumed by filter feeders (corals, sponges, etc.) or removed by the protein skimmer. This mechanism works in much the same way as the "vodka method" except there is no need to add extra short-chain carbon (ethanol) to the system. Also, the residuals from KMnO<sub>4</sub> treatment are potassium (k) and manganese (Mn) that are needed elements anyway, instead of the possible ozone residuals like very toxic hypobromite and/or hypochlorite (bleach), etc. Also, using oxidizers increases the ORP of the aquarium. We administer KMnO<sub>4</sub> similar to how ozone is administered by dosing directly into the water-intake of the protein skimmer; where it can react with waste and micro-parasites instead of reacting directly on contact with the corals and other invertebrates.

Be sure to vacuum residual detritus at water changes and to maintain calcium, magnesium, Kh and trace element levels.

Len Randel is an "old school" being a saltwater retail shop owner since February 1971 and a former high school biology, chemistry and physics teacher, and with some graduate hours in Marine Invertebrate Zoology at the University of South Florida.