

NUTRITIONAL BENEFITS OF PALM OIL

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Sufficiency of Oils & Fats

Oils and Fats Balance 2006 ('000 MT)					
	Production	Disappearance	Imports	Exports	Net Exports / (Imports)
Malaysia	18,139	3,662	1,287	15,535	14,248
Indonesia	18,366	4,504	86	13,761	13,675
Argentina	8,222	942	17	7,374	7,357
<i>- handful of countries are sufficient in terms of edible fat production</i>					
Philippines	1,533	698	268	1,084	816
Thailand	1,119	997	105	272	167
Australia	944	769	287	449	162
Colombia	867	824	237	272	35
USA	16,699	16,202	2,637	2,596	(41)
Russia	3,169	3,444	923	671	(252)
Taiwan	513	812	312	16	(296)
Nigeria	1,416	1,763	367	13	(354)
Rep of S. Africa	450	1,116	733	34	(699)
South Korea	412	1,160	760	9	(751)
Japan	1,940	2,859	926	13	(913)
Mexico	1,667	2,788	1,101	30	(1,071)
Bangladesh	199	1,318	1,102	0	(1,102)
Spain	230	1,161	1,162	13	(1,111)
Iran	306	1,531	1,282	78	(1,204)
North Africa *	507	1,758	1,642	313	(1,329)

- Why palm oil?
- Largest production, largest amount exported, highest yield - no supply problem

Nutritional attributes of Palm Oil/Palm Olein

- **Variety of carotenoids (Vitamin A)**

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"Vitamin A" activity of red palm oil

	RE Per 100 g	Relative quality (Times <red palm oil
Red Palm Oil	30,000	-
Carrots	2,000	15
Leafy Vegetables	685	44
Apricots	250	120
Tomatoes	100	300
Bananas	30	1000
Orange Juice	8	3,750

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Carotene Profile of red palm oil

Phytoene	2.0%
Phytofluene	1.2%
Cis- β - Carotene	0.8%
β - Carotene	47.4%
α - Carotene	37.0%
Cis- α - Carotene	6.9%
ζ - Carotene	1.3%
δ - Carotene	0.6%
γ - Carotene	0.5%
Neurosporene	Tr
β - Zeacarotene	0.5%
α - Zeacarotene	0.3%
Lycopene	1.5%

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Numerous human studies showing efficacy of red palm oil in fighting Vitamin A deficiency

...studies have adopted different approaches to provide Vitamin A naturally

- Children fed traditional Indian sweets made with redPO
- School children fed biscuits baked with redPO
- School children given 5 - 10 mL redPO daily
- Cooking green leafy vegetables in redPO

- Also Vitamin A status improved by feeding redPO to pregnant mothers at various stages of pregnancy.

- Also lactating mothers

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... Palm Oil/Palm Olein

- Variety of carotenoids (Vitamin A)
- Vitamin E (tocopherols and tocotrienols)

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Comparison of Vitamin E Content of red palm oil & other Vegetable Oils

Oil	Tocopherols(ppm)				Tocotrienols(ppm)				Ppm T+T3
	α T	β T	γ T	δ T	α T3	β T3	γ T3	δ T3	
Red Palm Oil	152	-	-	-	205	-	439	94	890
Soyabean	101	-	593	264					985
Cornoil	112	50	602	18					782
Groundnut	130	-	216	21					367
Safflower	387	-	174	240					801
Sunflower	487	-	51	8					546

Numerous in vitro studies showing efficacy of tocotrienols in inhibiting breast cancer cell proliferation and decreasing neurodegeneration

... Palm Oil/Palm Olein

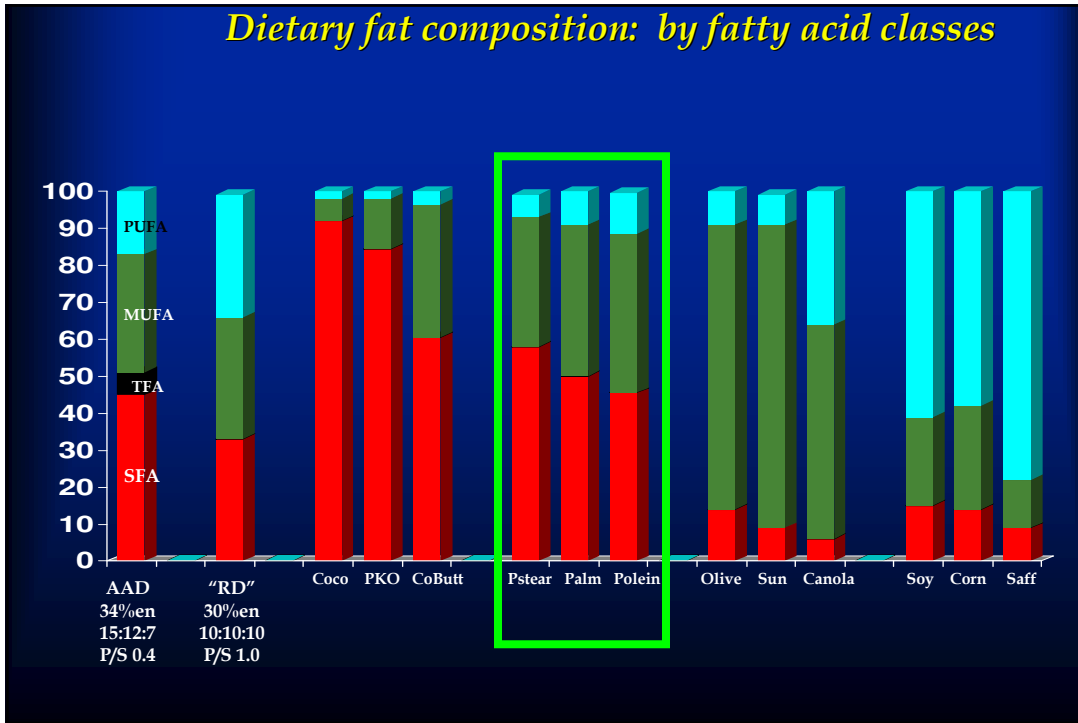
- Variety of carotenoids (Vitamin A)
- Vitamin E (tocopherols and tocotrienols)
- **Fatty acid composition - replacement for trans Fatty acids**

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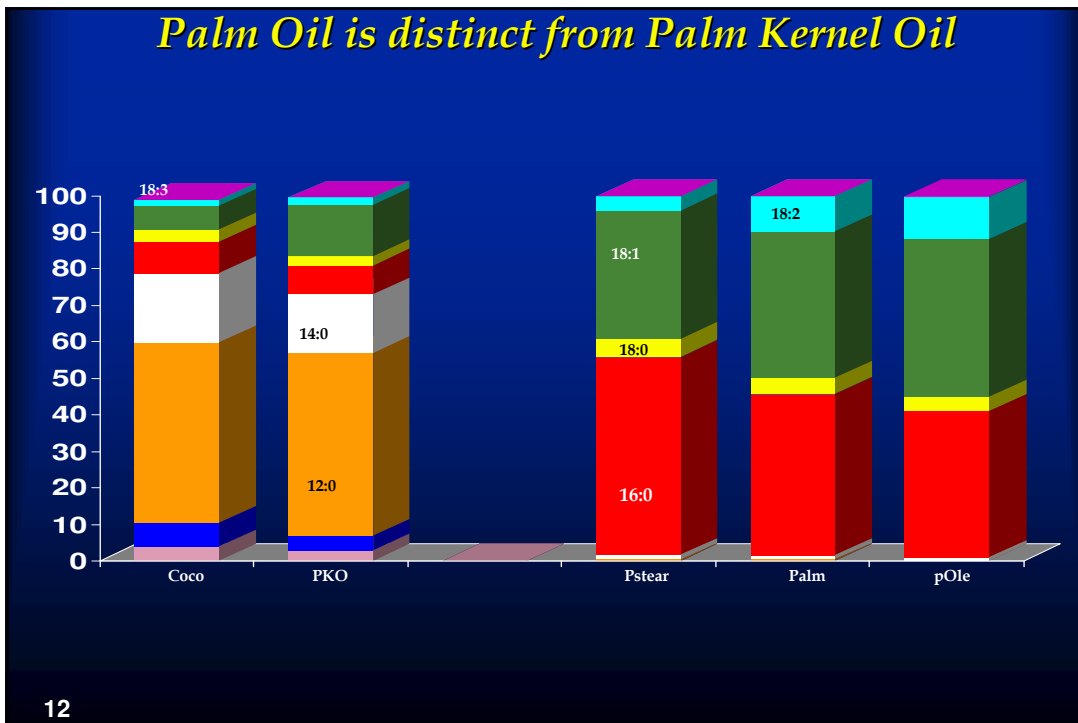
CHD risk

- Numerous factors
- **CHD risk calculator** - Age, Gender, TC, HDL-C, Smoking status, Blood pressure and treatment for Hypertension
- Lipids - not just LDL - LDL particle size, Lp(a) levels
- Also **HDL** levels
- Blood lipids affected by Diet (Fat, Fatty acids, carbohydrates, protein)

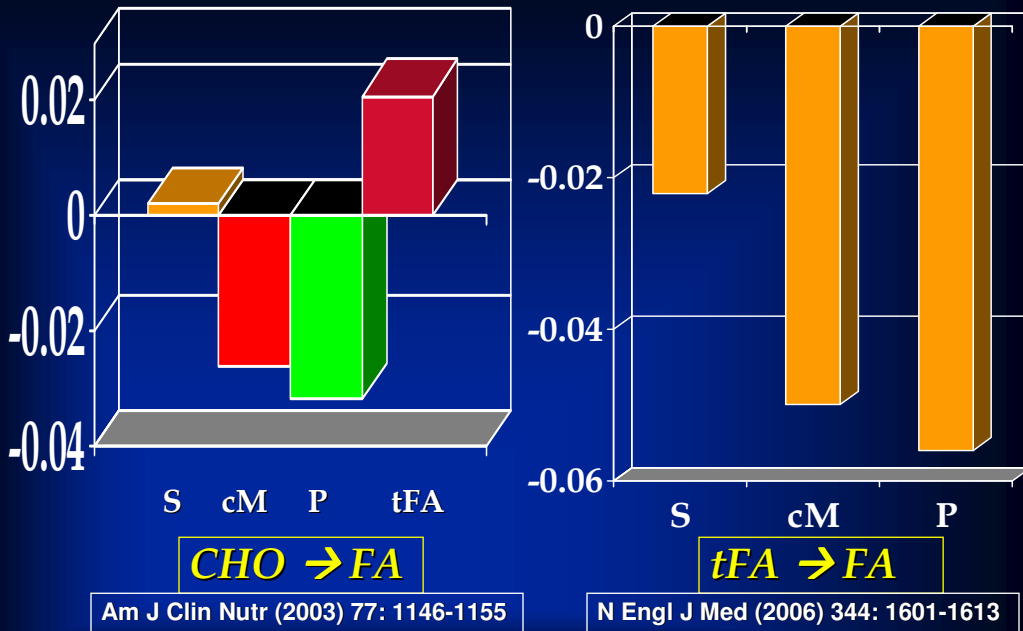
Dietary fat composition: by fatty acid classes



Palm Oil is distinct from Palm Kernel Oil

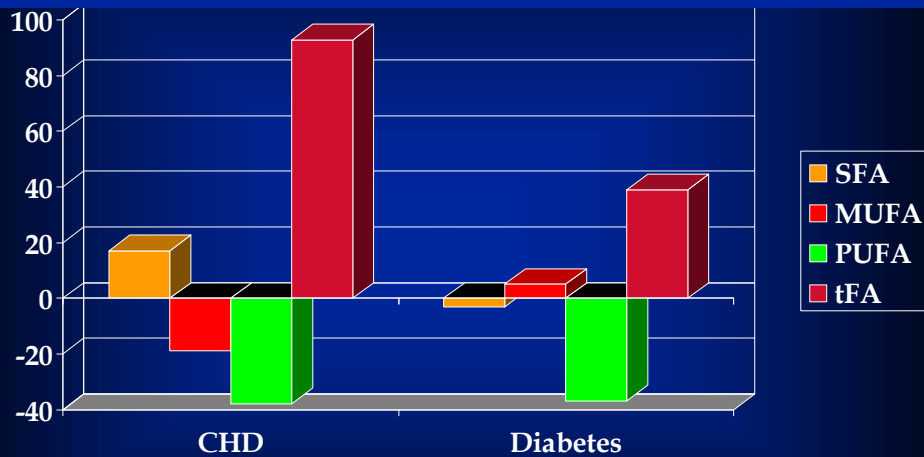


Effects on the TC/HDL-C ratio



Dietary Fat intake and Risk of CHD and Type II Diabetes (TIID) in Women

Effects of replacing 2%en from carbohydrates with trans fatty acids

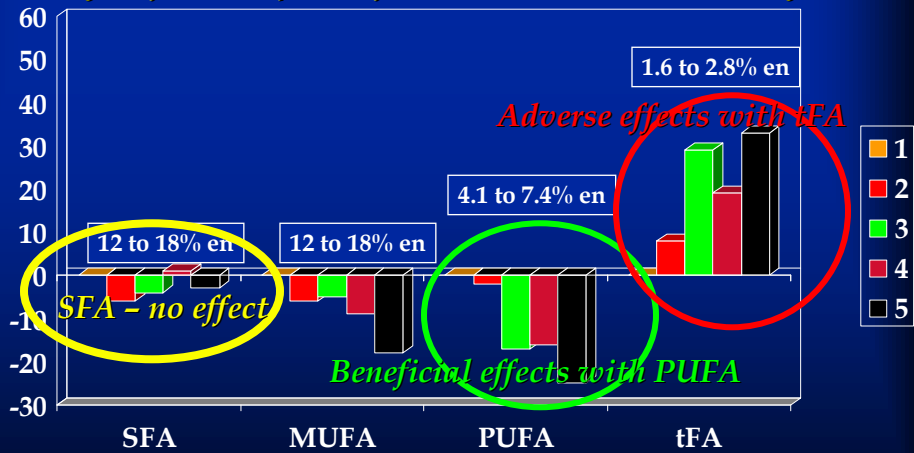


Effects of replacing 5%en from carbohydrates with specific fatty acids

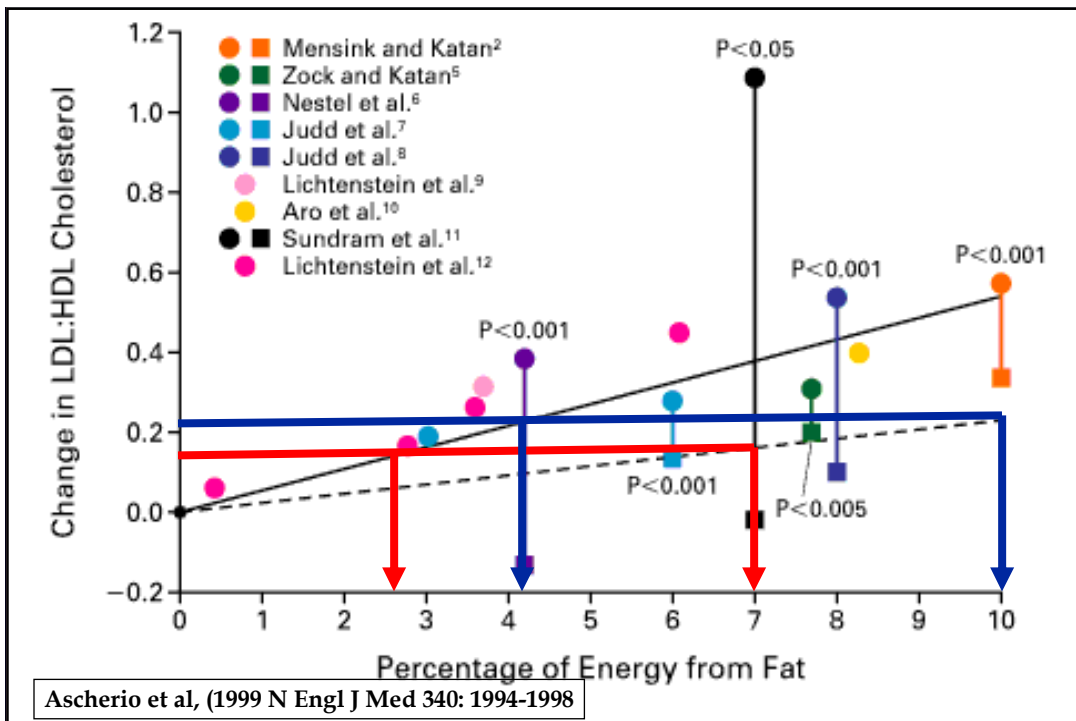
CHD data - Hu et al, (1997) N Engl J Med, 337: 1491-1499

Type II Diabetes data - Salmeron et al, (2001) Am J Clin Nutr 73: 1019-1026

*Relative risk of CHD based on quintiles of dietary fatty acid intake (Multivariate analyses)
20 year follow-up data from the Nurses Health Study*



from Oh et al (2005) Am J Epidemiol, 161: 672-679



How much palm oil? Conservative approach -- based on current recommendations for restricting SFA -- can calculate the amount of palm oil in a prudent diet that satisfies various dietary guidelines

% calories from SFA	% calories from total fat				
	20	25	30	35	40
5	54	43	36	31	27
6	65	52	43	37	32
7	76	61	51	43	38
8	87	69	58	49	43
9	97	78	65	56	49
10	100**	87	72	62	54

Khosla (2006) J Agro Food Ind. 17: 21-23

17 Hayes and Khosla, Eur J Lipid Sci Tech (2007) 109: 453-464

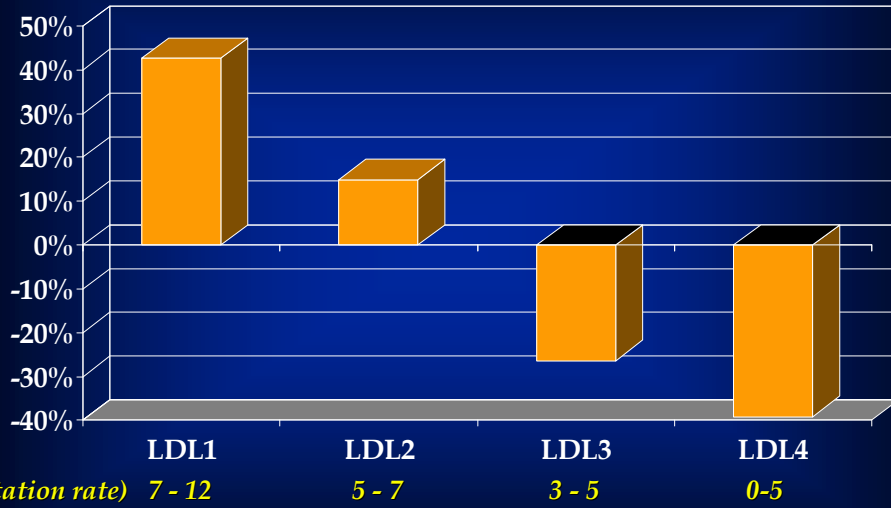
- Since trans are **twice** as potent as SFA - an **equal** replacement of trans with SFA (e.g. 1 g with 1 g) will **improve** lipids and decrease risk
- .. further **improvement** with unsaturated oils

Major saturated fatty acid in palm oil is palmitic acid

- Saturated fat → Increases LDL-C → Increases CHD risk
- Saturated fat → Increases CHD risk !

- Does it?? Some interesting bits of data.....

*Changes in LDL subfraction mass. Low → high fat diets
(24% cal → 45% cal; SFA 6% cal → 18% cal)*



Sf (flotation rate) 7 - 12

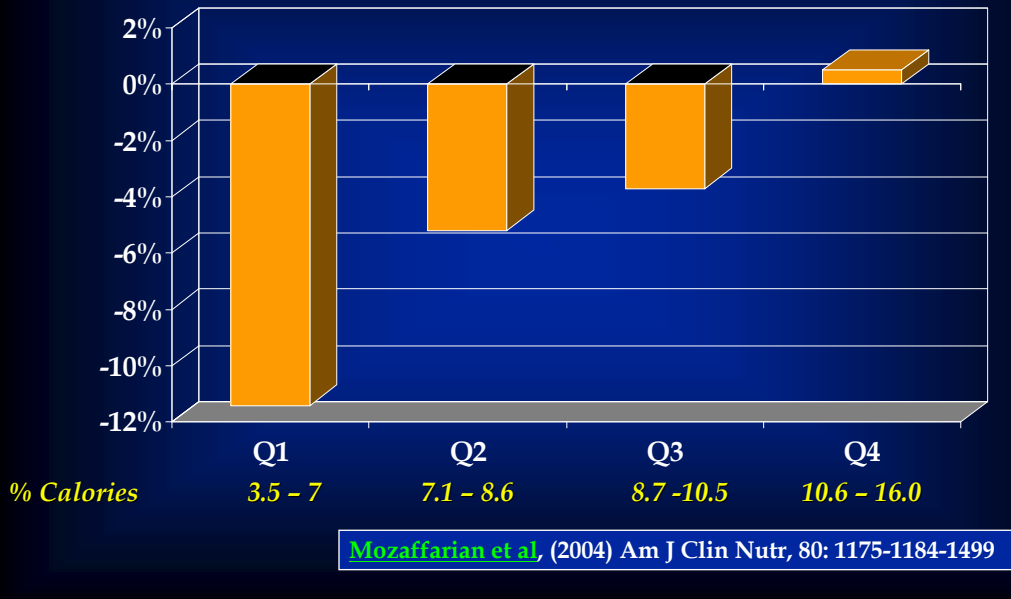
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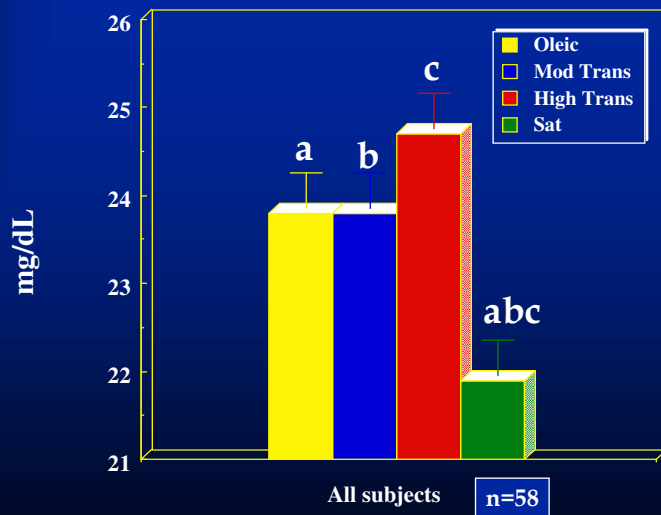
0-5

Dreon et al (1984) Am J Clin Nutr, 67: 828-836

Saturated fat intake and Changes in mean minimal Coronary Arterial Diameter in post-menopausal women



SFA lower Lp(a) concentrations ?



Clevidence et al, (1997) Arterioscler. Thromb. Vasc. Biol. 17, 1657-1661,

How would this affect CHD risk?

Has been calculated that based on

- 1) Changes in plasma lipoproteins, replacing 2% calories from trans FA with saturated fatty acids... would decrease risk by 4%
- 2) Changes in additional parameters for CHD, besides lipoproteins, replacing 2% calories from trans FA with saturated fatty acids... would decrease risk by 17%

[Mozaffarian and Willett, \(2007\) Curr. Ather. Rep., 9: 486-493.](#)

... .. practical aspects

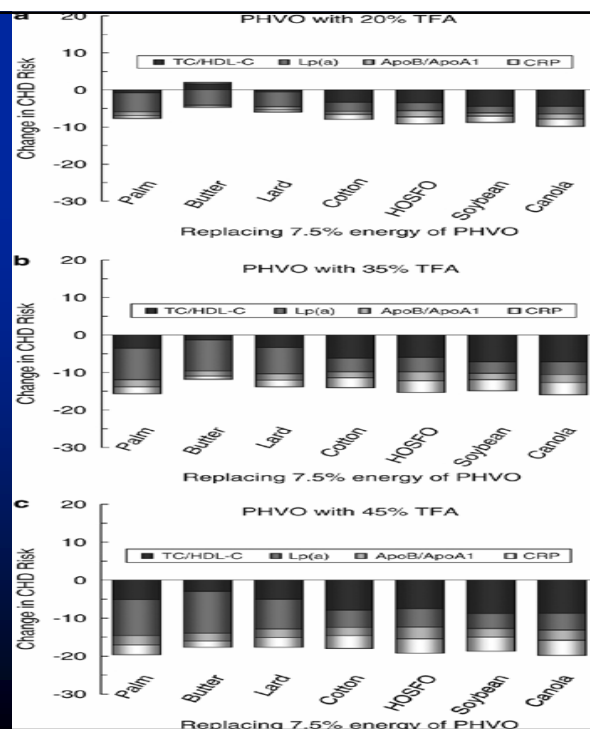
SFA vs tFA- not a realistic comparison

Look at specific fats/oils replacing PHVO containing tFA

CHD risk based not just on changes in plasma lipoproteins.

Report of [Mozaffarian and Clarke \(2009\)](#) is of interest

Also risk assessment papers ([Barraj et al 2008](#), [Mente et al 2009](#))



Summary

Palm Oil and its products – serve a multitude of nutritional needs

Adequate supply makes palm oil *the* important player on the global stage

Natural fatty acid profile of palm eliminates need for hydrogenation – so ideal for trans fat-free formulations.

Even if trans FA replaced exclusively with **SFA**, CHD risk improved

Vast array of products using palm oil blended with other oils already in the US

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Help in removing trans FA

Trans Fat Help Center

www.notransfatnyc.org

Margarines Spreads - 0 grams trans fat

- Promise
- Gold-N-Sweet Zero Trans Whipped Spread
- Smart Balance 67% Buttery Spread
- Smart Balance Omega Plus Butter Spread
- Gold-N-Sweet Zero Trans Whipped Margarine
- Sunglow Zero Trans European Style Whipped Butter Blend
- Gold'n Flavor Table Grade Margarine
- Old World Table Grade Zero Trans Margarine
- Aurora Trans Free Butter Blend
- Aurora Table Grade Margarine
- Admiration 0 Grams Trans Fat Margarine
- Ventura Table Grade Margarine - Natural
- Ventura Table Grade Margarine - Natural Non-Dairy
- Plus 7 others

Baking Shortening, Baking Margarines and Doughnut Fry Oils - 0 grams trans fat

All purpose baking shortening

- Majestic NH 20 Plus
- Transadvantage P-100 NH Palm Shortening
- Sanstrans RS 39 T20
- BBS Z
- Elite Vream NH
- Primex Z
- Sanstrans 39
- Sanstrans 39 T15
- Richtex P-ZT
- Ventura All Purpose Palm Oil Shortening

Butter, Butterblend and Bakers Margarine

- Buckeye Z
- Gold'n Flavor Palm/Soy Table Grade Margarine W
- Old World Zero Trans Table Grade Margarine
- Coral NH White Margarine
- Gold'n Flavor Baker's Margarine (Palm/Soy)
- Smart Balance Butter Blend
- Ventura Cookie Dough Margarine (GMO free)
- Old World Zero Trans Bakers Margarine
- Victor NH Margarine
- BBS Z
- Bunge Donut Fry NT

Doughnut Fry Shortening

- Primex Z
- BBS Z
- Bunge Donut Fry NT
- Sans Trans Donut Fry P

Cake and Icing Shortening

- Cremol NH Icing Shortening
- Sweetex Z
- Alpine Z
- Hymo Z Emulsified Cake and Icing Shortening

Roll-in/Flake Shortening (Puff Pastry/Danish/Biscuit)

- Bunge NH Hi Ratio Roll In
- Bunge Biscuit Flake NH
- Golden Brands LP415NT Zero Trans Shortening Flake
- Golden Brands LP480NT Zero Trans Shortening Flakes

Roll-in/Flake Margarine (Puff Pastry/Danish/Croissant)

- Ventura NTF Puff Pastry Margarine
- Bunge Croissant NH Roll-in Margarine
- Ventura Pastry Margarine
- ZT Puff Pastry Margarine (Con Agra)

Fry Oils and Shortenings - 0 grams trans fat

- Fry Chef
- SansTrans Fry HD-50
- Old World Trans Free Liquid Margarine
- Palm Oil