



Palm Oil: Good For You?

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Outline

- Overview of Palm Oil
- Fats
 - Types & Functions
 - Fatty Acid Composition of Palm Oil & Comparison with Other Oils
- Phytonutrients
- Vitamin E & Provitamin A
 - Introduction
 - Food Sources
 - Comparison
 - Benefits
- Palm Oil – Food Application & Advantages

Palm Oil in Global Context



Most popular vegetable oil globally

Accounts for 30% of the global oils and fats supply



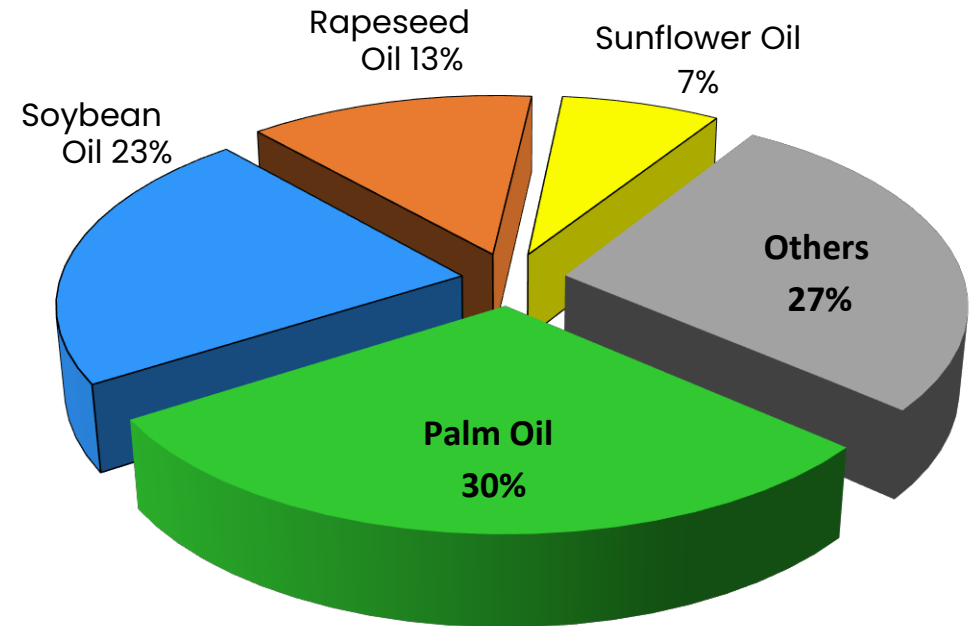
Most productive vegetable oil in terms of yield per hectare

- ✓ 7% of the total global vegetable oilseed planted area
- ✓ 0.4% of the total agricultural area in the world



Major applications:

- ✓ Food
- ✓ Oleochemicals
- ✓ Biofuels
- ✓ Renewable energy resource (biomass)



GLOBAL OILS AND FATS SUPPLY

Industry Governance



**Under the Ministry of Plantation Industries and Commodities
(MPIC)**

Key agencies:

Malaysian Palm Oil Board (MPOB)
Malaysian Palm Oil Certification Council (MPOCC)
Malaysian Palm Oil Council (MPOC)

Lifecycle of Oil Palm Tree



2.5 – 3 years to start producing fruits

The Oil Palm Fruit



Oil Palm Tree



Fresh Fruit
Bunch (FFB)



Mesocarp
(flesh)

Kernel
(seed)

Palm oil

Palm kernel
oil

Types of Fat



**SATURATED
FAT**

- No double bond
- Found in animal products & tropical oils such as palm oil & coconut oil
- Semi-solid/solid at room temperature
- Stable, not easily broken down & oxidised
- No effect on Total Cholesterol if taken within recommended level



**UNSATURATED
FAT**

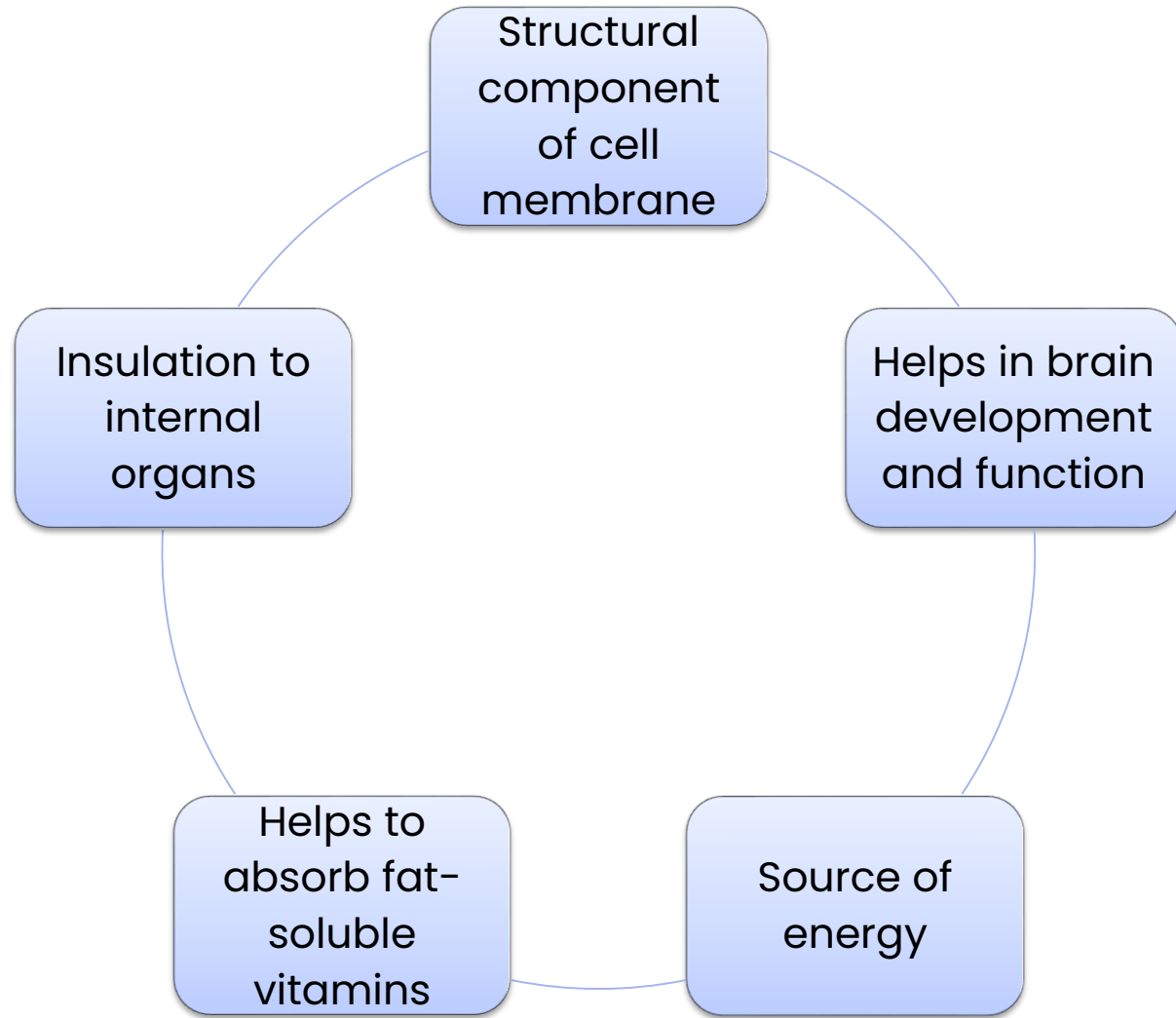
- 1 or more double bond(s) in cis configuration
- Mono- or Poly-
- Mainly found in plants, nuts & seeds, seafood
- Liquid at room temperature
- Can be easily oxidised (i.e. polyunsaturated)
- Increases HDL cholesterol (good)



TRANS FAT

- Double bond in trans configuration
- Naturally exists in dairy and meat products
- Formed during partial hydrogenation of UFA, especially polyunsaturated fat (PUFA)
- Solid at room temp.
- Increases LDL cholesterol (bad) → increases risk of heart diseases & stroke

Functions of Fats

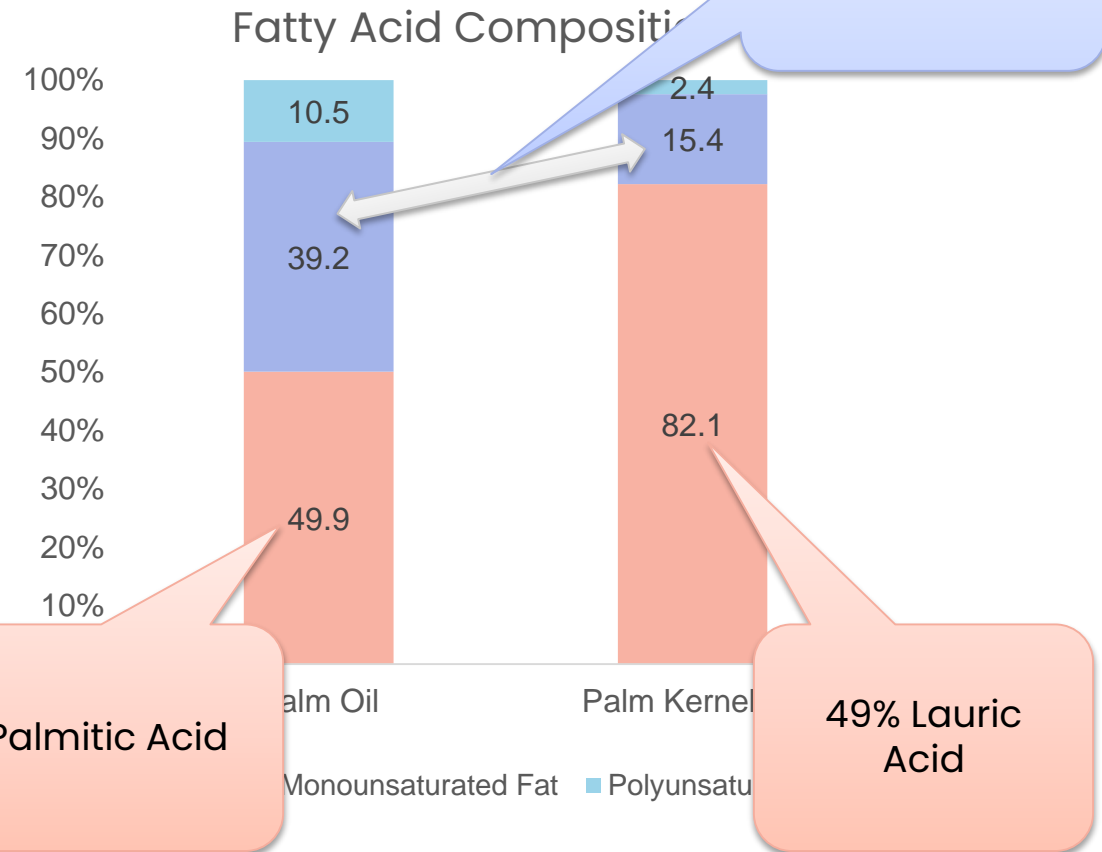


Fatty Acid Composition



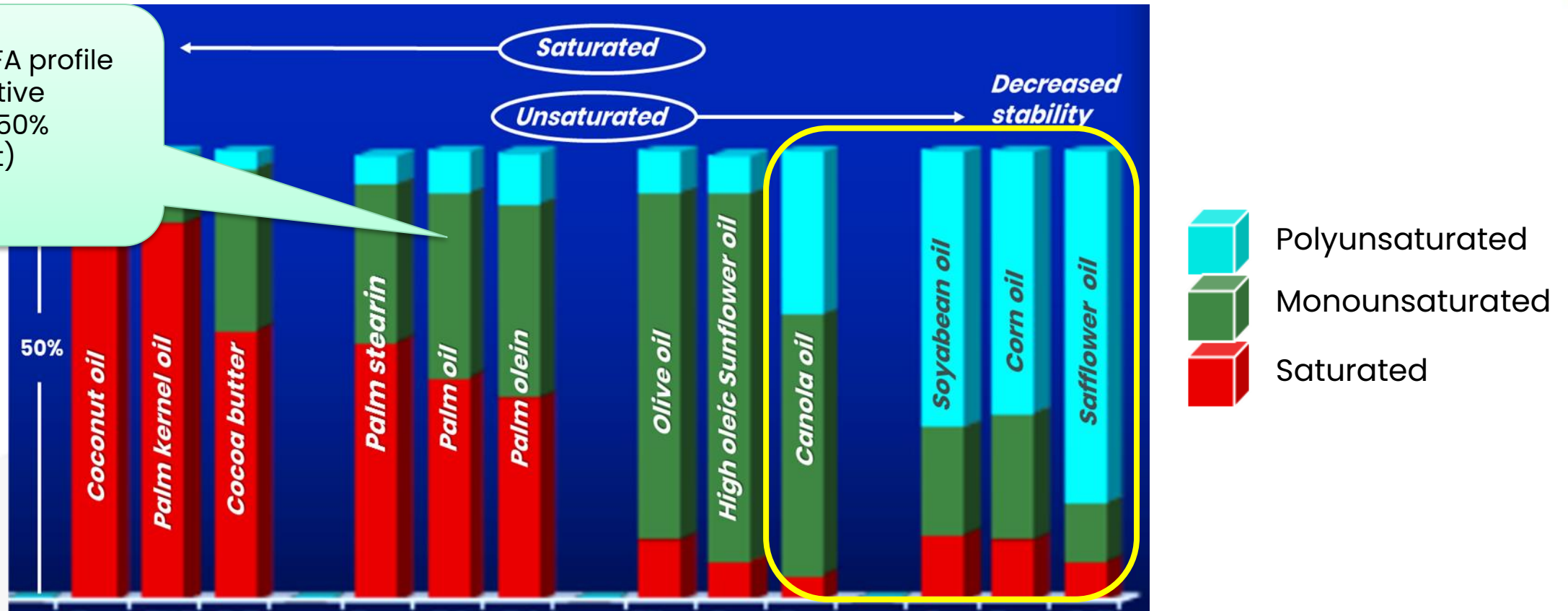
Palm oil

Palm kernel
oil



Comparison of Fatty Acid Profile

✓ Balanced FA profile
✓ High oxidative stability ($\therefore \geq 50\%$ saturated fat)
→ **Stable oil**



PUFA are easily oxidized and are not recommended for deep frying.
PUFA needs to be partially hydrogenated to make them stable for frying but this will generate TRANS FATTY ACIDS.

Phytonutrients

- Natural chemicals in plant foods (thousands of them!)
- The function is to protect plants from insects and sun, and to keep them healthy
- Antioxidant and anti-inflammatory effects → human body
- Examples: carotenoids, flavonoids, polyphenols, resveratrol, tocopherols

How Much Phytonutrients in Palm Oil?

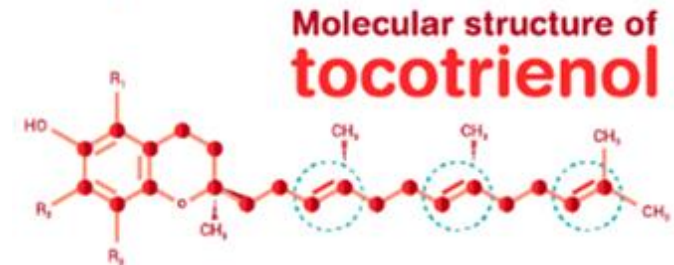
Major Phytonutrients in Palm Oil

| Phytonutrients | Concentration (ppm) |
|--|---------------------|
| Tocols (Tocotrienols, Tocopherols) | 600-1000 |
| Carotenoids (α -carotene, β -carotene, lycopene, phytoene) | 500-700 |
| Phytosterols (Sitosterol, Stigmasterol, Campesterol) | 300-620 |
| Squalene | 250-540 |
| Lecithin (Phospholipids) | 20-100 |
| Co-enzyme Q10 / Ubiquinones | 10-80 |
| Polyphenols (Phenolic acids, Flavonoids) | 40-70 |

Vitamin E

Provitamin A

1% of crude palm oil
= phytonutrients



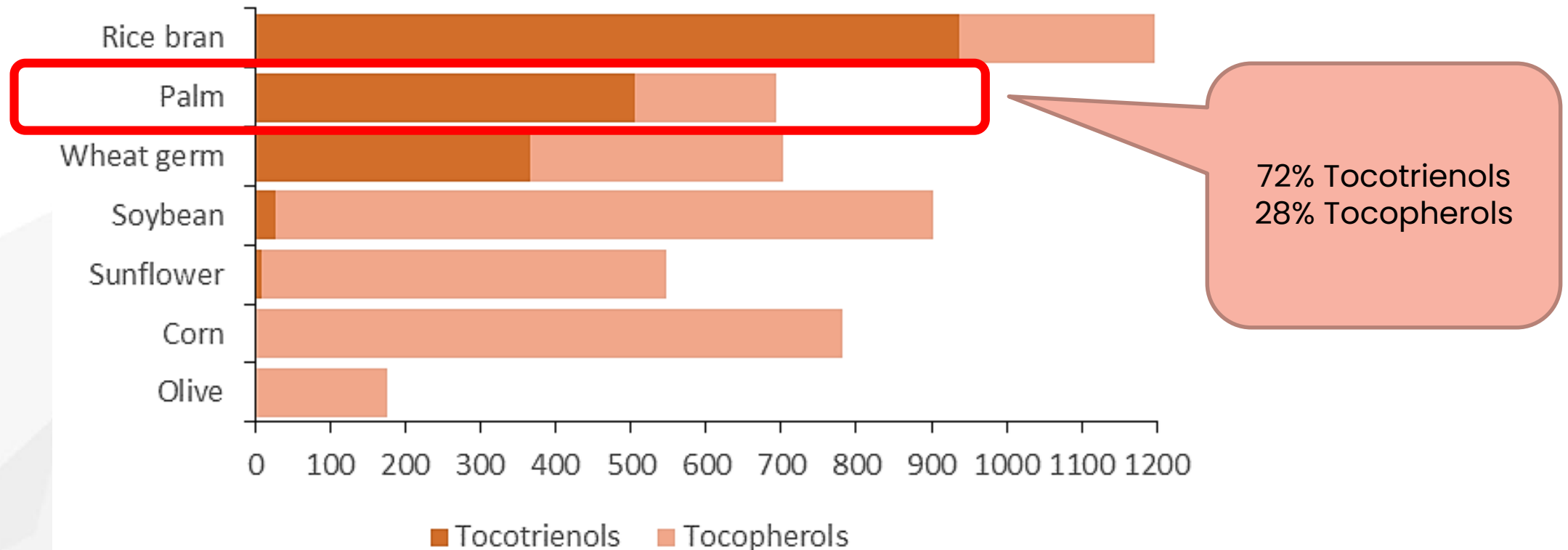
Main Sources of Vitamin E

Vitamin E is fat soluble, hence higher content is found in fat-containing food, including oils, nuts, wheat, avocado and others



Comparison of Tocopherol & Tocotrienol with Other Oils

Tocopherol and tocotrienol content (mg/kg) of common edible oils





Potential Health Benefits of Palm Vitamin E Tocotrienols

- ✓ Powerful antioxidant
- ✓ Neuroprotective
(i.e. Stroke prevention & protection)
- ✓ Potential anti-cancer & anti-inflammatory properties

Carotenoids – Provitamin A

- Vitamin A precursors
- Converted into Vitamin A in our body
- Common carotenoids: α -carotene, β -carotene, lycopene, lutein etc
- Main characteristic of Carotenoids: Vibrant orangey red colour
- Retinol Equivalent (RE): Unit of measurement for Vitamin A content

Carotenoids in Palm Oil

Palm oil: α -carotene, β -carotene, lycopene, phytoene

| Major Phytonutrients in Palm Oil | |
|---|---------------------|
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Malaysian Red Palm Oil (RPO)

Refined using a special method that retains Provitamin A carotenoids (the red pigment that gives its colour)



Red Palm Oil is suitable for salad dressing & stir frying

Common Food Sources of Vitamin A



Carrots



Spinach



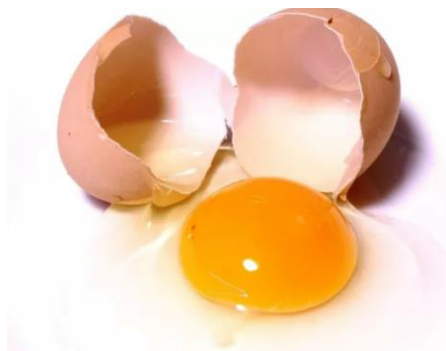
Pucuk Manis



Sweet Potatoes



Chicken/beef liver



Whole Egg



Red Capsicum

How Much Do We Need?

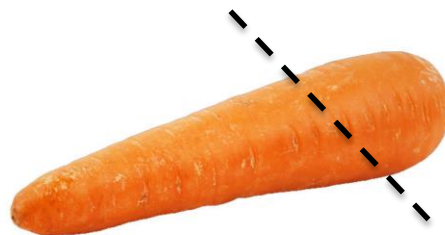
Recommended Nutrient Intake (RNI) of Vitamin A:

- Children (1 – 9 years) : 400 – 500 μg RE/day
- Adolescents (10 – 18 years) : 600 μg RE/day
- Adults & elderly (19 years and above): 600 μg RE/day

How Much to Eat for 600 μg RE?



1 medium tomato
(~100g)

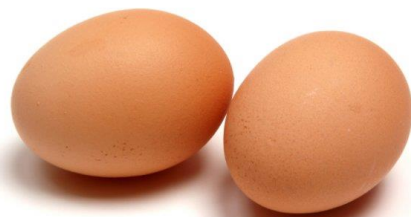


2/3 medium carrot
(~70g)



**Do Not
Recommend
= Too Much
Sugar!**

1kg watermelon
(edible portion)



2 whole
eggs



1 dessert spoon
RPO
(~10mL)

Remember to
consume with oil
as Vitamin A is fat
soluble and can
only be absorbed
with oil/fat

Functions of Vitamin A



Vision



Cell Growth & Development



Cognitive Function (Elderly)



Immune System



Foetal Development

Vitamin A Deficiency (VAD)

- Estimated 250 million preschool children are VAD (WHO, 2019)
- VAD in children causes visual impairment, blindness, risk of infection & stunting
- Mainly in developing & low-income countries

RPO Fortification

- South Africa: RPO was used to fortify biscuits & were distributed in primary school children → Increase in blood retinol levels
- Many studies conducted to evaluate the impact of RPO supplementation on the blood carotenoids level showed a positive impact



| Country | Publication |
|--------------|---|
| South Africa | • van Stuijvenberg et al (2001). Eur J Clin Nutr. 55:657–662. |
| Tanzania | • Mosha et al (1998). Ecol Food Nutr. 37:569–593. • Lietz et al (2006). J Nutr. 2006;136:1821–1827 |
| Nigeria | • De Moura et al (2015). PLoS One, 10(6), e0129436 |
| India | • Radhika et al (2003). Food Nutr. Bull. 24(2):208-2017 |
| Burkina Faso | • Zagre et al (2003). Public Health Nutr. 6:733–742. |

Major Food Application: Palm Oil

Cooking oil



Bakery fats:
margarine/shortening



Vanaspati:
Solid frying medium



Dairy fat substitute



Confectionary Fats/
Cocoa Butter Substitute



Other Food Uses

**Santan
sawit**



**Special
animal fat
replacer**



**Infant
formula**



**Emulsifier
/Stabiliser**



**Cheese
analogue**



Best Oil for Food Industry



Palm oil is ideal for deep frying

- 01 ➤ Stable at high cooking temperatures
- 02 ➤ High oxidative stability
- 03 ➤ Has right content of polyunsaturated fat



Polyunsaturated-rich oils are easily oxidized and **NOT** recommended for deep frying

Advantages of Palm Oil over Other Types of Cooking Oil

01



Less oil absorption

Good & consistent texture on fried product



02



Produces less volatile compounds

Less sticky residue on walls & utensils



03



Resistant to oxidation

Long shelf life



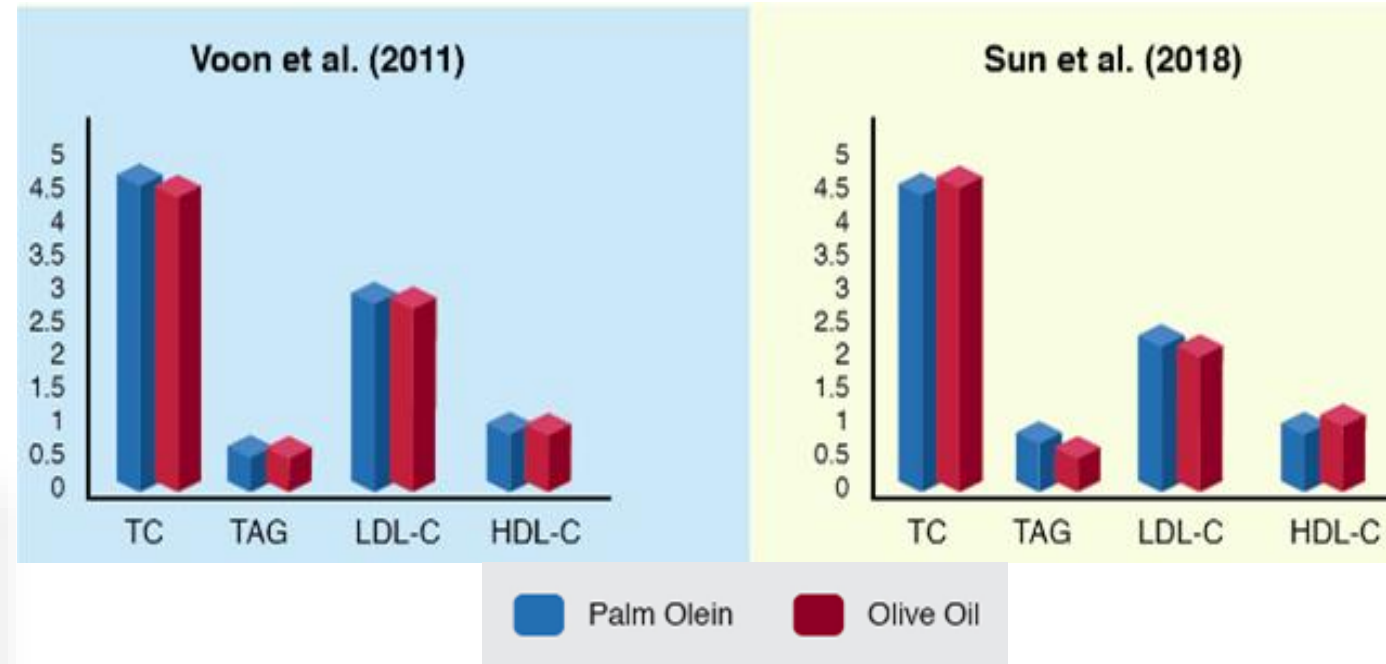
Palm Oil & Cardiovascular Health

- 180++ nutritional human studies evaluating palm oil conducted by the leading research institutions around the world (eg. America, Europe and Australia)
- When palm oil is incorporated into the daily human diet where the total fats are consumed at WHO or RNI levels, **palm oil does not increase the total blood cholesterol or the 'bad' LDL-cholesterol levels**



Palm Olein and Olive Oil Have Similar Effects on Blood Cholesterol

Voon et al. (2011). The American Journal of Clinical Nutrition, 94(6), 1451-1457.
Sun et al. (2018). Asia Pacific Journal of Clinical Nutrition, 27(3), 572.



RNI Total Fat: 50 – 70g/day (~30% Total Energy Intake)
RNI Saturated Fat: <20 – 25g/day (<10% Total Energy Intake)

Conclusion

- ✓ Stable oil (high oxidative stability)
 - ✓ High phytonutrients (esp. Tocotrienols & Carotenoids)
 - ✓ Less oil absorption in end product
-
- ➔ Useful and most versatile oil
 - ➔ Does not increase the total blood cholesterol and LDL-cholesterol levels
(if consumed within recommended levels)

Sustainability & Conservation Efforts

Sustainability Certification

- Palm oil is one of the few commodities that can be certified sustainable
- The world's first and only certified sustainable vegetable oil
- MSPO – launched in 2013 to provide general principles for the production of sustainable palm oil in Malaysia, covering the 3Ps (people, planet, profit)

Progress of MSPO Implementation (August 2021)



Palm Oil: One of the Important Contributor to the Socio-Economic Development for Malaysia



Oil palm transforms the livelihood of smallholders while improving their quality of life



Oil palm industry has lifted rural communities from poverty. 1 million people have been lifted out of poverty under FELDA Scheme

Student Ambassador Programme



SEGi
University



INTI
INTERNATIONAL UNIVERSITY
LAUREATE INTERNATIONAL UNIVERSITIES



UPM
UNIVERSITI PUTRA MALAYSIA



UNIVERSITI
TEKNOLOGI
MARA



Objectives:

- Cultivate greater sense of pride for palm oil in our Malaysia youths.
- Enable the youth to recognize and appreciate palm oil's vital role in our country.
- Student ambassadors will be the voice for Malaysian palm oil and help create the education and awareness on the benefits of Malaysian palm oil amongst their peers.


Benefits of being a student ambassador:

- Exposure to the Malaysian palm oil industry – gaining industry contacts via networking.
- Future career prospects – increasing employability.
- Acquiring soft skills – Building up confidence, effective communications and event management.
- Voice of your generation – Engaging the Malaysia palm oil industry constructively.

Upcoming Webinar



The banner features a dark blue background with abstract geometric shapes in yellow and orange on the left. On the right, there is a vertical strip showing a doctor in a white coat and stethoscope, with icons of a heart, a plus sign, a DNA helix, and a person above it. The central text area contains the following information:

 Science and Sustainability Engagement Series 

SERIES 4:

PALM CAROTENIDS IN HUMAN NUTRITION AND HEALTH WEBINAR

DATE : 15 SEPTEMBER 2021 (WEDNESDAY)

TIME : 3.00 - 5.00 PM (MALAYSIA/GMT+8)

Registration link

<https://bit.ly/mpocwebinarseries-06>

On the left side of the banner, there is an image of a glass bottle containing orange liquid next to a bunch of palm fruits.



Thank you!



www.mpoc.org.my
www.palmoiltv.org



www.palmoilhealth.org



vickyc@mpoc.org.my

14.09.2021 . Tuesday



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Palm Oil Processing
Special Interest Group