



Degumming

Safety

1. SDS Sheets: Available upon request on all chemicals used in this process.

Enzyme Usage

1. Enzymatic process breaks the phosphatides into two parts. One part will be a lipophilic by-product which requires additional winterization to fully remove. The second is hydrophilic, which will require a heptane/water wash to remove.
2. It is recommended to perform the degumming process prior to winterization for best results.
3. Do not subject Enzyme powder to temperatures $>50^{\circ}\text{C}$ (Ideal temperature for enzymatic activity is 40°C)
4. Do not expose Enzyme to Alcohol or other solvents during incubation as this may de-nature the enzymes and render them useless.

Preparation

1. Required Materials/Media:

- Heptane
- Water
- Heat plate/Mag Stirrer
- pH Meter/Test Strips
- Thermometer
- Homogenizer
- High-accuracy scale
- Rotovap
- Sep Funnel/Reactor

Procedure

1. Heat distillate or crude to $80-100^{\circ}\text{C}$ – add approx. 20% hot distilled water directly to material and mix. You may do this by hand, with mag stirrer, or with a homogenizer. Let the mixture cool to 45°C before proceeding to next step.
2. In a separate vessel, weigh out Carbon Chemistry Enzymes (1.5g of powder for every 1000g of material) add distilled water to hydrate the powder and stir until solution is milky white and all the powder has dissolved into the water. Add this directly into the material vessel and stir-in thoroughly.
3. Maintain concoction at a strict 40°C for 30 minutes while enzymes incubate.

**At this stage, if you choose to bypass the heptane/water rinse, you can dilute concoction to 10:1 with ethanol and proceed with winterization as desired. We strongly recommend removal of the water-soluble components prior to final distillation but understand that lab/processing facility limitations exist with regard to certain chemicals.*

4. Dilute in 1-2 parts heptane – transfer to sep funnel or reactor and add water.
5. Shake sep funnel or stir reactor vigorously to allow water to interact with heptane/material solution – and let rest for 5-10 minutes prior to draining.
6. Drain off water layer as well as opaque emulsion (gums).
7. (OPTIONAL) You may repeat steps 5-6 with heavy brine or saline (salt water) until you do not observe emulsion layer.
8. On the final draining, let de-gummed heptane/material solution sit for 1 hour to ensure all the water has left the suspension.
9. Rotovap the solvent from material, introduce desired ratio of alcohol and proceed to winterization.