

IMPACT OF RED PALM OIL CONSUMPTION ON CARDIOVASCULAR HEALTH

The **protective effects of RPO** on cardiovascular health are attributed to a large extent by its **high content of antioxidants**, namely:

- Vitamin E → tocopherols
→ tocotrienols

- Carotenoids

and natural **bioactive components** such as:

- Flavonoids (0.65mg/ml)
- Phytosterols (~300 mg/kg)
- Phenolic acids (10,800 mg/kg)

Table 1: Levels of minor beneficial components in palm oil

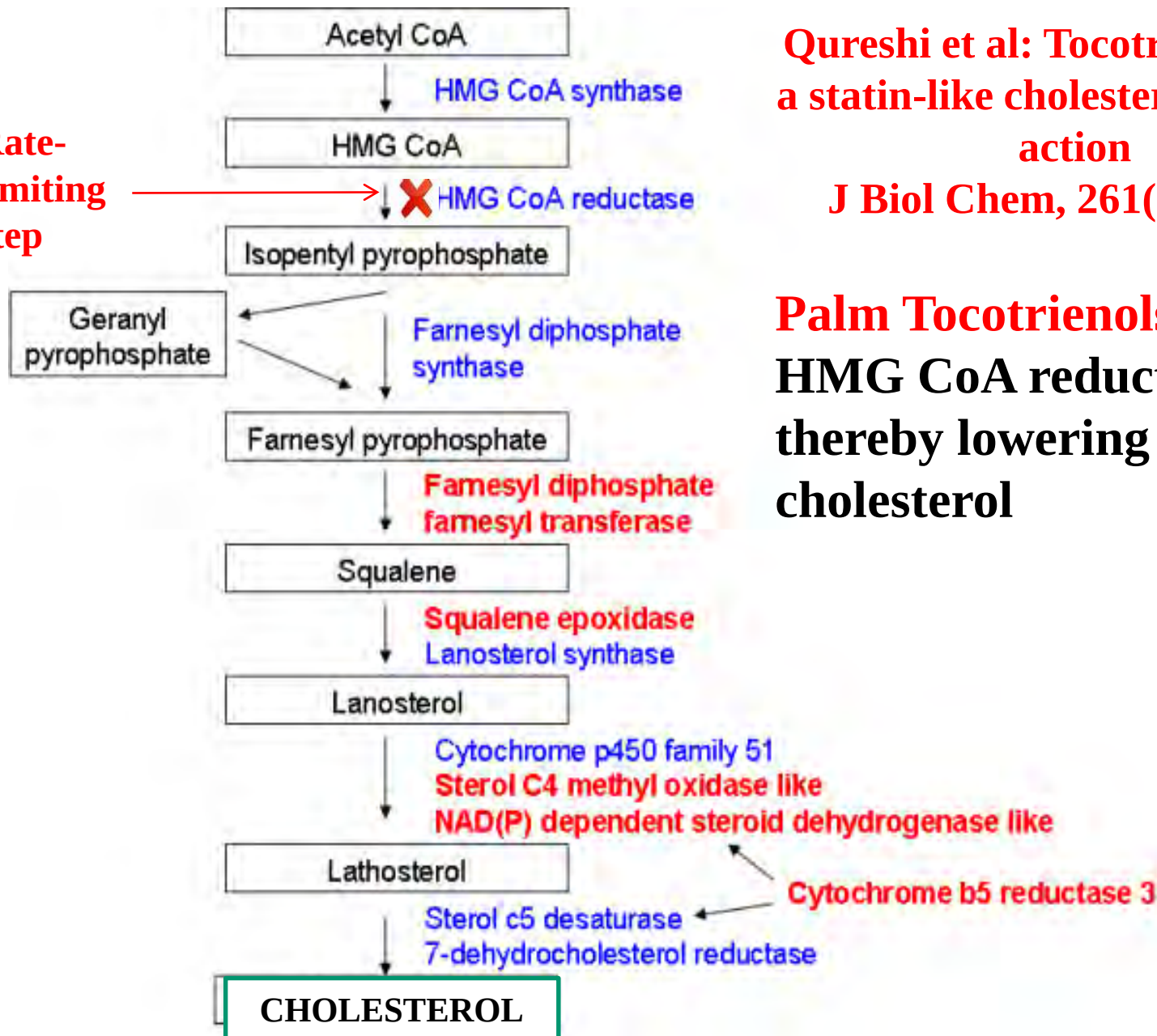
Sample	Carotenes (ppm)	Vitamin E (ppm)	Phytosterols (ppm)
Crude Palm Oil ^a	643	869	210–620
RBD Palm Olein ^a	Nil	561	109–170
Red Palm Olein ^b	513	707	325–365

^aSample from palm oil refinery

^bRed palm olein sample processed by molecular distillation at the Palm Oil Research Institute of Malaysia.

Credit: Adapted from data in Nagendran, B., et al.,
<http://dx.doi.org/10.1177/156482650002100213>, 2000.

Rate-limiting step

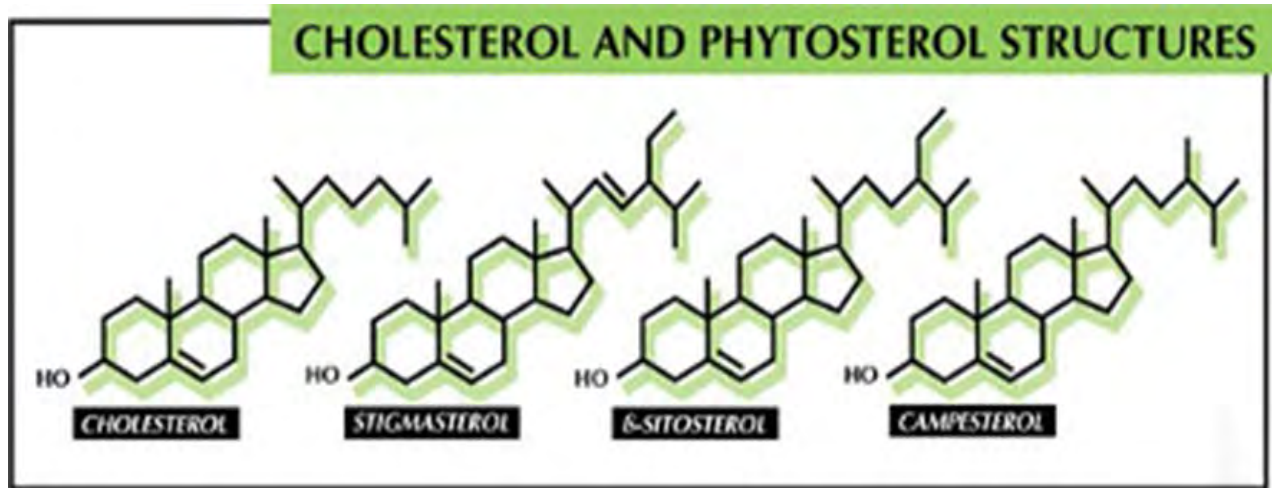


Qureshi et al: Tocotrienols have a statin-like cholesterol lowering action

J Biol Chem, 261(23),1986,

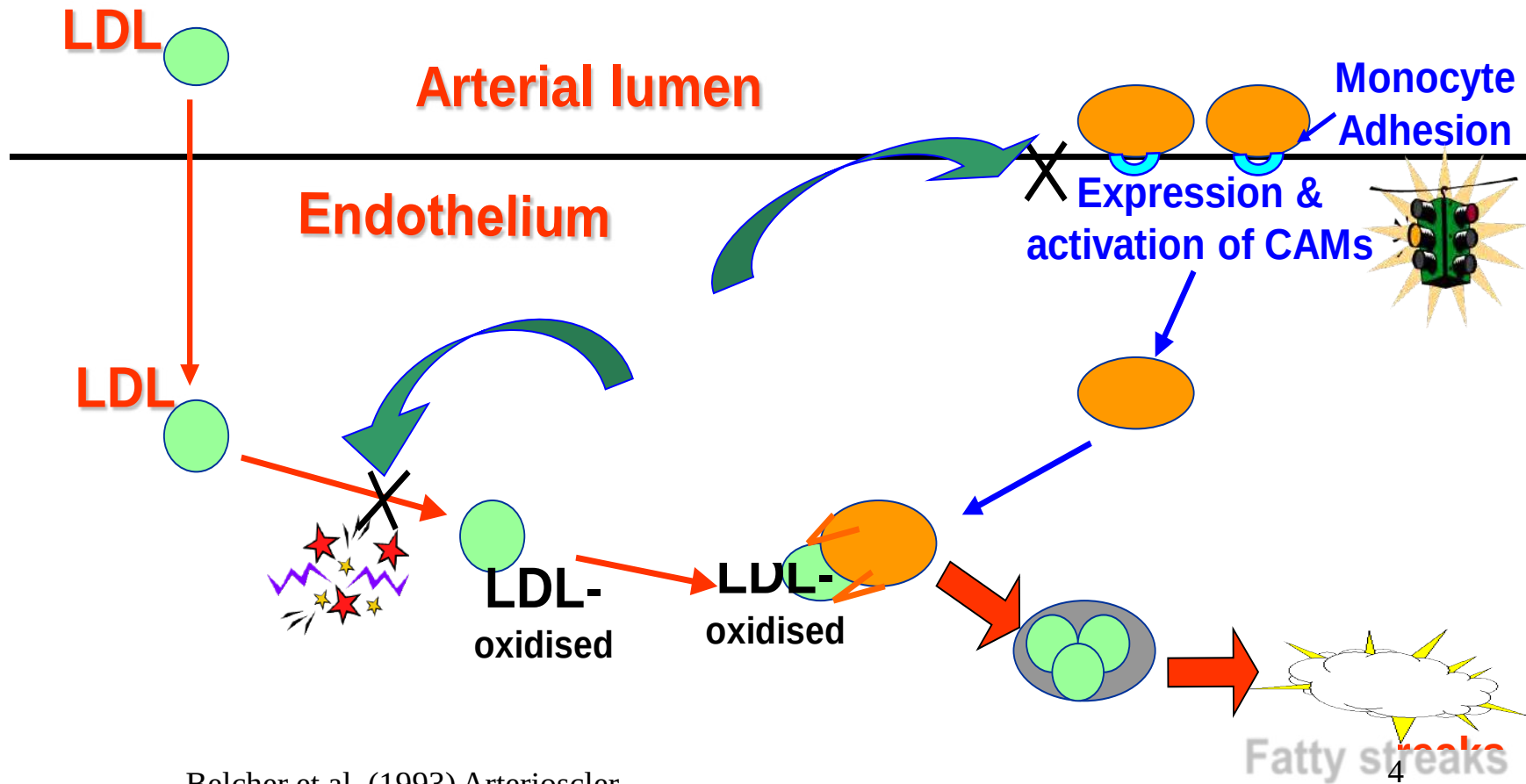
Palm Tocotrienols inhibit HMG CoA reductase, thereby lowering blood cholesterol

RPO also has an abundance of **phytosterols**-
structurally similar to cholesterol.



Phytosterols block cholesterol from being absorbed.
**→ Lower total cholesterol up to 10% and LDL or “bad”
cholesterol up to 14% → Lower risk of CVD**

Ref: <https://my.clevelandclinic.org/health/articles/17368-phytosterols-sterols--stanols>



Do carotenoids, flavonoids and other bioactive compounds in RPO inhibit LDL oxidation and reduce atherosclerosis?

YES

Center for Human
Nutrition, University of
Texas

. 1991 Oct 15;1086(1):134-8. doi: 10.1016/0005-2760(91)90164-d.
Jialal et al., 1991, Biochim Biophys Acta

***Beta-Carotene inhibits the oxidative modification of low-density lipoprotein (LDL)**

***Fuhrman et al., 2001. Flavonoids protect LDL from oxidation and attenuate atherosclerosis. Lipidology 12(1)[Israeli study]**

**RPO Bioactive
compounds**

***Sambanthamurthi et al., 2011, Brit J Nutr 106(11) Br J Nutr. 2011 Dec 14; 106(11): 1655–1663. (MPOB-MPOC article)**
Oil palm vegetation liquor: a new source of phenolic bioactives

**Antioxidant
action:
Quenchers of
free radicals
(Singlet oxygen)**



**Prevent LDL
oxidation → curb fatty
streak formation →
Less severe
atherosclerosis**

One early study of RPO on experimental atherosclerosis in a rabbit model

David Kritchevsky (Fd & Nutr Bull. No.21(2), 2000)



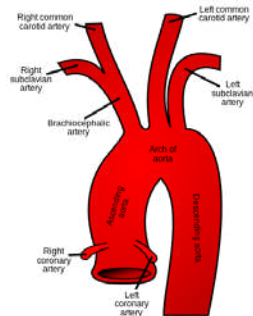
The rabbits (8 in each group) were fed a semipurified cholesterolemic diet containing 0.2% cholesterol for 65 days.

b. 2 aorta sites were graded visually for atherosclerosis on a 0–4 scale.

c. Significant difference between the two supplemented groups ($p < .05$)

FINDINGS:

***Less severe atherosclerosis at aorta arch in RPO group compared with palm olein control group ($p < 0.05$).**



Since the control group was **carotenoid-free**, the beneficial effect seen in the RPO group must have been contributed by the **RPO carotenoids**.

Arterial injury → *Chronic inflammation* → CVD

Published online 2014 Dec 20. doi: [10.1186/s12950-014-0041-4](https://doi.org/10.1186/s12950-014-0041-4)
Jeanine L Marnewick et al

PMCID: PMC4297406

PMID: [25598708](https://pubmed.ncbi.nlm.nih.gov/25598708/)

The combination of **red palm oil** and rooibos (rich in flavonoids) show **anti-inflammatory effects** in rats

Inflammation, triggers activation of intravascular leukocytes, and **release of proinflammatory cytokines** from the ischemic endothelium and brain parenchyma. Over the long term, this **has the potential to increase tissue injury → CHD, STROKE.**

The Good News; RPO contains both carotenoids and flavonoids which may act **synergistically** to protect against chronic inflammation.

IN SUMMARY:

Aggawal et al.

Cardioprotective effects of Red Palm Oil:

Attributed to its high content of antioxidants (tocopherol, tocotrienols, carotenoids and flavonoids) and natural bioactive compounds mediated through their

- *antioxidant mechanisms
- *inhibit HMG-CoA reductase in cholesterol biosynthesis, block cholesterol absorption → reducing blood cholesterol
- *suppress chronic inflammation
- *reduce LDL-oxidation, activation & expression of CAMs → less phagocytes formed → reduced atherosclerosis.

Final take home message: Make RPO a part of your daily diet

Thank you!