TWO TYPES OF OILS/FATS FROM OIL PALM FRUIT

Palm oil rich in C16 and C18

Palm Kernel Oil rich in C12 and C14

NONFOOD USES

Palm oil

- Fractionated into palm olein and stearin
- Palm olein – food
- Palm stearin – nonfood / oleochemicals

Palm Kernel Oil

- Fractionated into palm kernel olein and kernel stearin
- Palm kernel stearin – food
- Palm kernel olein – nonfood / oleochemicals

OLEOCHEMICALS INDUSTRY IN MALAYSIA

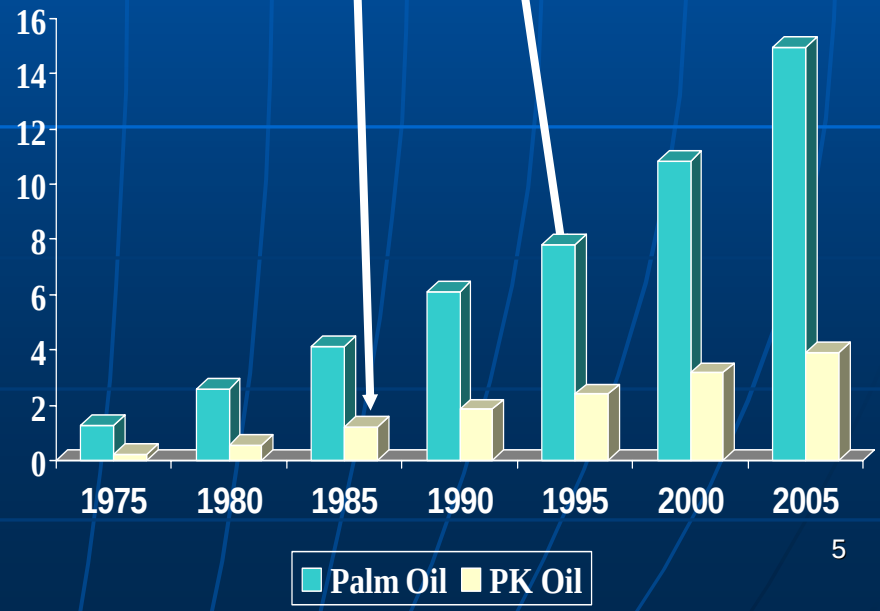
COMPOSITION OF PO = TALLOW & PKO = CNO

R, R', R''	PO	Tallow	CNO	PKO
C6			0.2	0.3
C8			8.0	4.4
C10			7.0	3.7
C12	0.23		48.2	48.3
C14	1.09	2.5	18.0	15.6
C16	44.02	26.6	8.5	7.8
C18	4.54	21.8	2.3	2.0
C18:1	39.15	42.8	5.7	15.1
C18:2	10.12	2.3	2.1	2.7
C18:3	0.37			

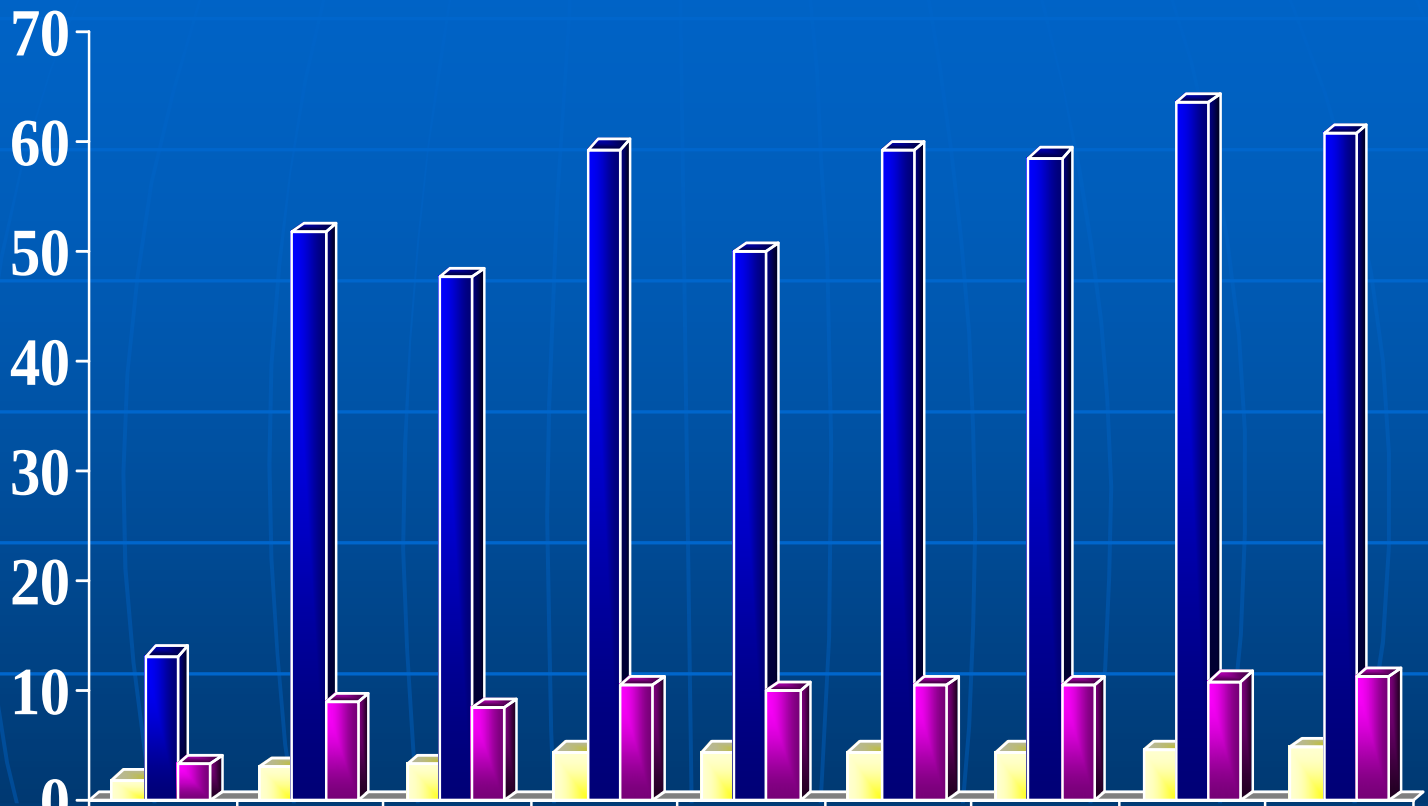
CHANGING THE SCENARIO

- Availability of lauric oils
- Predictability in supply
- Good Government incentives
- Good infrastructure
- Political stability
- FAC Tallow = PO
- FAC CNO = PKO

The development of oleochemicals industry in Malaysia (& Indonesia)

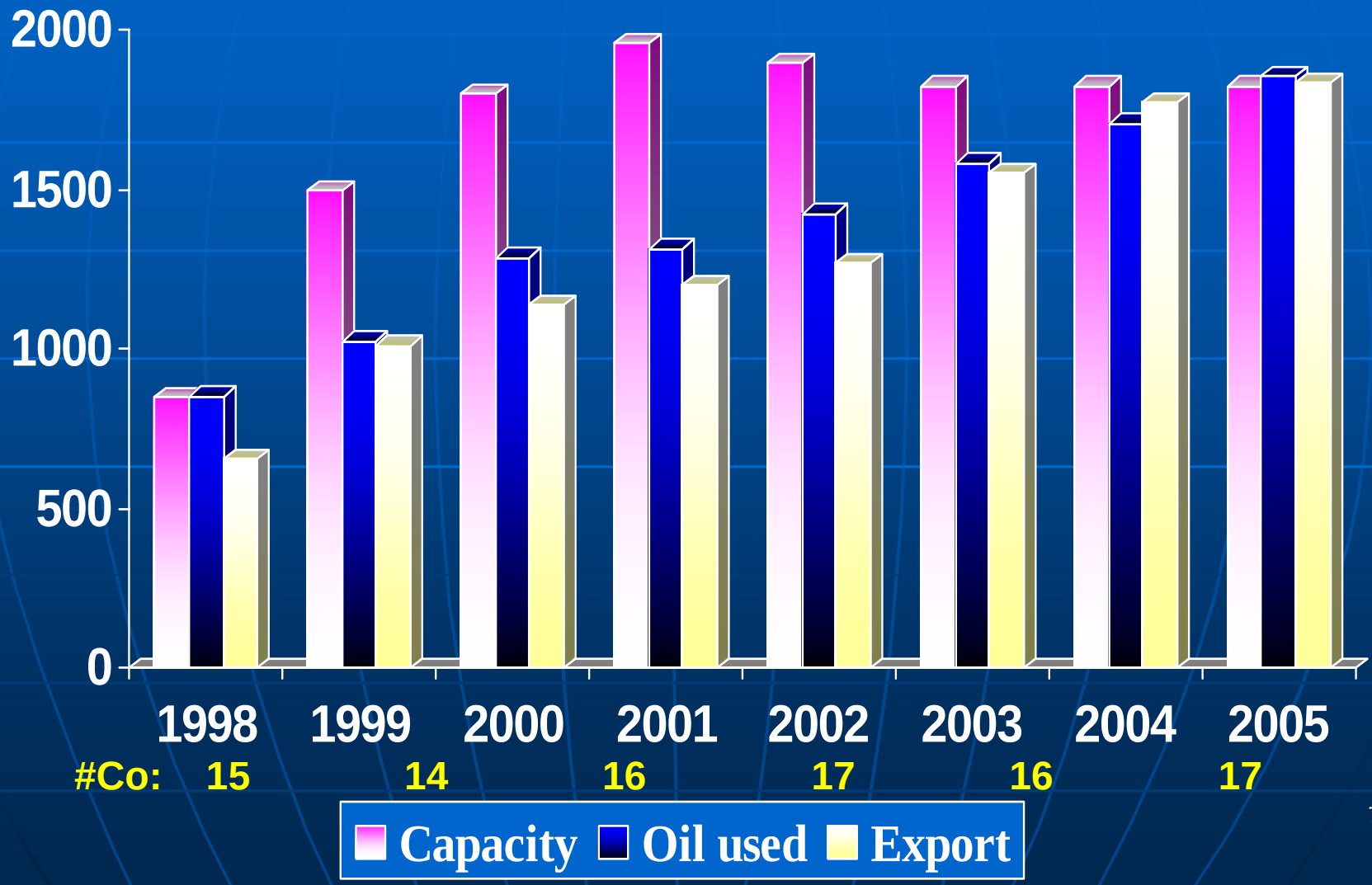


Percent Utilization of Palm Products in Malaysian Oleochemical Industry

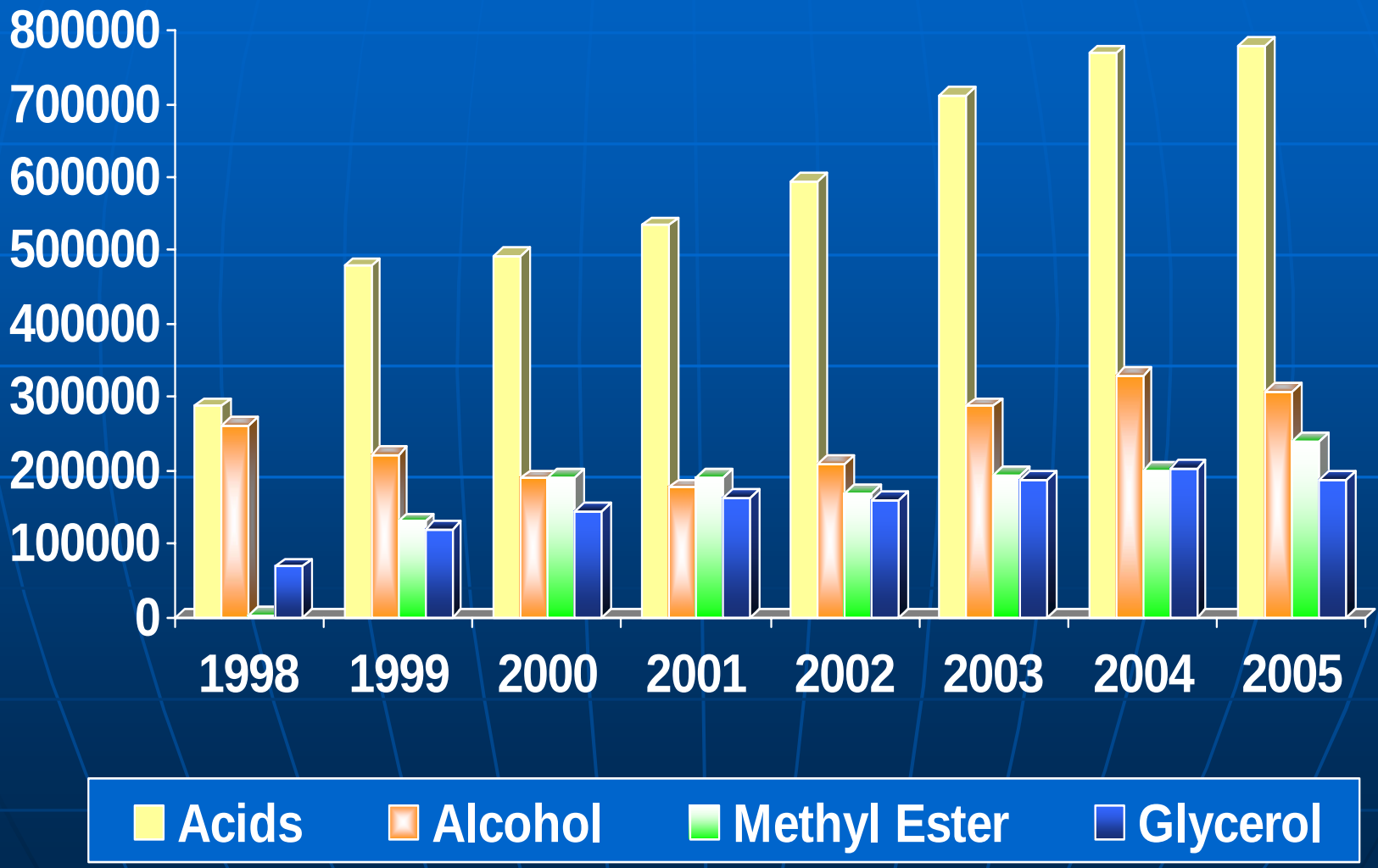


	1990	1998	1999	2000	2001	2002	2003	2004	2005
PO	2	3.1	3.4	4.5	4.6	4.6	4.6	4.7	4.9
PKO	13.3	51.7	47.6	59.3	50	59.2	58.5	63.6	60.7
Total P	3.4	9	8.5	10.5	10	10.6	10.5	10.9	11.3

MALAYSIAN OLEOCHEMICALS: CAPACITY, PRODUCTION AND EXPORTS (in'000 tonnes).



TYPES OF BASIC OLEOCHEMICALS EXPORTED FROM MALAYSIA (in tonnes)



METHYL ESTER FROM PKO

PKO

PKO rich in C12 & C14
- desired chain length for surfactants

MES ← Crude Methyl Ester

Distilled Methyl Ester

High temp. & High pressure Hydrogenation

Fatty Alcohol

sulfation

ethoxylation

Fatty Alcohol Sulfates

Fatty Alcohol Ethoxylates

Fatty Alcohol Ether Sulfates

COSMETIC & P.CARE PRODUCTS

LOTION WITH VITAMIN E

- Isopropyl Myristate
- Octyl Stearate
- Stearic Acid
- MCT
- Water
- Glycerin
- Preservatives
- Rheological additives
- Vitamin E
- Triethanol Amine

CREAM

- Isopropyl palmitate
- Octyl palmitate
- Stearic acid
- MCT
- Cetyl alcohol
- Glycerol
- Preservative
- Rheological additives
- Neutraliser

COLLABORATION WITH HR MARKETING SDN. BHD.

Skincare with goat's milk

PRODUCTS WITH ROSELLE

PRODUCTS WITH PALM VITAMIN E

COLOR COSMETICS

- LIPSTICKS
- DEODORANT STICK
- COMPACT POWDER
- LIQUID FOUNDATION

LIPGLOSS

MASCARA

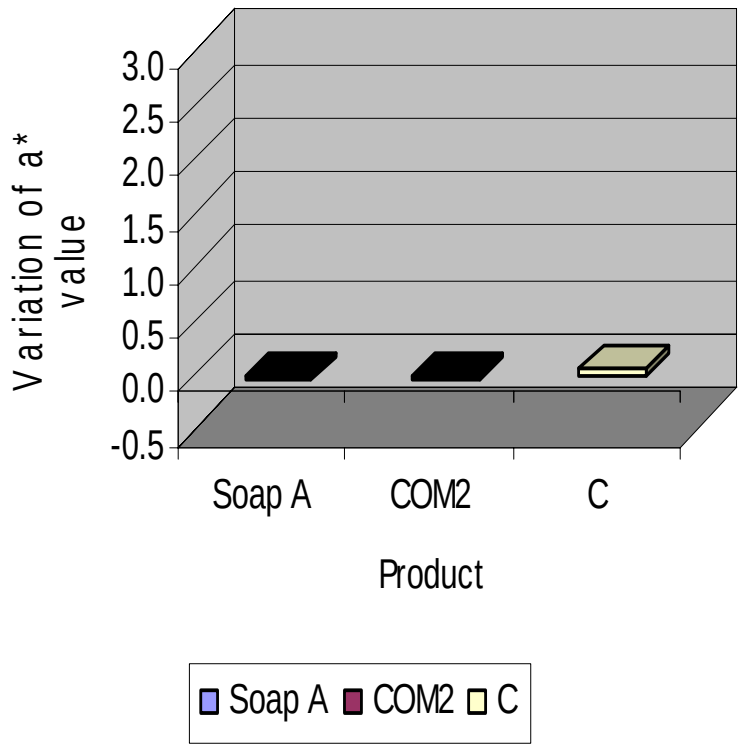
LOOSE POWDER

EFFICACY TESTING

- Efficacy tests (in-vivo and in-vitro) are carried out to get data.
- Data is used to substantiate claims made on a particular product.
- In developed countries – claim substantiation is necessary.

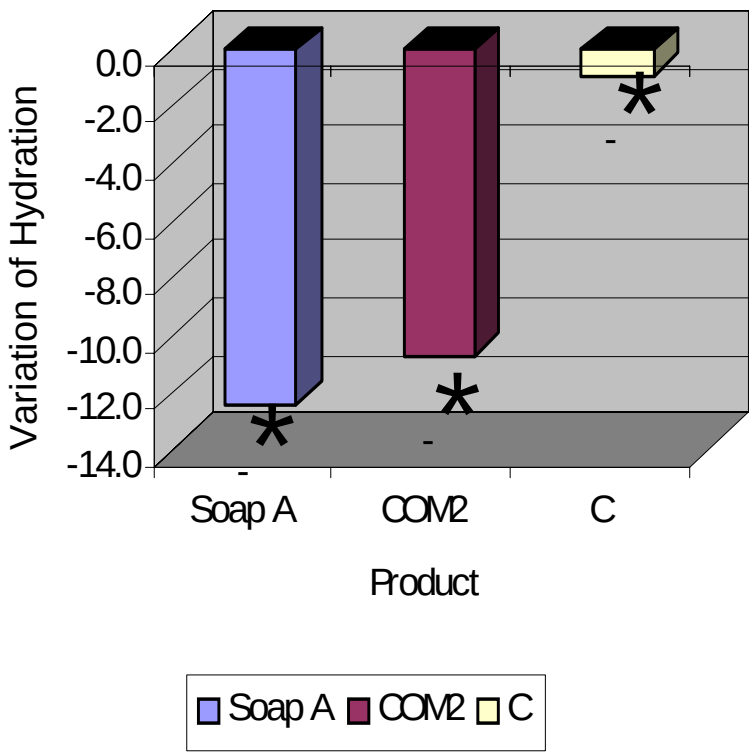
SAFETY AND EFFICACY EVALUATION OF SOAPS

Figure 4. Results of Chromamater Readings



Irritation test

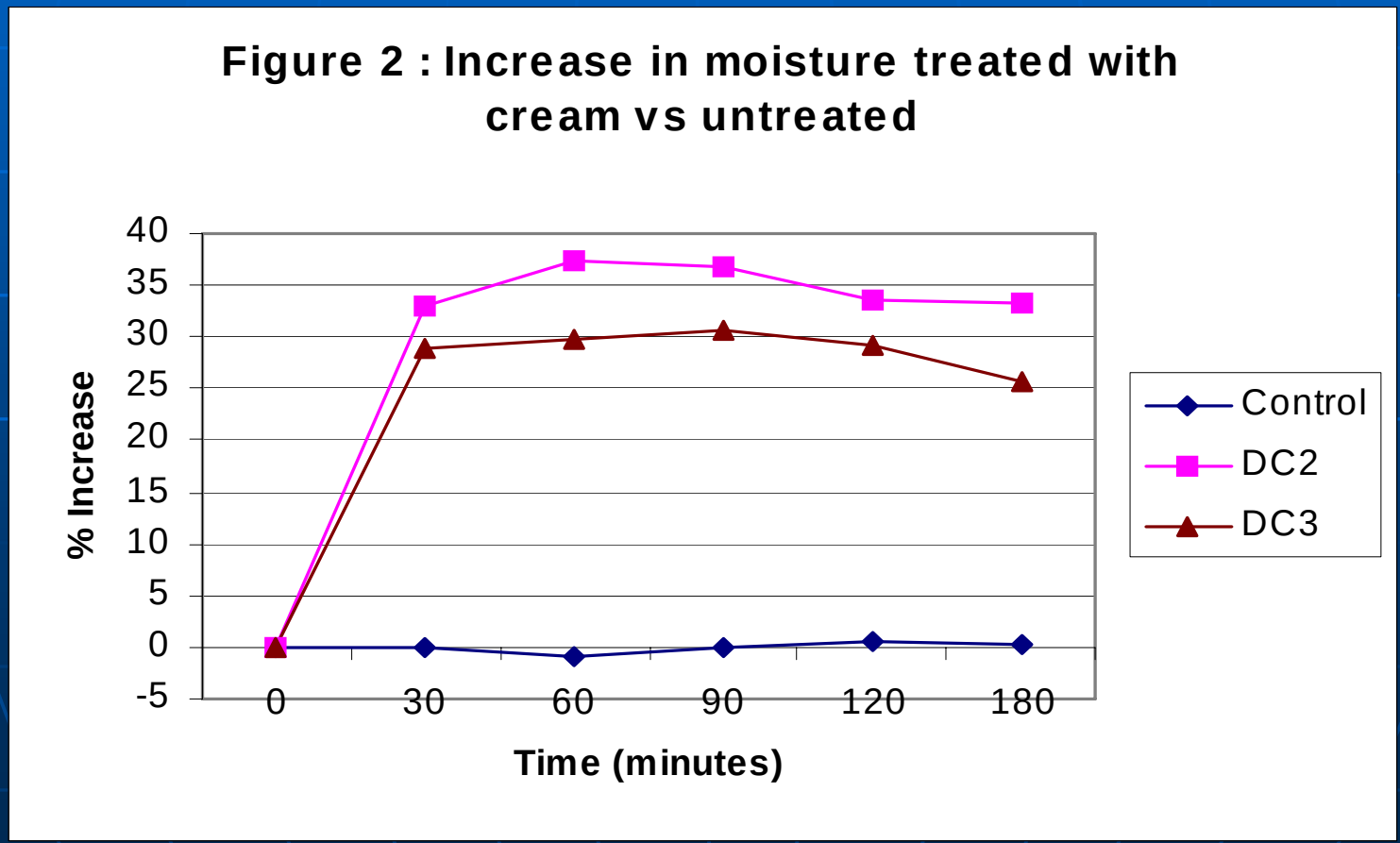
Figure 7. Results of Skin Hydration



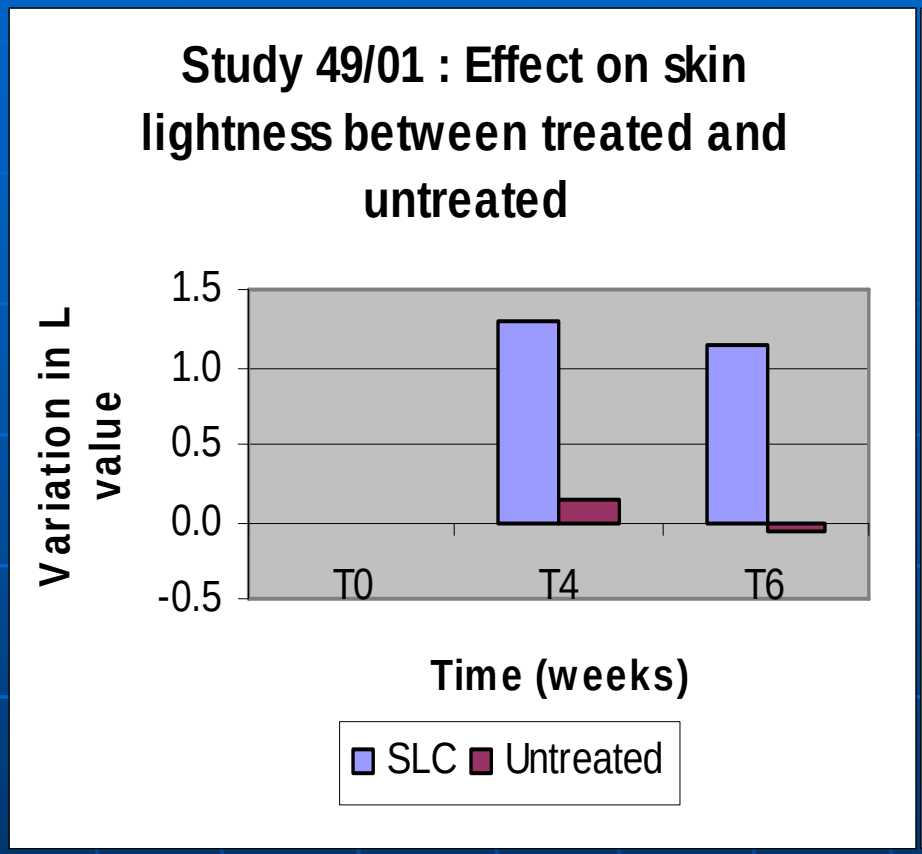
Skin Hydration test

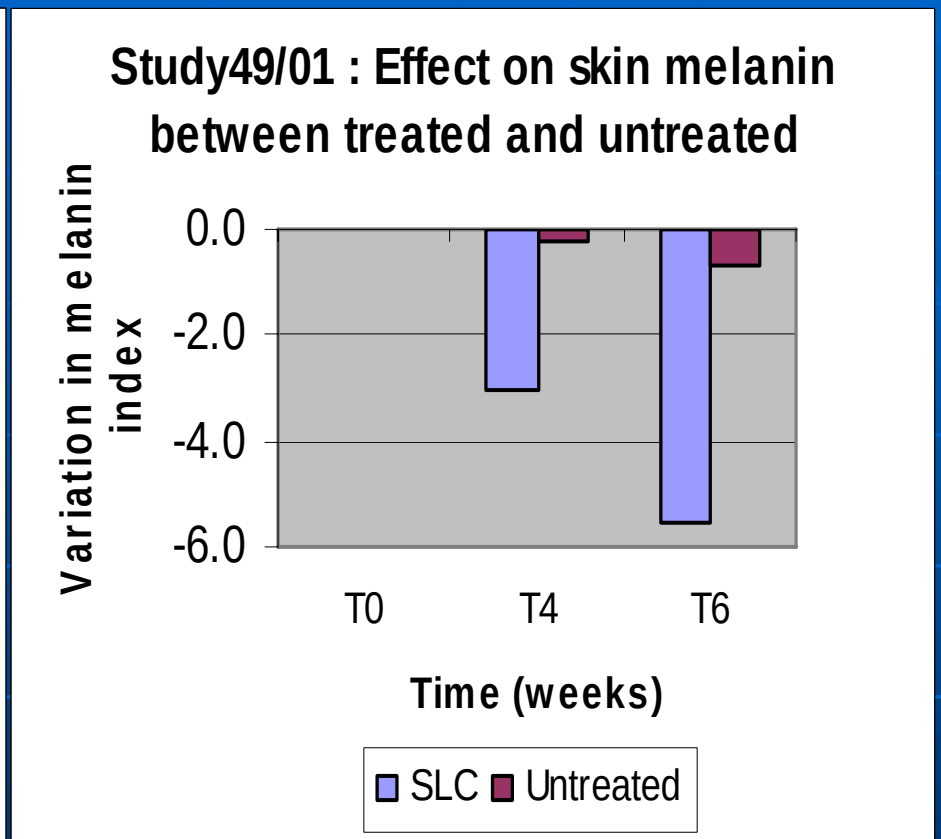
ROSELLE MOISTURIZING CREAM

35-38% increase in skin moisture after application (Rosnah, 2002)



WHITENING EFFICACY

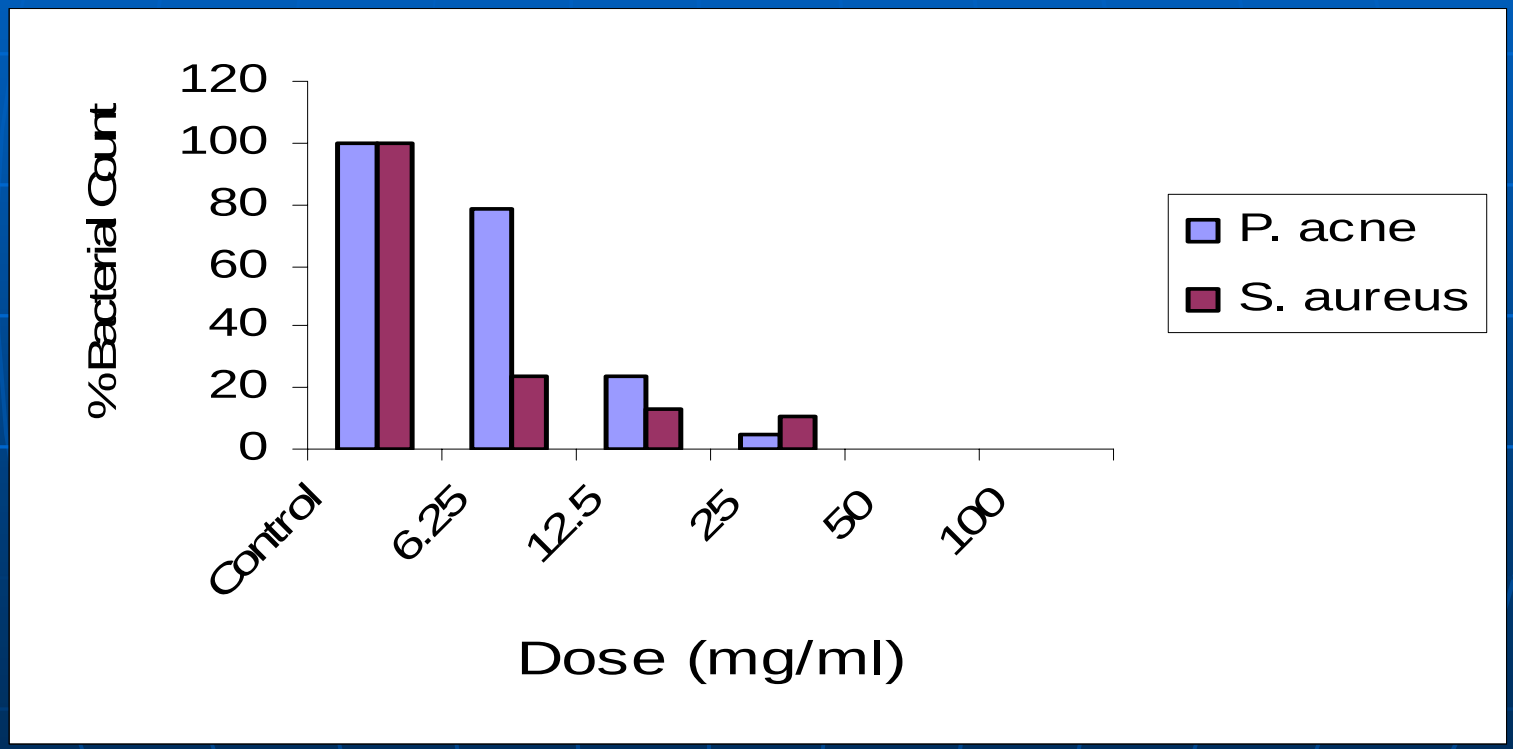




- No. of Volunteers = 20 Product type = cream
- Skin types = Group 3 (14), 4 (6)
- Result = significant ($p<0.05$)

Palm-based anti acne cream

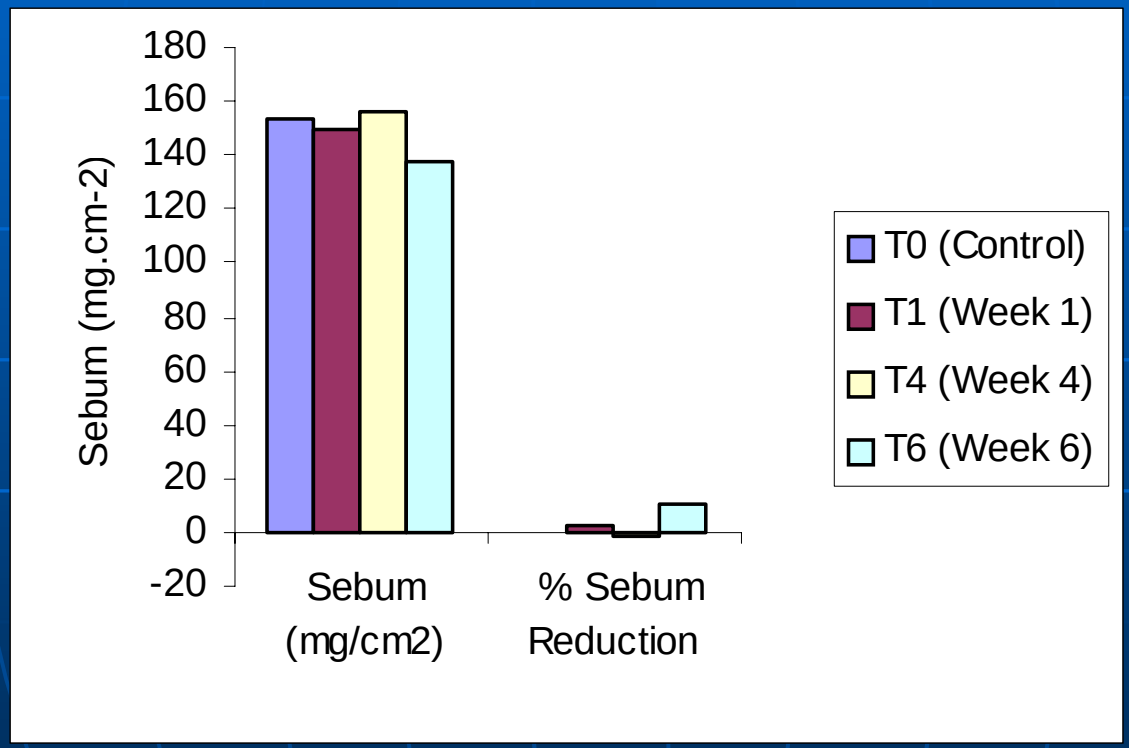
In vitro **tests of using the essential oil at 50mg/ml showed that the compounds could significantly reduce *Propionibacterium acnes* and *Staphylococcus aureus*, which are the main microflora of acne lesion.**



In vitro anti-microbial test of essential oil against *Propionibacterium acnes* and *Staphylococcus aureus*

Palm-based anti acne cream

Direct sebum measurement indicated a 9% reduction after 6 weeks application of the anti-acne cream.

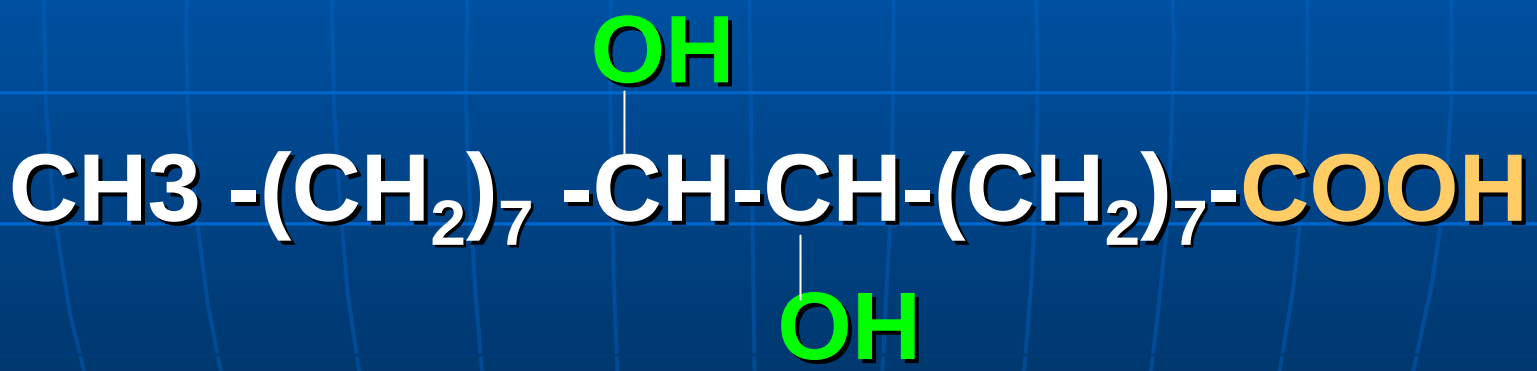


In vivo study on the effect of anti-acne cream on sebum production against time

COSMETIC & P.CARE PRODUCTS

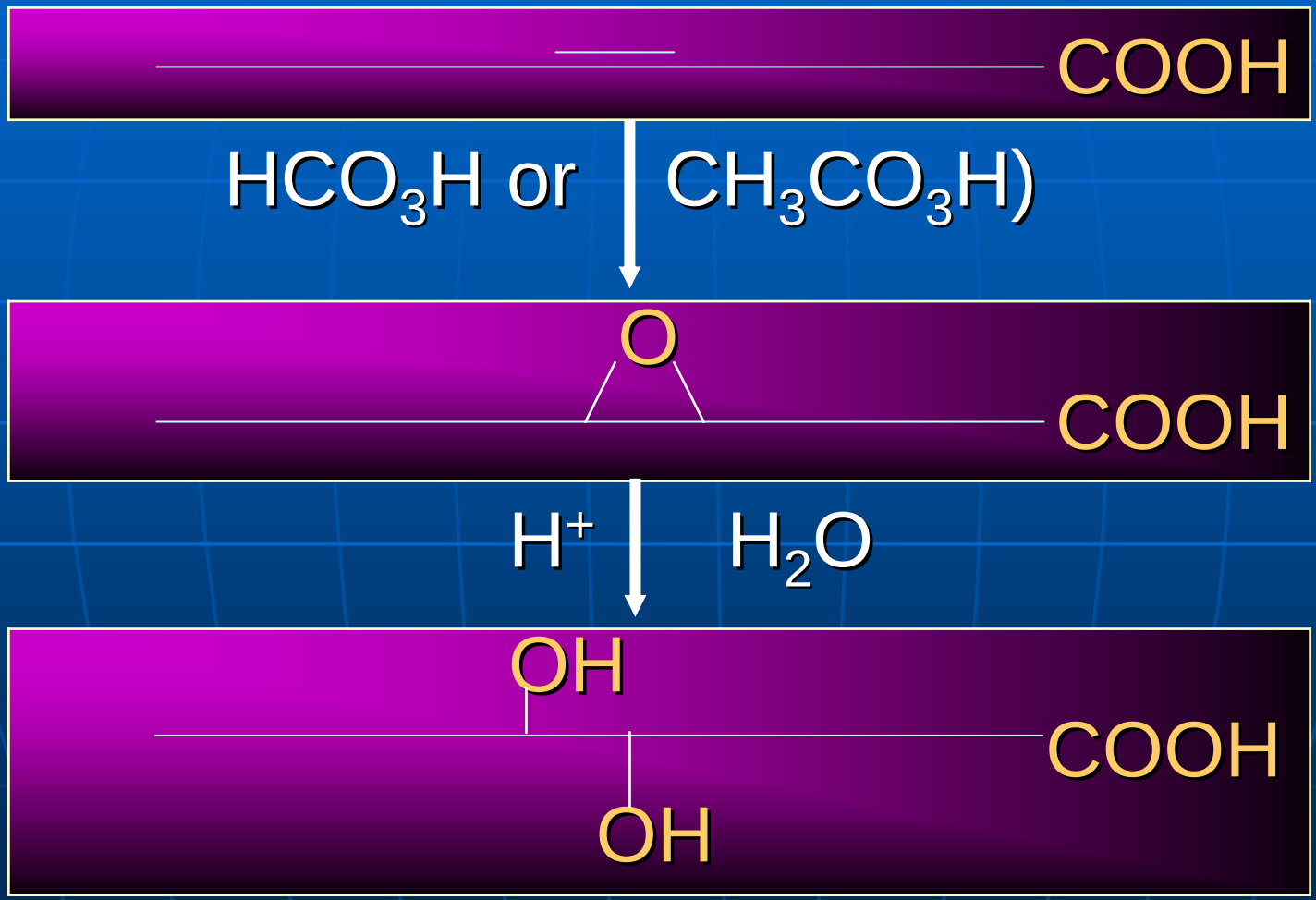
NEW INGREDIENT

PALM DIHYDROXYSTEARIC ACIDS (PALM DHSA)



MW 316

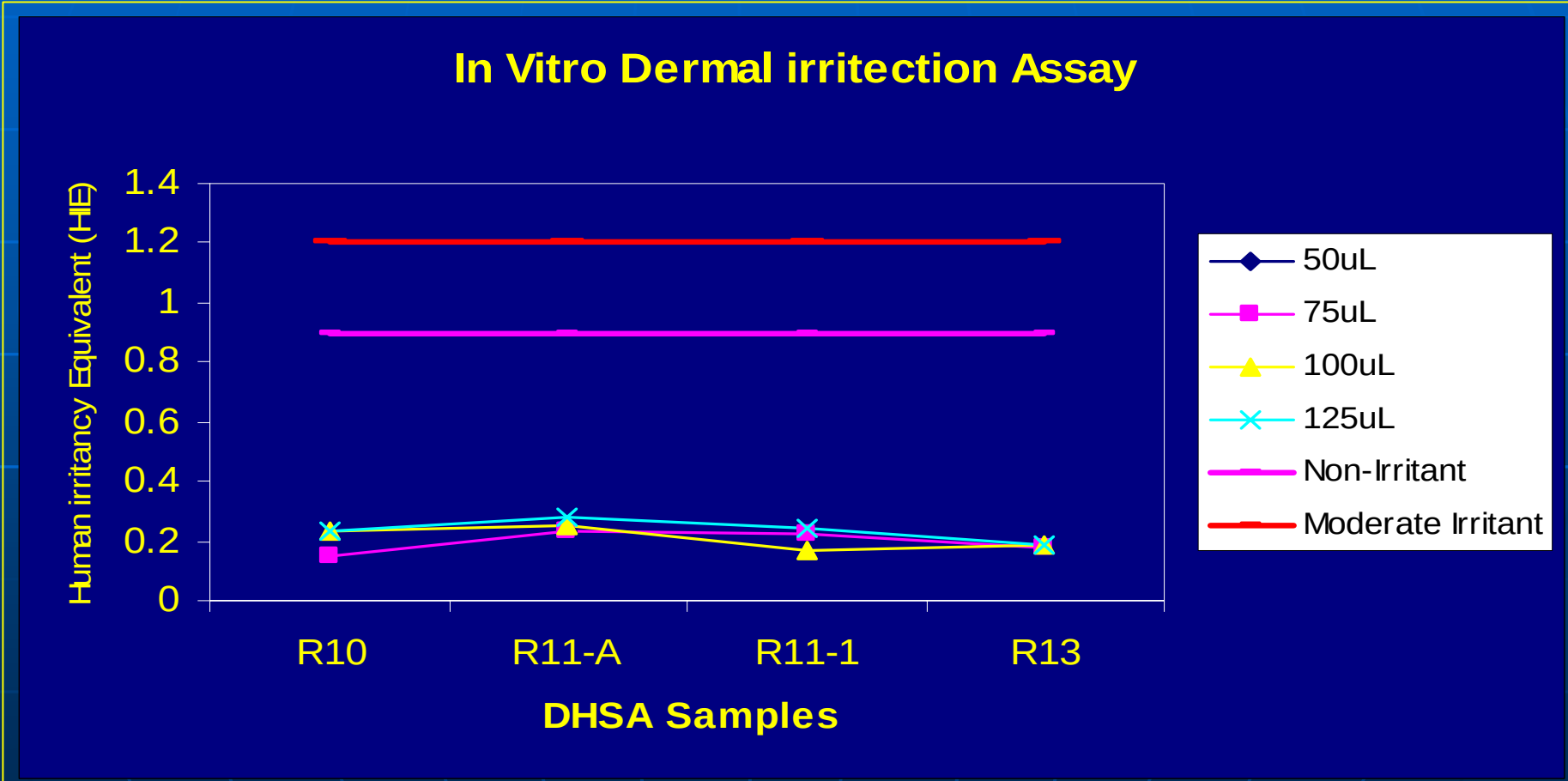
PRODUCTION OF DHSA



9,10-dihydroxystearic acid

In Vitro test for Skin Corrosion → Not determine

In Vitro test for Skin Irritation




PALM DHA

COSMETIC & P. CARE PRODUCTS

SPECIALTY SOAP

3 PROCESSES TO PRODUCE SOAP/SOAP NOODLES

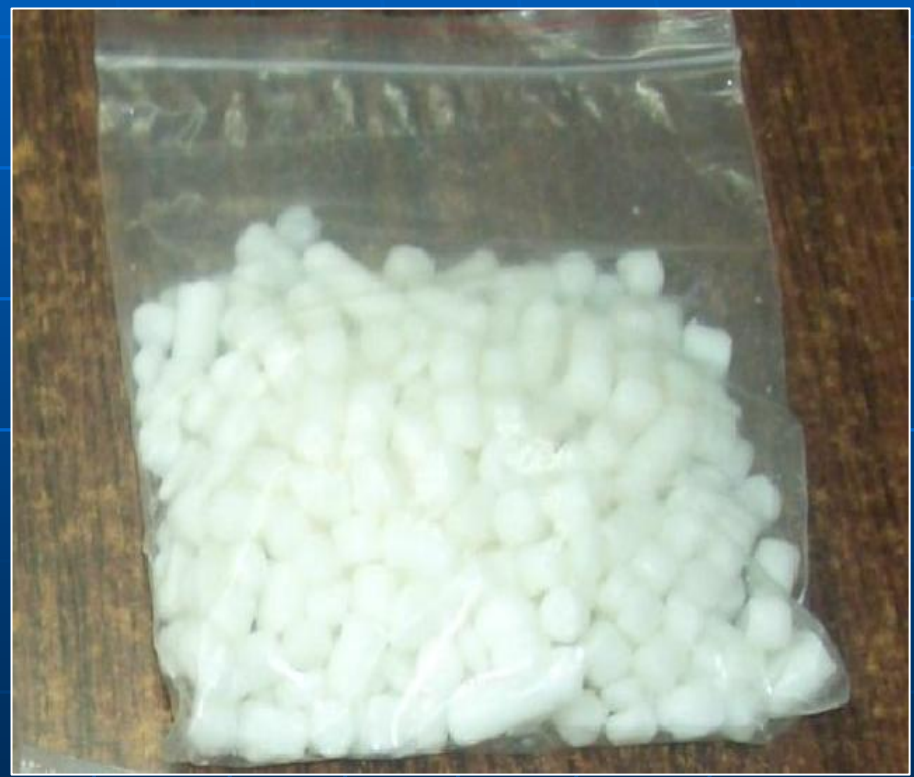
$RCH_2COO\text{-}CH_2$ $RCH_2COO\text{-}CH$ $RCH_2COO\text{-}CH_2$	RCH_2COOH	RCH_2COOCH_3
NaOH ↓	NaOH ↓	NaOH ↓
$3\ RCH_2COO^-\ Na^+$ $+\ CH_2OHCHOHCH_2OH$	$RCH_2COO^-\ Na^+$	$RCH_2COO^-\ Na^+$ $+\ CH_3OH$
↓	↓	↓
Soap noodles USP glycerin	Soap noodles	Soap noodles

DIFFERENCES BETWEEN THE VARIOUS SOAP NOODLES

Saponification of oils/fats	Neutralization of fatty acids	Saponification of fatty methyl ester
FAC depend on the types and ratio of various oils/fats used	FAC can be varied by selecting the fatty acids to neutralize	FAC can be varied by selecting the fatty methyl ester to saponify
Color – darker	Color – good	Color – Very good
Elaborate process	Simplified process	Process is simple but CH_3OH can pose problem to some.
☆ ☆	☆ ☆ ☆	☆

PALM-BASED SOAP NOODLES FROM MALAYSIA

- PO 80, 75, 70, 60
- PKO 20, 25, 30, 40
- H_2O 9-12.5%
- TFM 79-83%
- FFA 1.3 - 7.0%
- GLY 0.4 - 0.6%
- Sesq. Present



PALM-BASED TRANSPARENT SOAP FOR SKIN CARE & DECORATIVE

- Developed by neutralization of fatty acids and in combination with polyol (i.e. glycerine) as an agent to impart transparency to the soap.

PALM-BASED TRANSPARENT SOAP VS COMMERCIAL TRANSPARENT SOAPS

Sample	pH (1% solution)	Penetration depth (mm)	Transparency value
Palm-based transparent soap for skin care	9.84	1.09	0.90
Commercial 1	10.17	0.18	0.77
Commercial 2	10.46	1.09	0.88
Commercial 3	10.28	3.09	0.86

SUMMARY

- Palm oil is an important oil in the oils/fats market
- Very versatile – many potential applications
- Some applications compete with petro-based products
- Oleochemical products can compete in terms of performance and cost