Ingredients Used in the BioPro 190

The BioPro 190 is designed to use reagents as follows:

190 ml Sulfuric acid:
This does not need to be of a high grade of purity as long as the concentration exceeds 93%. This grade is often known as 66 BE. Battery acid is too weak as it is usually less than 50%. Some people have been able to successfully use sulfuric acid marketed as a drain opener. Due to the fact that the companies manufacturing sulfuric acid drain openers often change their formulas or add diluting agents, we cannot make a broad recommendation of these products. We recommend that the user obtain the sulfuric acid from a nearby chemical distributor, or ask your BioPro dealer about purchasing convenient, individually-packaged doses.

Lye:
The BioPro 190 may use 1520 grams (1.52kg or 3.2lbs or 3lbs 4.3oz) of sodium hydroxide (NaOH). This weight measurement applies to whatever dry form that is being used (flakes, beads, bricks, granules, etc.) Because the granulated form of this chemical is so common and has such a consistent density, the user may employ a simple volume measurement to avoid using a scale. They will find that approximately 1350 ml of this product will total the 1520 grams required for the process.

The BioPro 190 may use 2130 grams of potassium hydroxide (KOH). This weight measurement applies to any dry form of the chemical. It has been found that nearly all manufactures of Potassium Hydroxide are unable to refine their product to purity greater than 90%. The BioPro 190 can accommodate this, however, the user must add a corresponding 11% more to make up for what is lacking due to impurity. This will total approximately **2350** grams (2.35Kg, 5.17 lbs, 5lbs 3oz) for KOH. Due to the inconsistent nature of the density of this chemical in the flake form, we due not recommend that the user attempt to employ a volume measurement.

Note: Upon exposure to air both of these chemicals absorb carbon dioxide and degrade by turning into carbonates. This renders them ineffective to the chemical reaction and can even cause damage to the machine components. We strongly recommend that the user does not employ lye that has been stored for extended periods of time or in an unsealed container. The user is strongly encouraged to carefully seal up the container of lye after each use. Some have found it effective to only open a small corner of the bag of lye and then seal this corner with duct tape after every use.

It is usually an easy process to obtain potassium and sodium hydroxide from agricultural and chemical suppliers. It often comes in fifty-pound bags. Some have found that certain brands of drain openers and oven cleaners such as "Red Devil Lye" were effective in the process. Once again, due to the frequent changes by manufacturers, we can only give an unqualified recommendation to chemical suppliers or to prepackaged doses supplied by your dealer.

Both potassium hydroxide and sodium hydroxide have relative strengths. It is your choice as to which catalyst works best for you. Sodium hydroxide tends to be a fair amount cheaper than potassium hydroxide. In addition, less sodium hydroxide is required for a batch of biodiesel. Because of its granulated from, sodium hydroxide is typically easier to handle and pour. Potassium hydroxide has two distinct advantages. The first is that if potassium hydroxide is used as the base catalyst, the glycerin produced can be used as a fertilizer or composting agent. Secondly, especially in colder temperatures, the glycerin produced when potassium hydroxide is used tends to resist solidification.

Methanol:
The machine is set up to run using 10 gallons of methanol. Most racing methanol is approximately 99.95% pure. We recommend that the customer not use methanol less than 99.90% pure. Gasohol mixtures are not acceptable. This product will absorb moisture from the atmosphere as well. It is essential to completely reseal the container where it is stored after every use.

Ethanol may by used in lieu of methanol as long as the user carefully adheres to the instructions below:

In order for the biodiesel reaction to happen properly and thoroughly, there needs to be a certain number of molecules of alcohol present. Because ethanol alcohol is made up of larger molecules than methanol, the same number of molecules takes up more room. While the BioPro 190 is built to use 10 gallons of methanol, the reaction requires 14.5 gallons of ethanol. In order to use ethanol effectively, the following strategy must be employed.

First, add all of the ingredients, except for the sulfuric acid, as directed in the Owner's Manual. Then add another 4.5 gallons of ethanol into the main reaction tank. Then, close the lid and press start. Wait till the stirring motor turns on. Then, wait an additional 5 seconds before adding the sulfuric acid to its respective port.

The wash cycle should be carried out exactly as directed in the Owner's Manual.

There are several caveats to consider. For one thing, ethanol is much more difficult to purify (by distillation) than is methanol. The main contaminant in the distillation process is water. When the ethanol reaches a purity level of approximately 96% it forms a mixture with the 4% water called an azeotrope. The result is that the last 4% water is very difficult to remove from the ethanol. That last 4% will greatly hinder the biodiesel reaction. Therefore, this grade of ethanol unacceptable.

Small quantities of methanol in the ethanol (as is often the case with denatured alcohol) are acceptable for use in the BioPro 190. However, many common gasohol mixtures such as E 85 are not. It is recommended that methanol and ethanol alcohols should add to at least 99.9% of the total volume of the alcohol used in processing. There has not been extensive and rigorous testing done on the use of ethanol instead of methanol in the BioPro 190, so the user should be aware that results are likely to vary somewhat. All of the same cautions regarding oil quality still apply when using ethanol.