PALM-BASED HYDROXY FATTY ACIDS-PRECURSOR TO SURFACTANTS, COSMETICS AND LUBRICANTS

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Recent research at PORIM has developed a new derivative from palm oil with great commercial potential. This product is dihydroxy fatty acid (DHFA). Hydroxy fatty acid has been shown to have numerous commercial uses such as, additives in lubricants, starting material to make emulsifiers and surfactants, and polyol for polyurethanes.

REACTION

Laboratory scale studies carried out by PORIM indicated that DHFA from unsaturated palm fatty acids could be obtained through simple reaction. The chemicals used in the experiment have been well recognized and are inexpensive.

Table 1 shows the properties of the starting materials and the products. The

TABLE 1. PROPERTIES OF STARTING MATERIAL AND PRODUCT

Parameter	Oleic Acid	DHFA	Crystallized DHFA
Iodine Value	94.8	9.5	1.4
Acid Value	179.9	167.5	139.4
Hydroxyl Value	23.7	220.3	316.7
Saponification Value	182.3	208.0	178.1
Colour	Light yellow	White	White
Form	Liquid	Semi solid/paste	Powder
Melting Point(°C)	-	70-75	86-88

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results show a marked increase in the hydroxyl value of the products. This indicates the formation of hydroxyl groups in the compound. The decrease in iodine value suggests the conversion of an unsaturated to saturated compound.

POTENTIAL USES

The potential uses for palm-based DHFA are:

1. Provide attractive material for the production of emulsifiers and surfactants for personal care products. For example, this material can be used as feedstock for production of GEMINI surfactants. These surfactants have very low critical micelle concentration (CMC) which makes them extremely surface active.

2. Can be a substitute for castor oil in many of the latter's commercial applications, *e.g.* hydroxy fatty acid derivatives can be used in lipstick formulations to extend shelf-life.

3. Hydroxy stearate has been used in the manufacture of multipurpose greases. For example, high-pressure lithium-based greases derived from hydrogenated castor oil are used as the gelling agent which imparts improved performance.

4. Hydroxy fatty acids can be used as solidifier for used cooking oil and as reagents for the recovery of ocean-spilled oil.

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