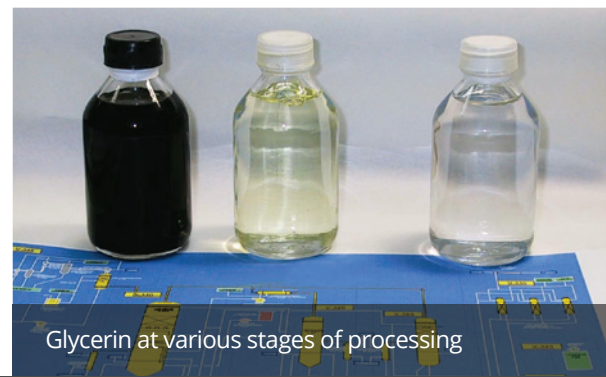




# CPM Crown's Glycerin Recovery



Deodorizer and crude still



Glycerin at various stages of processing

## DESIGNED TO PRODUCE HIGH-QUALITY USP-GRADE PRODUCTS

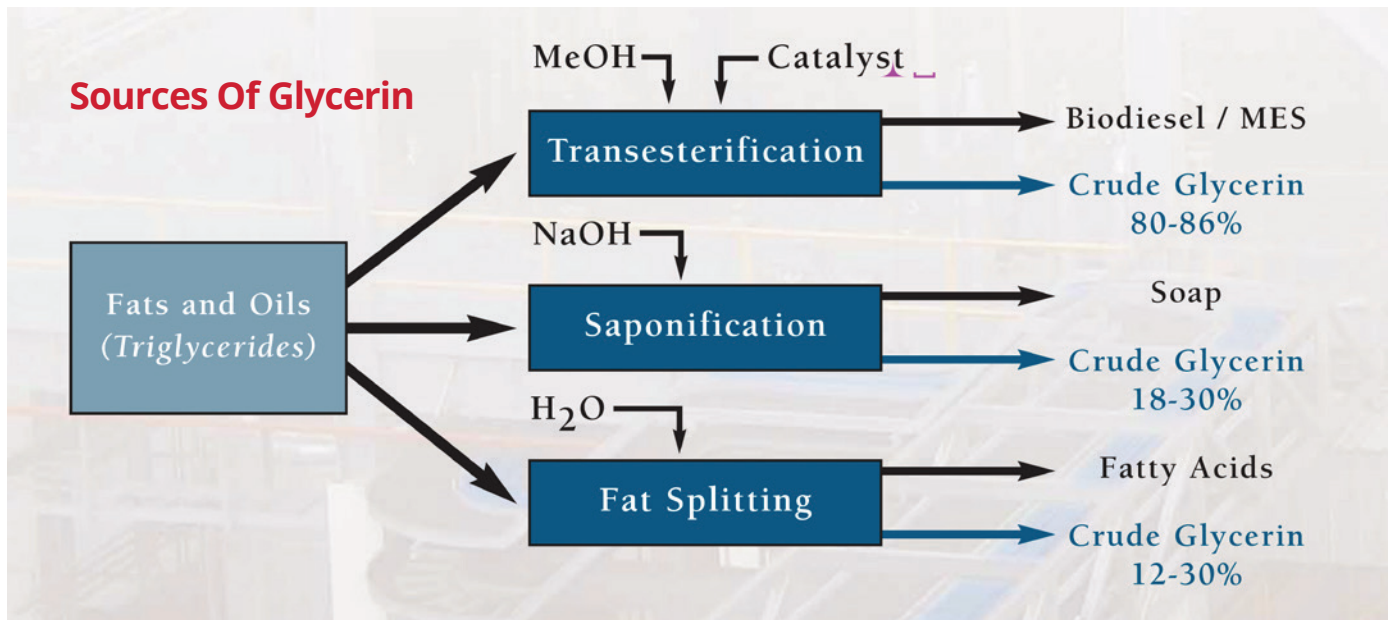
Natural crude glycerin can come from many sources, including fat splitting (hydrolysis of fat), saponification (adding caustic soda to fat as part of the neutralization process) and transesterification (making biodiesel or detergent feedstock).

CPM Crown's glycerin recovery system is specifically designed to produce a high-quality USP-grade product from a variety of these feedstocks. The system provides an overall efficiency typically exceeding 95% yield of the available glycerin.

The process of refining crude glycerin involves the removal of contaminants such as salts, unreacted fats, matter organic non glycerin (MONG), water and other impurities. Depending upon the feedstock characteristics, the crude may need

pretreatment and evaporation (water removal) prior to refining. In many cases, such as that for biodiesel crude, the crude can be sent directly to the refining process.

Pretreatment is typically required for SSL and fat splitting crudes, and often involves a separation step followed by a chemical treatment and filtration. In general, the primary objective of the pretreatment system is to reduce the MONG content and to protect the quality of the glycerin. Generally, pretreatment does not significantly affect the salt or water concentration of the crude.



If evaporation is required, the crude may contain a substantial amount of salt that may precipitate as the water is evaporated. If so, special salt removal and handling equipment is provided to purify the salt and recover a significant amount of glycerin. This recovered salt can be reused in an integrated soap plant

Depending upon the plant capacity, a multiple-effect evaporation system, including a thermocompressor, may be supplied. A variety of vacuum systems can also be provided to meet a variety of environmental and operating cost considerations.

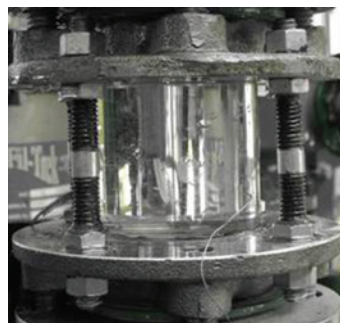
Most crude glycerin must be refined to classify the product as a USP or CP grade. In the refinery, glycerin is delivered to the crude still to be evaporated, contacted with stripping steam throughout this column, and is recovered in the packed column section. The unique deodorizer further purifies the glycerin by removing unacceptable volatiles. After cooling, the product is passed through a fixed bed carbon adsorber, producing a very low APHA color score product.

A byproduct of the crude still is a residue containing a significant amount of glycerin. The refinery is normally equipped with a foots still to process residue into a material containing 10-25% glycerin.

The residue from the foots still has a toffee-like consistency and can either be disposed of directly or, in some cases, can be used as a feed-grade additive. For higher capacity plants, or locations where disposal is a major consideration, a wiped film evaporator (WFE) may be a viable alternative. Typically, the WFE will produce a dry cake residue containing around 3% residual glycerin. In addition to the additional value of the recovered glycerin, the dry cake is typically easier to dispose.

A number of enhancements can be provided to the systems. A variety of energy-saving vacuum system alternatives is available. For the ultimate in cost-effective steam savings, Crown's patented Sub-Zero scrubber system is a very attractive option.

Crown glycerin recovery systems are known world-wide for providing the highest quality, lowest operating cost solutions.



Sightglass with glycerin



Cooled product is sent to carbon adsorbers to reduce color

**For ongoing innovation, Crown's technology and team are second to none.**

CPM Crown's Global Innovation Center is a facility unlike any other. A fully functional 15,000 sq. ft. pilot plant, analytical lab and training facility, the GIC offers piloting capabilities from benchtop lab scale to multiple tons per day of continuous production, simulating

real life and enabling customers to develop and test new product concepts in a confidential, controlled environment. The GIC has capabilities in preparation, extraction, desolventizing, drying, deodorizing, refining, fat splitting, renewable diesel and specialty extraction (including Hemp CBD Oil). Crown's technical expertise, R&D and full lifecycle process provide guidance and support at every step from feasibility, trials and custom processing to commercial-sized operations and aftermarket.



Feeding, Fueling and Building **a Better World.**



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