



**IOI GROUP**  
Loders Croklaan

# Coconut Oil and Palm kernel Oil

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# Coconut and Palm kernel oils

- **Applications of nuts**
- **Application of crude oil**
- **Application of refined oils**
- **Qualities issues with CNO and PKO**
- **Production and price trends**
- **Oil Extraction methods**
- **Fractionation methods**
- **Lauric specialty fats**

# Coconut palm



# Oil Palm



# Applications of Nuts

<b>Applications</b>	<b>Coconut</b>	<b>Palm Kernel</b>
<b>Oriental food</b>		
<b>Desiccated Coconut</b>		
<b>Coconut Milk</b>		
<b>Spray dried powder</b>		
<b>Oil Extraction</b>		
<b>Activated Carbon</b>		

## Applications of Nuts - continued

<b>Applications</b>	<b>Coconut</b>	<b>Palm Kernel</b>
<b>Offering in Hindu temples to invoke gods blessing – India, Malaysia, Singapore etc</b>		

# Applications of Crude Oil

<b>Applications</b>	<b>Coconut</b>	<b>Palm Kernel</b>
<b>Frying Oil -Oriental food – Cochin grade</b>		
<b>Hair oil</b>		
<b>Sun tan Oil</b>		
<b>Oleo chemicals</b>		
<b>Fractionation</b>		
<b>Refined oil</b>		

## Applications of Refined Oil

Applications	Coconut	Palm Kernel
Edible oil for - Frying		
Sun tan Oil/Hair Oil		
Spl fat fractionation		
Oleo Chemicals		
Ice-cream Industry		
Hydrogenation		

## Industrial applications – Oleo Chemicals

<b>Applications</b>	<b>Coconut</b>	<b>Palm Kernel</b>
<b>C- 8 / C-10 feed stock – MCT feed stock</b>		
<b>Oleic Acid –Feed stock</b>		



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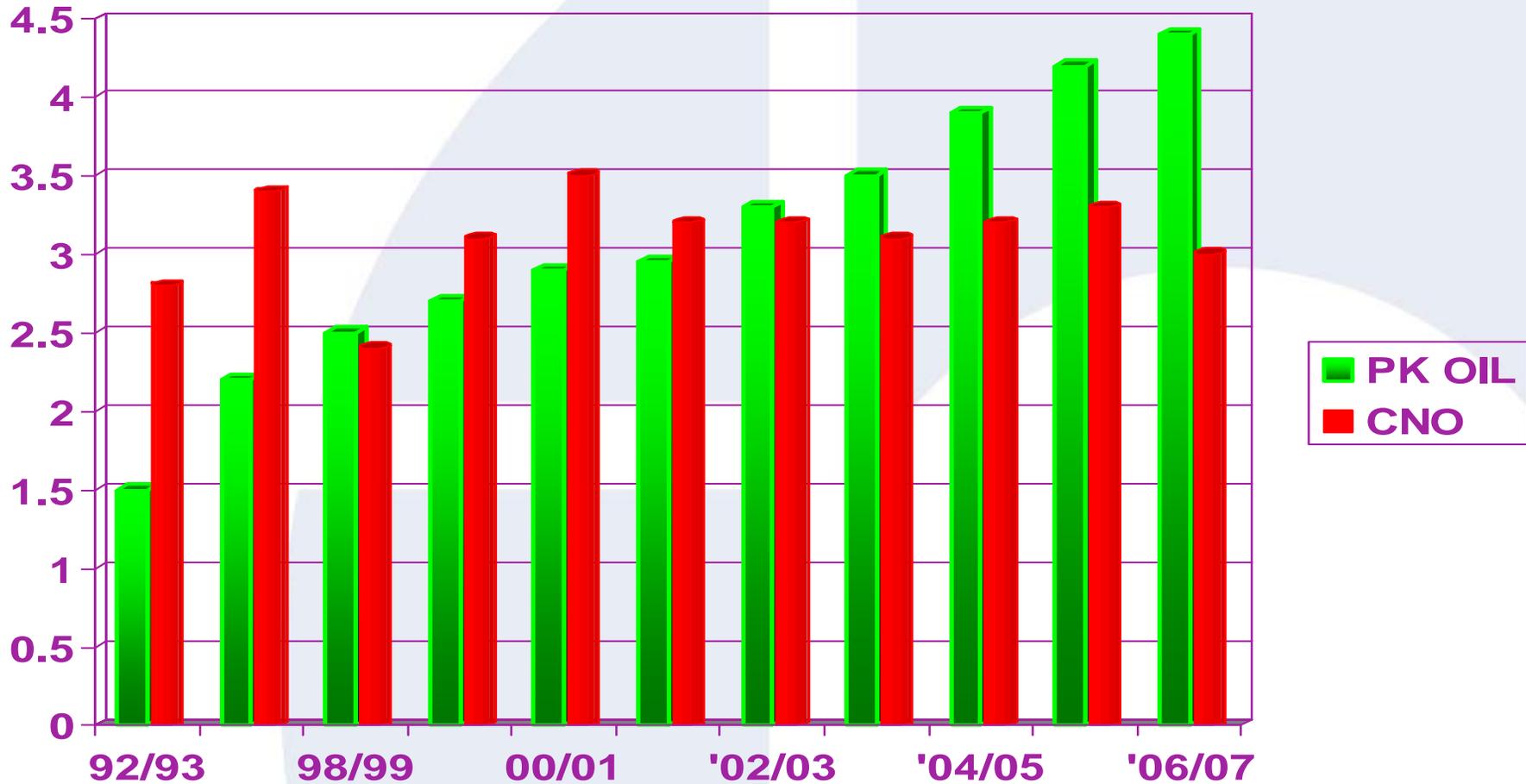
# Applications of Fractions and Hydrogenated Oils and Fractions

<b>Applications</b>	<b>Coconut</b>	<b>Palm Kernel</b>
<b>Hydrogenated Fat</b>	<b>Non dairy creamer, Ice-cream</b>	<b>Coating fat for confectionary</b>
<b>Non Hyd -Stearin fraction</b>	<b>Center filling</b>	<b>Trans free non Hydro Coating fat</b>
<b>Non Hyd –Olein fraction</b>		<b>Ice-cream coating</b>
<b>Hyd- Stearin fraction</b>		<b>Cocoa butter substitute</b>
<b>Hyd Olein Fraction</b>		<b>Creaming fat , wafer center fat</b>

## Quality and other issues of Crude oils

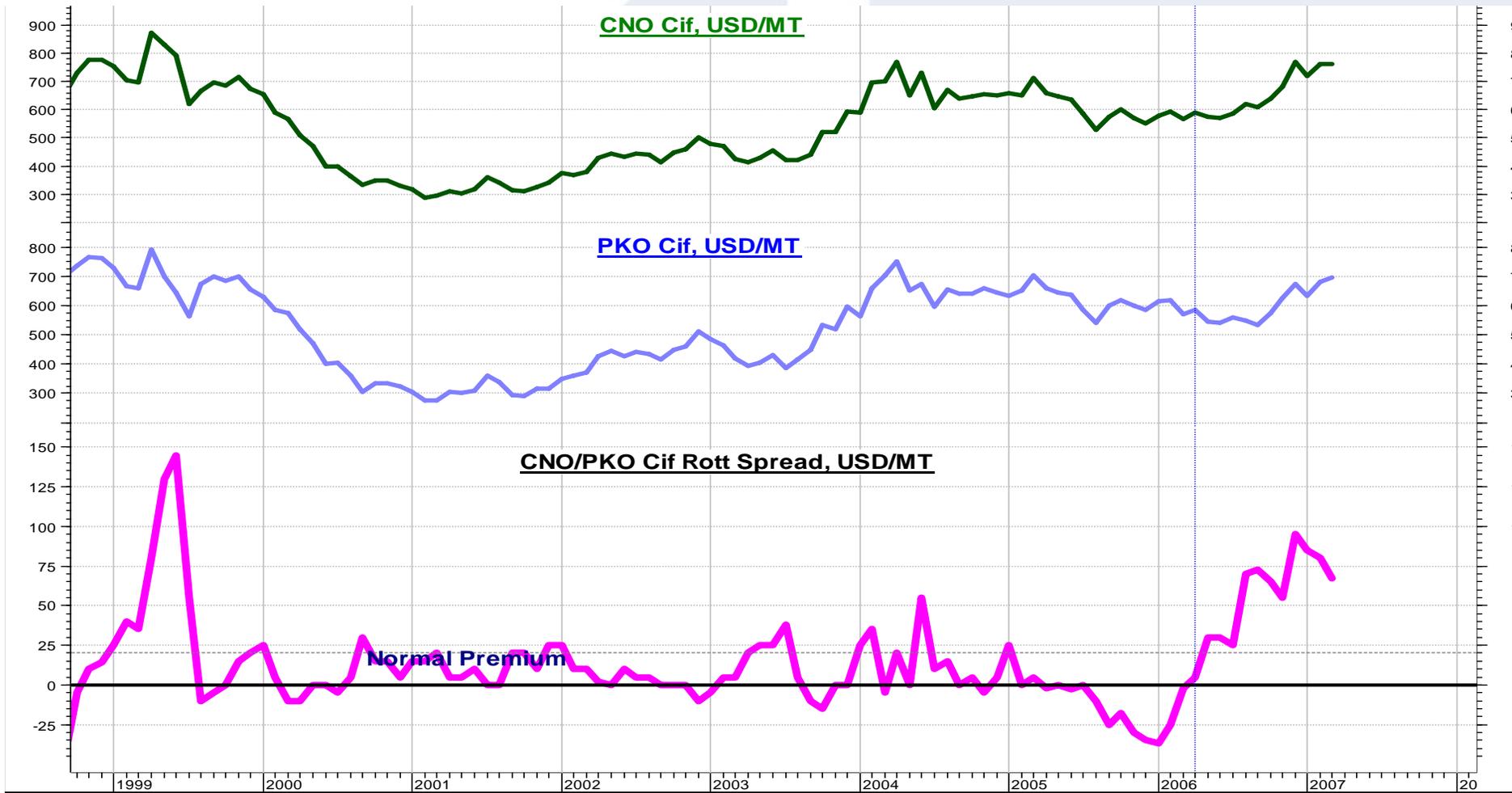
Issues	Coconut	Palm Kernel
High color		
High FFA		
High PAH – Due to smoke drying (poly aromatic hydrocarbons)		
High SAFA		
Price Volatility –( Prone to storm damage)		
Growth Stagnation		

# Year wise production of CNO,PK Oil in Million MT ( source - Oil world)





# Price trend 1999 - 2007 - Coconut Oil Vs. Palm Kernel Oil



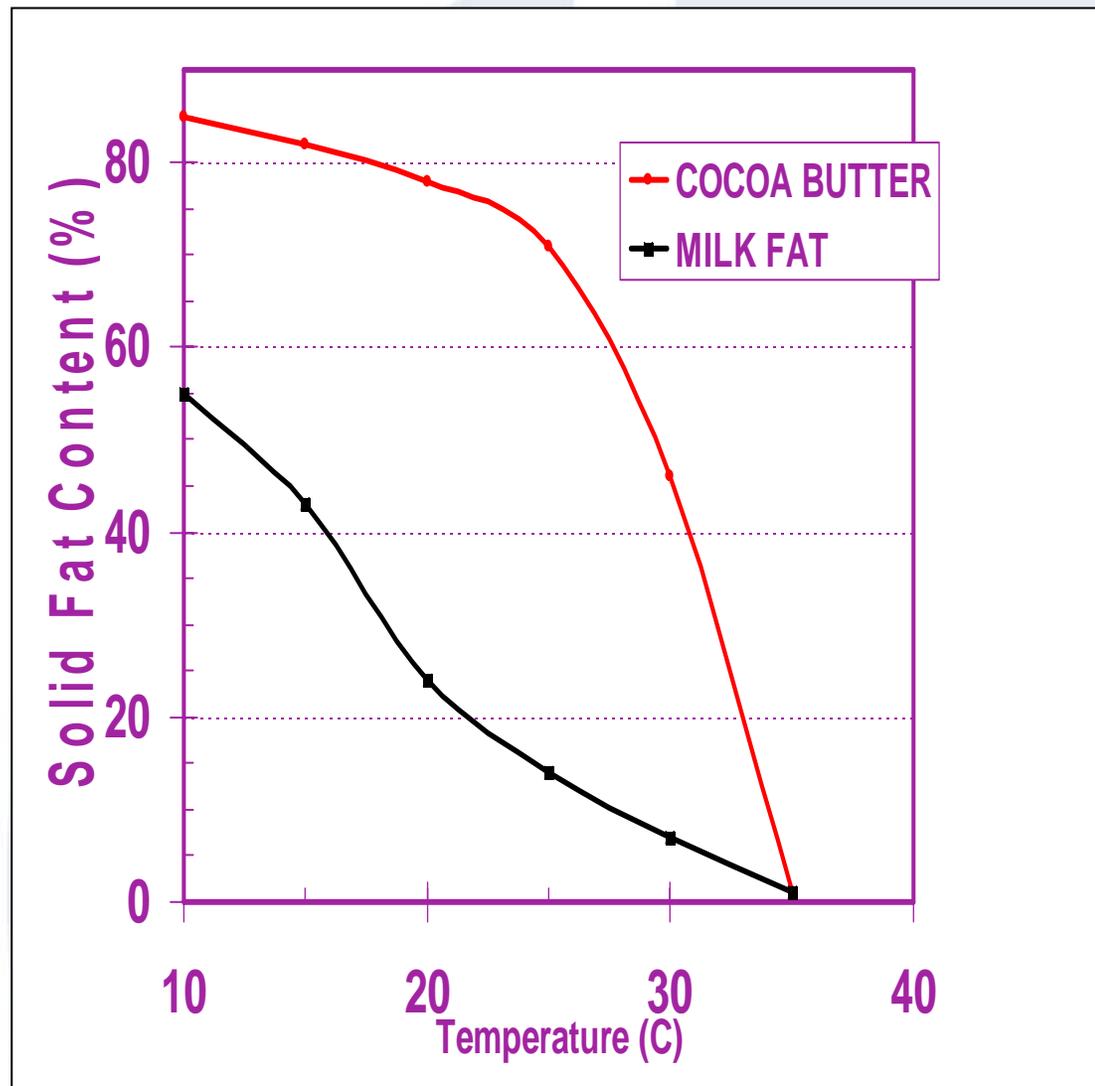


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## Processing of Nuts

<b>Processing type</b>	<b>Coconut</b>	<b>Palm Kernel</b>
<b>Full Pressing</b>	<b>Very Common</b>	<b>Very Common – Yield 44.5 to 45%</b>
<b>Pre pressing followed by solvent extraction</b>	<b>Very Common – Crude oil color and FFA high</b>	<b>Not practiced due to high hexane loss</b>
<b>Direct extraction</b>	<b>Not Common</b>	<b>Practiced by 2 to 3 companies in the world – Yield 48 - 48.5%</b>
<b>Caustic refining</b>	<b>Some times especially for high Colored oil to cut the color</b>	<b>Generally not practiced due to high refining loss</b>
<b>Physical refining</b>	<b>Common- RF 1.5% due to high short chain acids</b>	<b>Common – RF 1.35%</b>

# Solid fat Profile – Cocoa butter Vs Milk fat



## Fractionation – methods for PKO

- **Static cooling in stationary trays and hydraulic pressing – High Labor cost**
- **Cooling in moving trays and hydraulic pressing – High Labor costs**
- **Cooling in moving trays and HP membrane pressing – Low labor costs – Increased capital cost**
- **Cooling in membrane press type enclosures and HP pressing – min labor cost but high capital cost**
- **Cooling in High pressure press cavity followed by HP pressing in the same press – Very high capital cost**

# Quality

## General

## Specific

### Safety

### Identity

### Application

### Sensory

#### ★Contaminants

Microbiology  
Pesticides  
Insecticides  
Heavy metals  
PAH

#### ★Processes

#### ★Refraction

#### ★Iodine value

#### ★Chromatography

#### ★Melting curve

#### ★Solidification curve

#### ★Pilot tests

#### ★FFA

#### ★Peroxyde value

#### ★Rancimat

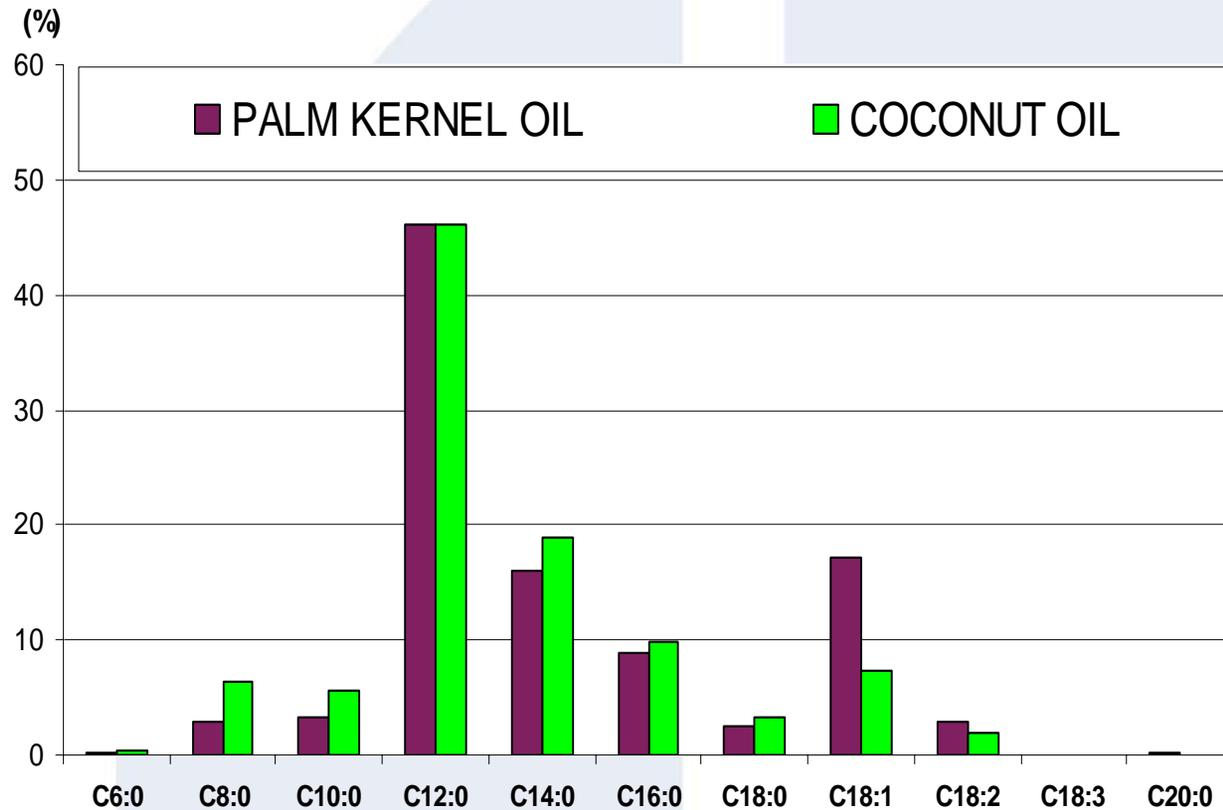
#### ★Taste

#### ★Shelf life

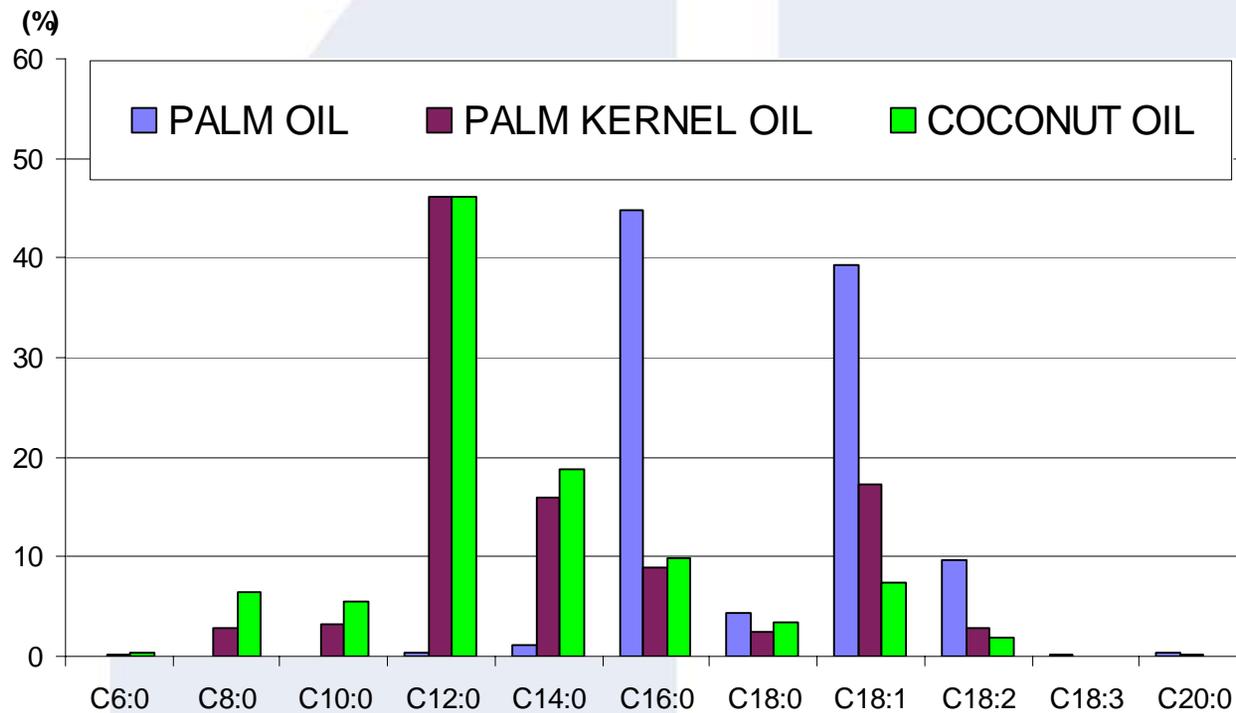
## Typical quality for Palm Oil, Palm Kernel Oil and Coconut Oil

	<u>Palm Oil</u>	<u>PALM KERNEL OIL</u>	<u>COCONUT OIL</u>
<b>Saturated Fatty Acids (SAFA)</b>	50	80	91
<b>Monounsaturated Fatty Acids (MUFA)</b>	40	17	8
<b>Polyunsaturated Fatty Acids (PUFA)</b>	10	3	1
<b>Trans Fatty Acids (TFA)</b>	<1	<1	<1

# Typical quality for Palm kernel oil and coconut oil - Fatty Acid Composition



# Typical quality for Palm oil, palm kernel oil and coconut oil - Fatty Acid Composition



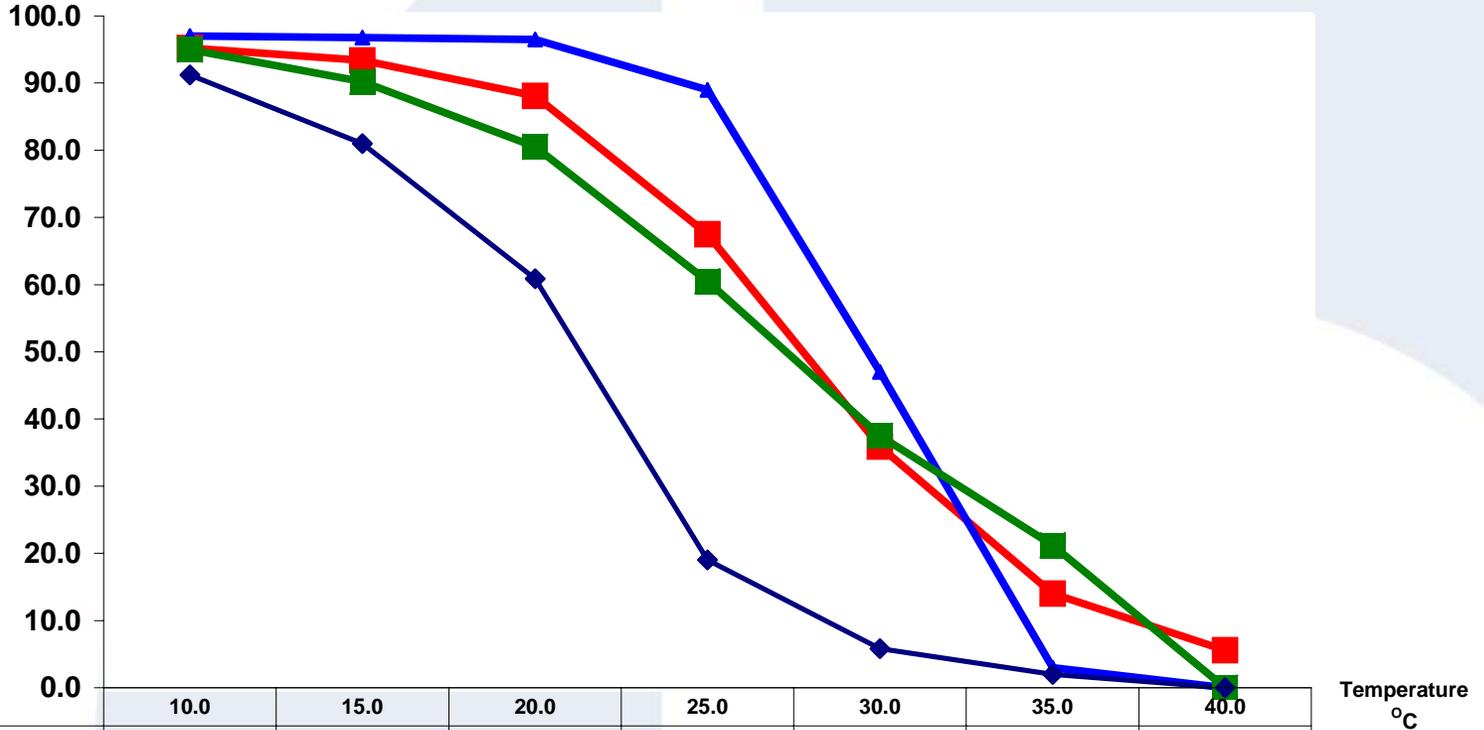
# Palm Kernel Oil and its fractions

	<u>PALM KERNEL OIL</u>	<u>PALM KERNEL OLEIN</u>	<u>PALM KERNEL STEARIN</u>
<u>Slip Melting Point (°C)</u>	27.5	23.5	32
<u>Solid Fat Content (%)</u>			
10 °C	71.3	55.5	94
20 °C	42.4	15.5	85.2
25 °C	16.0	0.4	70.5
30 °C	0.5	0	32.5
35 °C	0	0	0
40 °C	0	0	0



## Solid Fat Content Profile of Hydrogenated Lauric oils

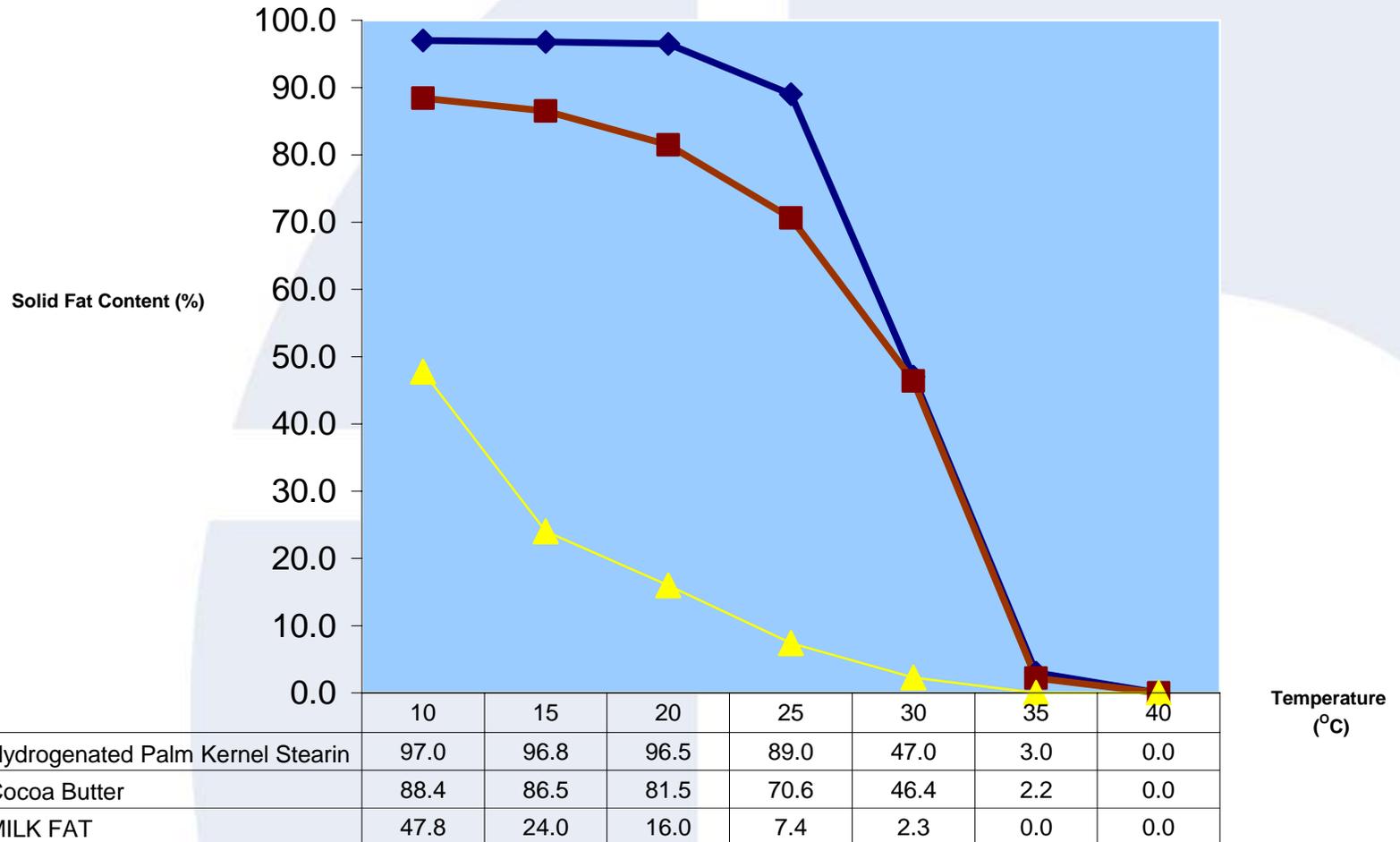
Solid Fat Content (%)



Temperature °C

■ Fully Hydrogenated Palm Kernel Oil	95.2	93.4	88.1	67.5	35.9	14.0	5.6
▲ Fully Hydrogenated Palm Kernel Stearin	97.0	96.8	96.5	89.0	47.0	3.0	0.0
■ Fully Hydrogenated Palm Kernel Olein	95.0	90.2	80.5	60.5	37.5	21.2	0
◆ Fully Hydrogenated Coconut Oil	91.2	81.0	60.9	19.0	5.8	2.0	0.0

## Solid Fat Content Profile of hydrogenated Palm Kernel Stearin comparing with Cocoa Butter and Milk Fat



# Palm

Gift from mother nature to the human  
kind

Relatively new crop

Marketing Strategy by the nature ??

# Take one free one

( two different type oils packed into one )





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**Thank You**