RECOVERY OF GLYCEROL AND VALUABLE COMPONENTS FROM GLYCEROL RESIDUE

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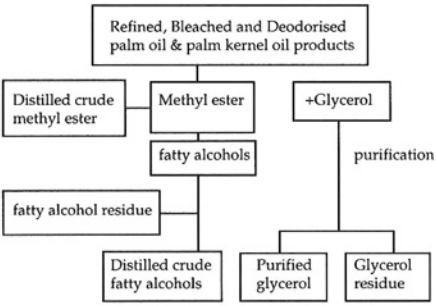
Oleochemicals are chemicals derived from oils and fats. The oils and fats could be vegetable or animal based and these include soybean oil, tallow, palm oil , palm kernel oil, coconut oil, fish oil, palm stearin, rapeseed oil, sun flower oil and others.

The five basic oleochemicals are the fatty acids, fatty methyl esters, fatty alcohols, fatty amine compounds and glycerol. In the processing of these basic oleochemicals, there are a number of by-products available of which most of them are still underutilised owing to lack of information, as not much research has been carried out on these fractions . One of the by-products produced is glycerol residue, which is generated from fatty methyl esters production plant . The methyl esters produced are used as a feedstock for the production of fatty alcohols and other applications.

PROCESS

The production of glycerol residue during the refining process of glycerine is schematically shown in *Figure 1.*



CHARACTERISTICS

A typical sample of glycerol residue is shown in *Figure 2.*

Figure 2 : Glycerol residue

The typical composition of the glycerol residue is shown in Table 1 .

Table 1 : Typical characteristics of glycerol residue

	Range	Mean
Glycerol %	15 - 35	23
Soap %	10 - 40	25
Sodium chloride%	30 - 60	44
Ash %	50 - 70	50
Free fatty matters %	0.5 - 8	3
Water %	1 - 10	6
pH (20 %)	10 - 12	11.7
Appearanc	Light to darkbrown powder or paste	

This glycerol residue is classified as Schedule Waste S 181. The disposal is still a problem and this will be a continuous problem in the industry . It is high time to convert this industrial waste into something usable, or in a form more easily disposed of with less adverse effect on the environment . Therefore, it is the object of this project to
recover the glycerol and other useful components from the glycerol residue.

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RECOVERY AND CHARACTERISTICS

Glycerol, fatty matters and salt could be recovered successfully via simple processes . The typical characteristics of the recovered glycerol and fatty matters are shown in Tables 2 and 3 respectively .

Table 2 : Typical characteristics of the recovered glycerol

	Glycerol residue	Purified glycerol
Glycerol %	17.1	93.0
Ash content	58.5	0.02
Water	11.2	3.9
MONG	13.4	3.1
Soap	10.2	nil

Table 3 : Typical composition of the fatty acids

C6	3.8
C8	34.6
C10	12.8
C12	35.8
C14	5.9
C16	2.2
C18	0.4
C18:1	4.2
C18:2	0.3

ECONOMIC FEASIBILITY

The estimated quantity of the recovered products are shown in Table 4.

Table 4 : Estimated quantity of the recovered products from 1 tonne of glycerol residue.

Products	Estimated amount (Kg)	Estimated Price/kg	RM
Glycerol (>92%)	150	3.20	480
Salt	650	0.50	325
Fatty acids	60	3.30	198
		Total	1003

CONCLUSION

The cost per tonne of glycerol residue for landfill is approximately RM700. Therefore based on the additional cost estimate of the recovered components (about RM1000), it is worthwhile to recover the valuables from the glycerol residue.

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