Proper Protein Fractionator Adjustment

A protein skimmer (actually a protein fractionator) is not a 'plug and play' piece of equipment. It requires close attention to achieve proper adjustment. This proper adjustment is critical to achieving the maximum performance from the unit.

The fractionator is adjusted by creating back pressure at the discharge by throttling the discharge valve. The gas intake and water inlet need to be set to their recommended flow rates. Throttling back the discharge valve increases the back pressure and raises the foam level in the upper chamber. This is basically a hydraulic balancing procedure. (Do not throttle water or air flow to and from the venturis to control foam height. Venturi water valves should run in the open position. Venturi air intakes should be adjusted to a 1" to 2" vacuum.)

The fractionator needs to be adjusted to a level that consistently produces an effluent the color of weak tea or ginger ale. Lowering the foam level to the point where it only produces dry foam and a dark effluent inhibits the removal of waste products. A new installation that has not had any fractionation for more than a few days will require 2 to 7 days for the system to achieve a level of stable organic removal.

Protein fractionators remove compounds from the water by injecting fine bubbles into the water. Organic compounds 'stick' to the surface tension of the water which includes the surface of the bubbles. As the organic laden foam rises into the upper chamber it overflows into the collection area.

The discharge valve adjustment combined with the Bio-load (and certain additives) will affect the foam level. If the foam level is set too low the protein fractionator will only remove a small amount of waste even from very dirty water. Waste levels which are below this threshold remain in the water since the protein fractionator is not adjusted to remove them. The result of this level of adjustment is a very dark, concentrated waste extract from the protein fractionator. When this is occurring the aquarist has no way of determining how efficient the protein fractionator is working other than by observing the color of the water in the aquarium.

Adjusting the level too high creates a situation where the fractionator is removing a large amount of water that has very little dissolved organics.

To properly adjust a protein fractionator takes at least several days of observation and adjustments. You should allow a minimum of a half an hour between adjustments to allow the hydraulics to settle into balance. There are a couple things to remember to achieve proper adjustment. The first is the protein fractionator only removes waste to the threshold you have set. As it approaches this threshold it removes less and less resulting in a concentrated extract. The other is that the extract should be roughly the color of ginger ale or weak tea. If it is darker, the threshold is set too low.

To adjust the fractionator properly the following must be done:

1. Make sure the venturi and inlet flows are set to the recommended rates.

2. Adjust the protein fractionator by throttling the discharge valve so that the extract is about the color of ginger ale or weak tea. Ideally you will produce a sudsy foam that is between the consistency of water and shaving cream.

3. Let it run, even though it may run wet for a while. As it approaches the new threshold level for waste extraction it will begin to slow down and the extract will become darker and more concentrated. When this happens repeat step 1 and step 2.

3. When the point is reached that the protein fractionator does not slow down after a few days then it can be assumed that the protein skimmer is properly adjusted. In the case of very dirty water this process may take quite a number of adjustments and may take longer to slow down the first time. Keep the protein fractionator adjusted so that the extract does not become dark.

Adding feed, organic matter or animals to the water will cause the foam level to rise, sometimes substantially. Certain oils and other compounds will inhibit foam production. If the skimmer level "bounces" or changes radically over a short period, there may be hydraulic issues with the way the filter is plumbed and/or vented.

NEVER BLOCK THE DISCHARGE VENT UNION AT THE TOP OF THE FRACTIONATOR. This will pressurize the unit, and void all warranties. If you connect any filters or ozone destruct equipment to the top vent, the vent must remain free-flowing or at a slightly negative pressure.

To maintain an efficient fractionator the upper chamber must remain clean and the rinse system in the upper chamber needs to be working properly. The chamber should be accessed through the top cover and cleaned manually every 90 days or if the rinse system has been out of operation for more than 3 hours. With a properly adjusted protein fractionator the water will be noticeably cleaner. Ideally aquarium water should be clear and colorless. The closer to this goal the better.