

Operation Guide

**Handling and Storage of By-products, Waste
Products and Accidental Products**

By Joseph Bornstein

Whitman Direct Action

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For



gotaverde

Handling of by-products, waste products, and accidental products

Introduction: In the transesterification process the main by-product is glycerin that contains 30% by volume methanol, and small amounts of mono and triglycerides, soap, and caustic soda. Other by-products include extremely watery and high in FFAs oil, emulsions, and soap.

Health Effects of Glycerin exposure: Glycerin on its own has fairly mild health effects which include:

Eye: May cause eye irritation.

Skin: May cause skin irritation. Low hazard for usual industrial handling.

Ingestion: Ingestion of large amounts may cause gastrointestinal irritation. Low hazard for usual industrial handling. May cause headache.

Inhalation: Low hazard for usual industrial handling. Inhalation of a mist of this material may cause respiratory tract irritation.

With that said, glycerin that has not had the methanol extracted from it should be treated as if it is methanol given its high methanol content.

Storage for Dirty (with Methanol) Glycerin: (1) establish a no smoking zone within your building and 100 feet around its perimeter, (2) keep in airtight containers (3) ground all glycerin drums to prevent static electricity build-up (4) keep glycerin drums within a safety container i.e. a large box or dish that the drum can sit within; the receptacle should of course be methanol resistant (steel, iron or HDPE plastic) and have a volume sufficient to capture the volume of drums held within the safety container (this is a back-up for leaks in your glycerin drums), (5) only open one container at a time, (5) store extra drums outside and away from flammable objects, (6) keep out of direct sunlight, and (6) make sure to have good ventilation.

Storage for Clean Glycerin: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. No special precautions needed.

Handling of Dirty (with Methanol) Glycerin: Dirty glycerin should be treated just like methanol, especially when it is hot. Using buckets and open-air containers is an unacceptable risk as well as an unacceptable level of exposure to biodiesel producers. All transfers of glycerin that is dirty should be done in a vaporless system, using pumps and quality seals to eliminate exposure to vapors.

General Handling Information: Be sure to wear protective gloves and eye protection as well. After use, wash hands thoroughly, especially before eating. Use adequate ventilation. Avoid contact with eyes, skin, and clothing. Avoid ingestion, and inhalation. Wash clothing before reuse.

First Aid Measures:

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation develops, get medical aid.

Skin: Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

Ingestion: Never give anything by mouth to an unconscious person. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water. Get medical aid if irritation or symptoms occur.

Inhalation: Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

Dirty to Clean Glycerin: Due to the hazardous nature of dirty glycerin it is worth the trouble to clean as much glycerin as possible. In order to do this, you need to boil off the methanol, which is in solution within the glycerin. Because methanol is a hazardous substance be sure to capture the methanol in a condenser that is airtight. After you have completed recuperating the methanol from the glycerin be careful when opening the recuperation tank because the glycerin could still be hot and vapors could still be in the tank. It is best to either transfer the hot glycerin using a pump system to a storage tank, or to wait enough time for the glycerin to fully cool before opening the container.

Handling Soap: The by-product of soap comes when you recuperate the methanol from biodiesel and the soap falls out of solution. The majority of this soap should be stuck to the sides of your recuperation tank and on the bottom of the tank itself. When attempting to handle this soap, you should first transfer all of the biodiesel into another holding tank so that you have easy access to the soap. Let the tank air in a well-ventilated area for 40 minutes before attempting to extract residual soap lining the tank. Using a scraper and a receptacle, extract the soap. Wear gloves since you will be handling the soap for a long period of time.

Handling High Water and FFA Oil: When making biodiesel from waste cooking oil, there will invariably be some oil that is just too watery and high in FFAs to use. This oil contains no toxic materials and can be disposed of via composting or safe trash disposal. Because it is oil, it should not be introduced to water systems.

Storing Emulsions: You can have emulsions when attempting to transesterify your oil, or when attempting to wash the biodiesel. In the former case, the emulsion is a much more toxic substance because it contains all of your methanol and caustic soda due to the fact that the glycerin has not settled out yet and that the reaction has not been completed. In this case, when storing an emulsion (1) establish a no smoking zone within your building and 100 feet around its perimeter, (2) keep in airtight containers (3) ground all emulsion drums to prevent static electricity build-up (4) keep emulsion drums within a safety container i.e. a large box or dish that the drum can sit within; the receptacle should of course be methanol resistant (steel, iron or HDPE plastic) and have a volume sufficient to capture the volume of drums held within the safety container (this is a back-up for leaks in your emulsion drums), (5) only open one container at a time, (5) store extra drums outside and away from flammable objects, (6) keep out of direct sunlight, and (6) make sure to have good ventilation. If the emulsion comes from washing, you are essentially dealing with a mixture of biodiesel and water, which is a relatively safe substance.

However, you should still keep in airtight containers, store within a safety container, keep away from flame, out of direct sunlight and in a well-ventilated area.

Handling Emulsions:

Emulsion from processing: Because this emulsion has such a high toxicity all transfers should be done through a vaporless system that uses pumps, hoses and seals to minimize exposure. Using buckets and open-air containers is an unacceptable risk as well as an unacceptable level of exposure to biodiesel producers. Be sure to wear protective gloves and eye protection as well. After use, wash hands thoroughly, especially before eating. Use adequate ventilation. Avoid contact with eyes, skin, and clothing. Avoid ingestion, and inhalation. Wash clothing before reuse. Methanol can go through most plastic gloves, so be sure to purchase chemical-grade gloves.

Emulsion from washing: Though this kind of emulsion is much less toxic than an emulsion from processing, general precautions should still be taken. Be sure to wear protective gloves and eye protection as well. After use, wash hands thoroughly, especially before eating. Use adequate ventilation. Avoid contact with eyes, skin, and clothing. Avoid ingestion, and inhalation. Wash clothing before reuse. Methanol can go through most plastic gloves, so be sure to purchase chemical-grade gloves. Using buckets to transfer is safe if the emulsion is COLD, but if the emulsion is hot use a vaporless system.