

RECOVERY OF GLYCEROL AND OTHER VALUABLES FROM GLYCEROL PITCH

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There are two principal processes used to produce natural glycerol: saponification and hydrolysis of oils/fats. These are mainly carried out respectively in soap and fatty acids in the oleochemical industry. However, with the recent development of the oleochemical industry, production of methyl esters and fatty acids contribute more to glycerol supply than does soap making. Saponification process produces what is commonly known as crude soap lye, and contains about 10% glycerol. On the other hand, hydrolysis releases sweet water which generally contains about 15-25% glycerol. These soap lye and sweet water are then subjected to multiple purification steps to give the pure refined glycerol. The process is summarized in Figure 1.

GLYCEROL PITCH

Glycerol pitch refers to the residue left after the high vacuum distillation carried out to obtain refined glycerol

from sweet water, as mentioned earlier (Figure 1). It can be very viscous, gel-like and the colour can range from brown to dark brown. It is also very alkaline and can easily absorb moisture if left exposed to air.

Recovery of Glycerol from Glycerol Pitch - Process

With the current production of fatty acids and methyl esters, it is estimated that considerable amount (~3500 tonnes) of glycerol pitch is produced yearly by the fatty acids plants in Malaysia. Attempts have been made to try and recover the glycerol. Glycerol pitch is subjected to conventional extraction procedure, using common reagents and chemicals which separate the pitch into major components such as fatty material, salt and glycerol (Table 1). The crude glycerol obtained was analyzed and purified by vacuum distillation (Table 2). The fatty acid fraction consisted of among others C6, C8, C10 and C18:1 chain-lengths.

Table 1: Composition of Glycerol Pitch

	Glycerol	Fatty Acid	Salt
*Composition of Glycerol Pitch (%)	65-75	~10	rest

* composition varies with samples

Table 2: Some of the Characteristics of the Recovered Glycerol Obtained in the Laboratory

Parameters	Crude glycerol	*Purified Glycerol	Commercial Glycerin
Glycerol Content (%)	78 - 81	99.1 - 99.8	99.2 - 99.98
Moisture/H ₂ O (%)	1.5 - 6.5	0.11 - 0.80	0.14 - 0.29
Ash (%)	1.5 - 2.5	0.054	< 0.002
Soap (%)	3 - 5	0.56	n.a
Acidity	0.7 - 1.3	0.10-0.16	0.4 - 0.07
Chloride	n.d	1 ppm	0.6 - 9.5 ppm
Color (APHA)	Dark	34-45	1.8-10.3

* Purified glycerol was obtained from the crude recovered from glycerol pitch via small scale vacuum distillation.

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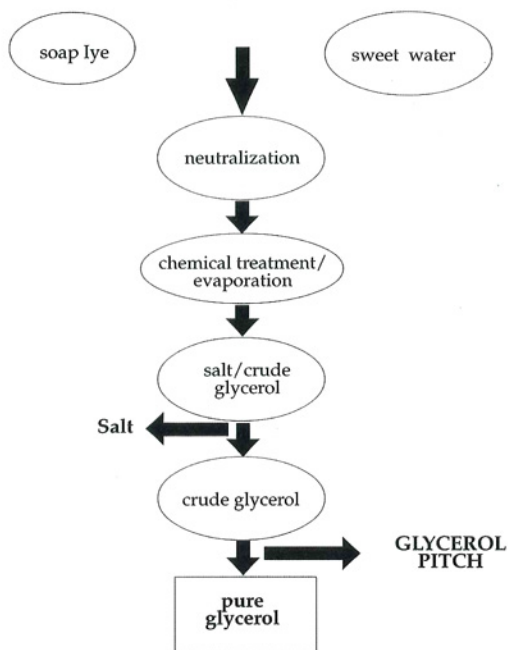
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Summary

Based on the above study, glycerol could easily be recovered from the glycerol pitch, where it could be used as a new feed-stock or be combined with the existing feed-stock of the industry prior to further purification steps. Glycerol pitch has been generally classified as a waste and its disposal creates problems to the industry. Sanitary landfills require suitable land sites and with certain costs. Therefore reclamation helps convert waste materials to a renewable and useful asset.

Figure 1: The Flow Chart of Recovery of Glycerol from Soap Lye and Sweet Water



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