The main purpose to dose organic carbon is the reduction of excess nutrients in the reef aquaria. The two main nutrients reduced from organic carbon addition are nitrate and phosphate molecules (NO3 and PO4 respectfully). The reduction of phosphates, in turn, allows for enhanced calcification and growth of corals. Additionally, lower NO3 and PO4 have the added benefit of reduced nuisance algae, both bubble and hair. This observation has been reported numerous times by vodka users. The reduction in algae is the result of lower NO3 and PO4 within the water column and not a direct effect of ethanol addition. These potential benefits have lead some to add foreign organic carbon sources not usually found in the reef ecosystem to their tank. The organic compound most frequently used is ethanol (sold in stores as vodka).

The addition of vodka/ethanol is thought to increase bacterial biomass. For this, vodka addition would result in bacterial growth and reproduction. During this process nutrients in the water (including NO3 and PO4) are taken up for the formation of new macromolecules that are needed in cell synthesis and viability. Due to this rapid growth and reproduction, NO3 and PO4 can drop quickly from detectable levels by most test kits on the market. The increased biomass of the bacteria leads to a notable increase in skimmate production, removing more waste than without vodka addition. The increased skimmate is thought to remove the bacteria or bacterial biproducts that have assimilated the NO3 and PO4 within the water column leading to NO3 and PO4 depletion.

Many view organic carbon dosing as unnecessary as organic carbon isn t thought to be limited in the reef aquarium environment since larger organic molecules are found within the water column at any given time. However, the amount of organic carbon that heterotrophic bacteria can utilize must be limited due to the reported benefits and observations on Reef Central from organic carbon dosing. This method is applicable for systems that have had the inability to effectively remove both NO3 and PO4 from their system. Stable systems that do not contain high levels of NO3 and PO4 may not benefit to any great extent by employing carbon source dosing.

Equipment - Skimmer, An Absolute Must!

Well if it sounds so great, why can t I just start dumping vodka/organic carbon into my system? Before running to the liquor cabinet, the simple answer is overdosing can cause serious and detrimental effects to the reef system. To help circumvent this potential issue a dosing regimen along with some basic equipment is needed. The absolute must is the requirement for a powerful skimmer. People that have reported beneficial results using this method all have had strong skimmer and report a change in skimmate from a light brown to a strong odiferous black sludge. This makes a good skimmer a key requirement and important for two reasons:

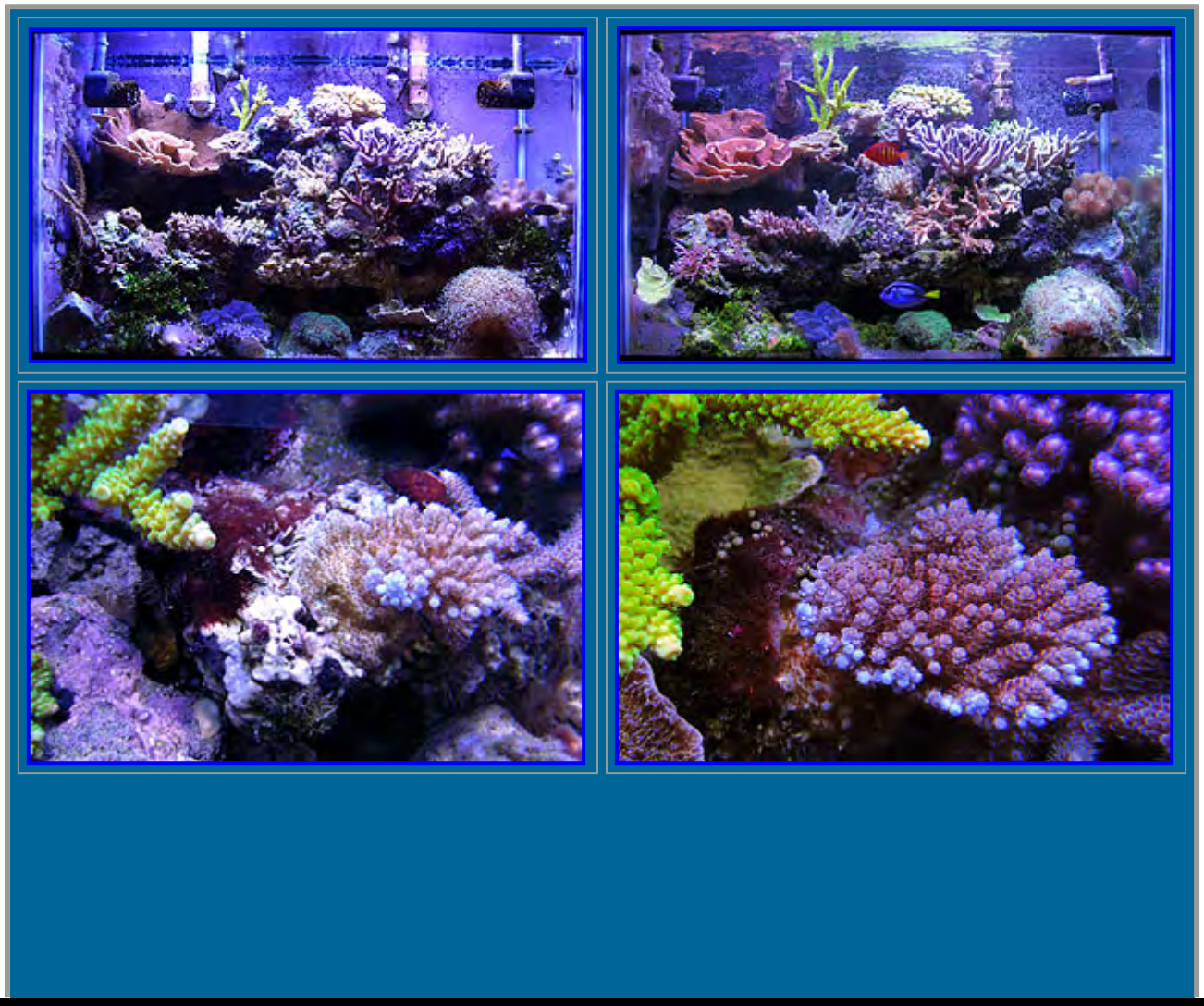
1. Gas exchange. The increased bacterial biomass and growth will decrease your dissolved O2 levels in the water

column. Too much vodka can result in a drastic decrease of O2 and can cause stress to your reef inhabitants, if not death.

2. Exporting bacteria/macromolecule mass. Vodka addition results in lower NO3 and PO4 levels. You will want to export the incorporated nitrogen and phosphates that you are cultivating by organic carbon dosing. Efficient skimming allows such removal.

Jörg Kokott, a key contributor to the original thread, recommended the use of ozone during the duration of vodka dosing to maintain high levels of dissolved O2 in the system. This decrease in dissolved O2 is indirectly observed in ORP meter readings after vodka addition. Though not an absolute requirement, as told from many RC participants, ozone may add an extra level of protection by increasing O2 levels during an overdose.

Gelbstoff, German for yellow matter, is reported to buildup in aquariums over time. Additions of vodka or other carbon sources have the potential to accelerate the yellowish water buildup from organics. To solve this problem, people have utilized ozonators to breakdown of the organic molecules responsible for resulting in yellowish water. Ozone is an attractive choice as it would not only breakdown the gelbstoff but will also add O2 to the water in case of an overdose. For people not interested in running ozone other solutions for this problem are the addition of granulated activated carbon or through regular water changes.



Left photos are pre-dosing of vodka.	Right photos are post-dosing.

Photos courtesy of Mike Woodard (miwoodar).

Pictured above is miwoodar's tank. This aquarium successfully used vodka to lower nitrates and phosphates. His setup utilizes a skimmer but does not utilize ozone. After reduction, continued growth and coloration was observed amongst SPS and LPS corals.

Dosing Instructions

These instructions will focus solely on using 80 proof vodka (40% ethanol by volume). They do not pertain to other organic carbon sources that are also currently used, including common table sugar (sucrose) and vinegar (sodium acetate). The dosing instructions below were as dictated by Jörg Kokott and have been used successfully by us.

1. Test your system s NO3 and PO4 levels. Do not dose if you do not know this! We recommend good test kits that have some low level of sensitivity. This will be important later on to determining a maintenance dose regimen. During the initial dosing test often and adjust dosing parameters as needed as each tank s requirement will be different. Dosing accuracy is of the utmost importance. A graduated measurement tool such as a syringe will come in handy. A journal of additions and test kit measurements is recommended.
2. Estimate your Net Water Volume (NWV) of your system. (Aquarium volume + sump + refugium + reactor volumes) (live rock displacement). It can be difficult to accurately measure the amount of water being displaced by the live rock. If unsure of the volume of live rock we suggest taking 30% off your display tank s Gross Water Volume. For vodka dosing there is absolutely no harm in underestimating the Net Water Volume and is recommended.

   As an example, let us assume that your setup contains 100 Net Gallons.

3. The starting dosage is 0.1ml of vodka per 25 gallons (~100 liters) NWV daily continued for three days. For 100 Net Gallons, your dosage would be 0.4ml daily during this period. It has been suggested to cut the daily dosage in half and dose twice daily for more consistency.
4. Days 4-7, double the daily dosage to 0.2ml of vodka per 25 gallons NWV. Your example dosage would be 0.8ml daily during this period.
5. Each subsequent week add an additional 0.5ml of vodka regardless of aquaria volume. At this point your example dosage during week two would be 1.3ml daily. If you do not see nutrient levels decrease during this week, the following week add an additional 0.5ml for a daily dosage of 1.8ml daily.
6. When your NO3 and PO4 levels start to drop maintain the current dose. For example, if you were on week two