The nutritional properties of palm oil

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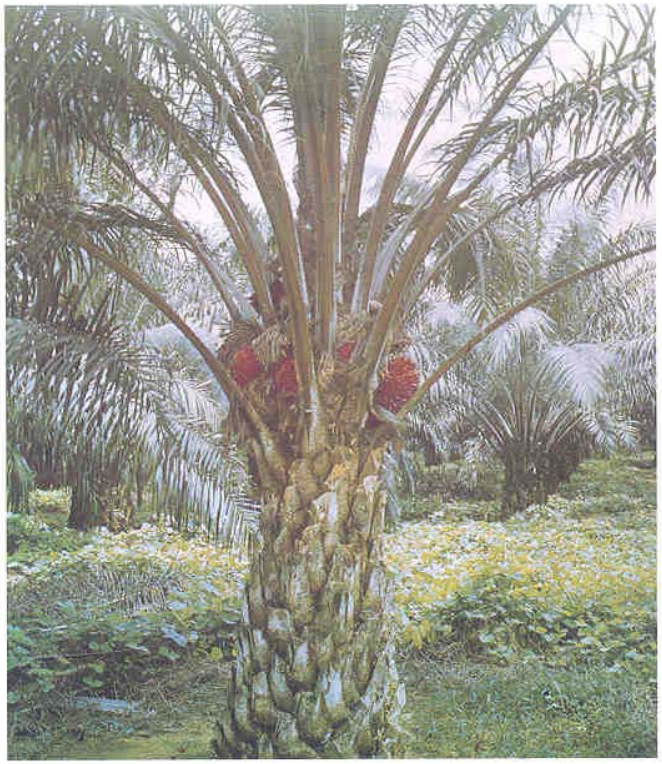
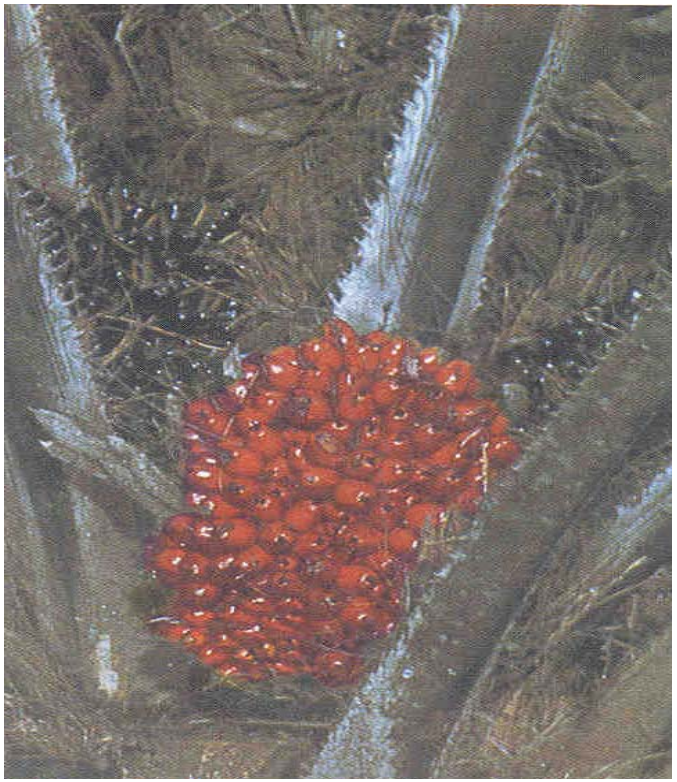
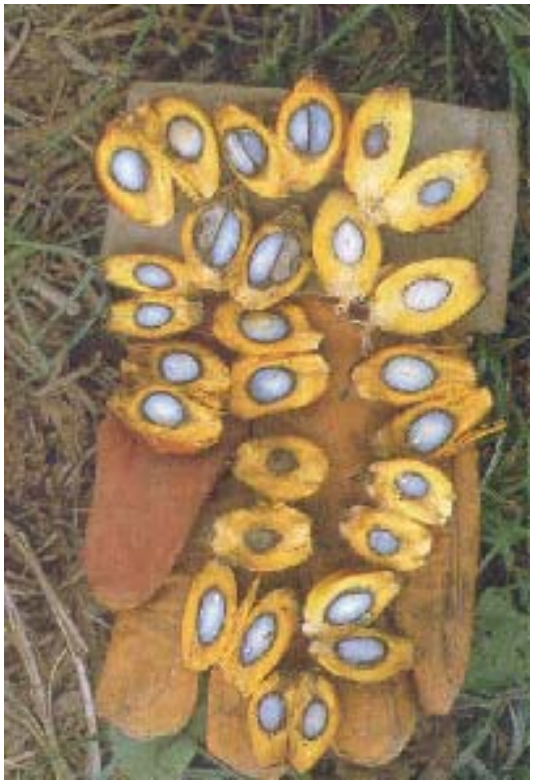
King's College London

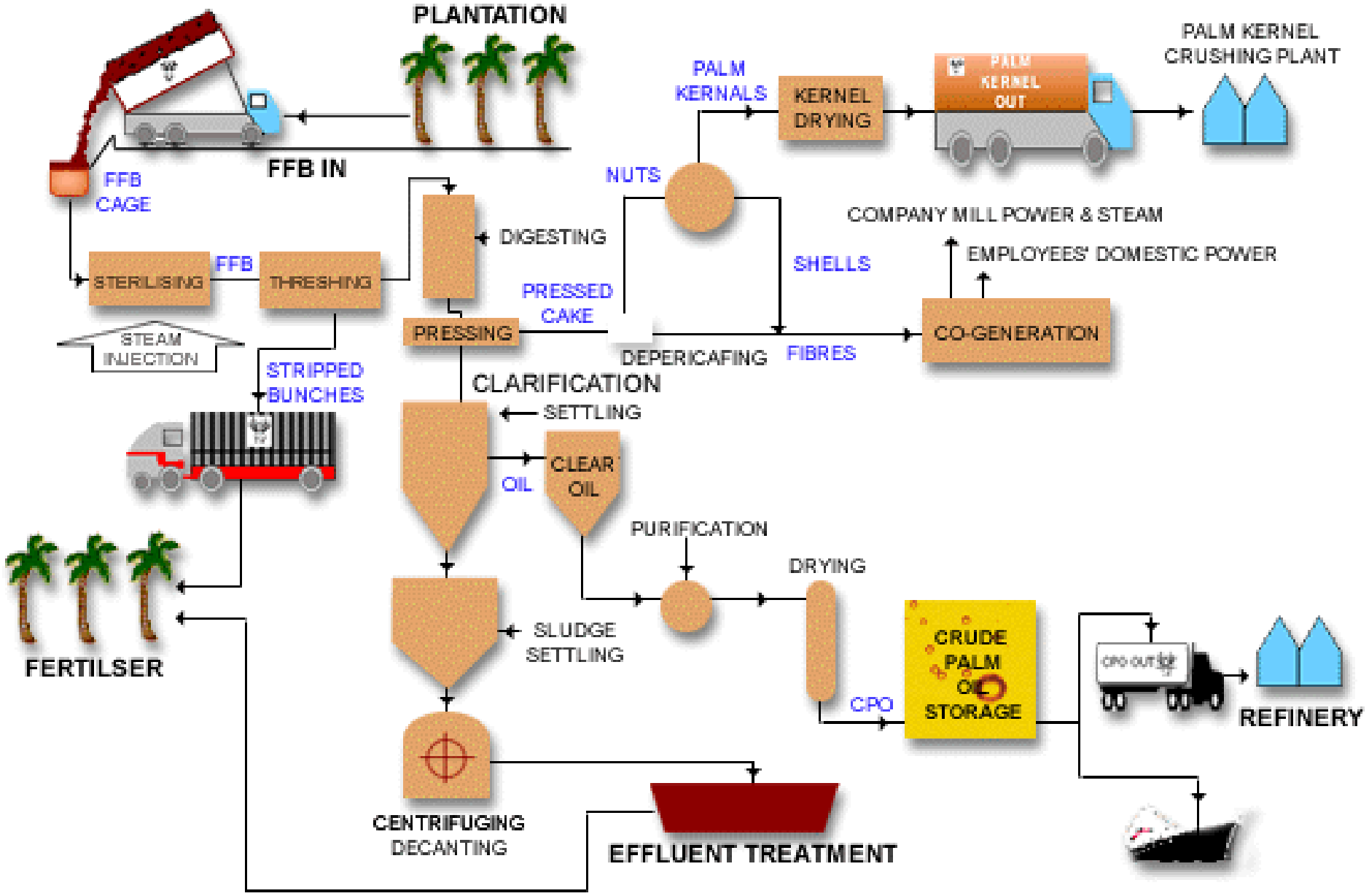
Palm Tree and Fruit







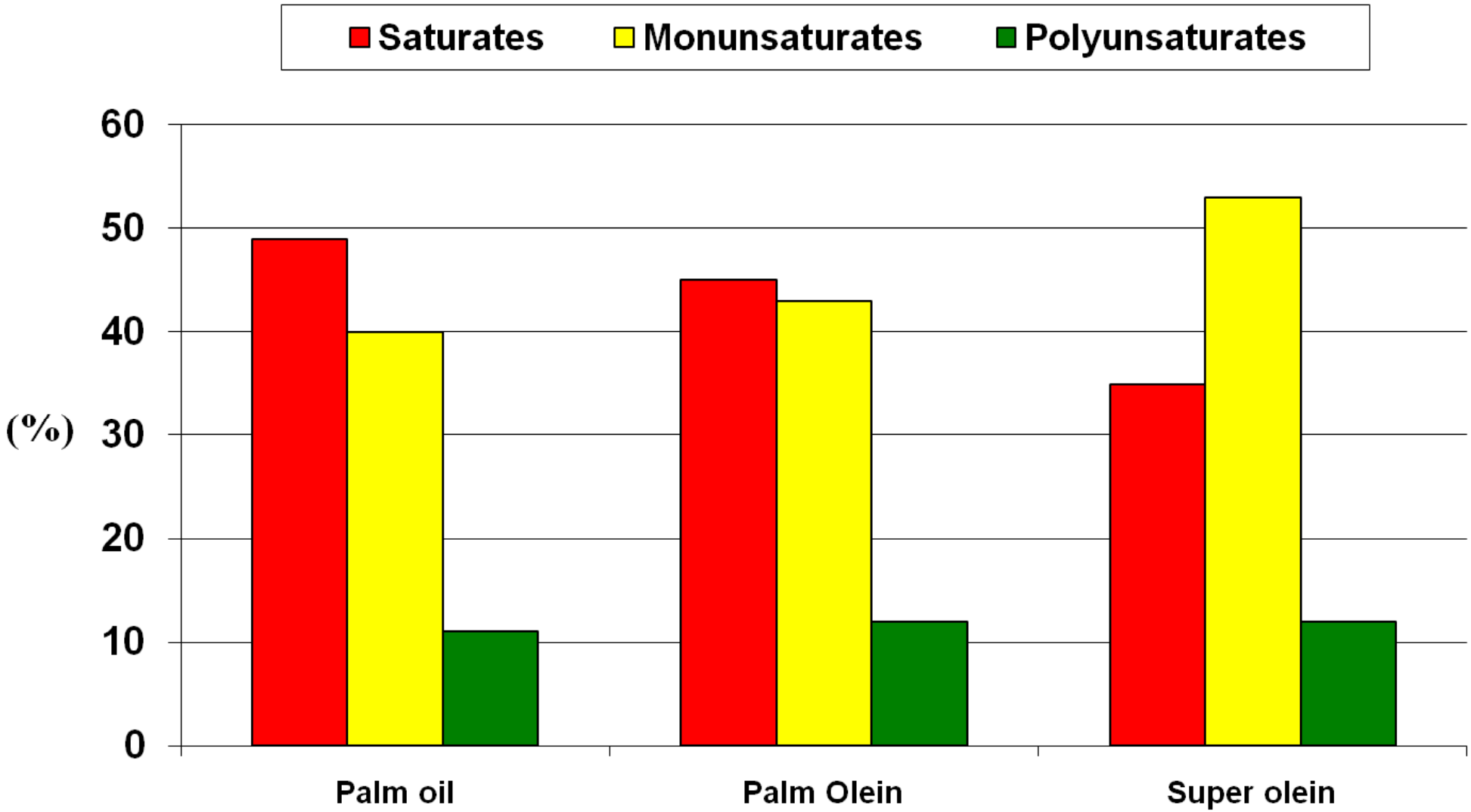
Crude Palm Oil Milling Process



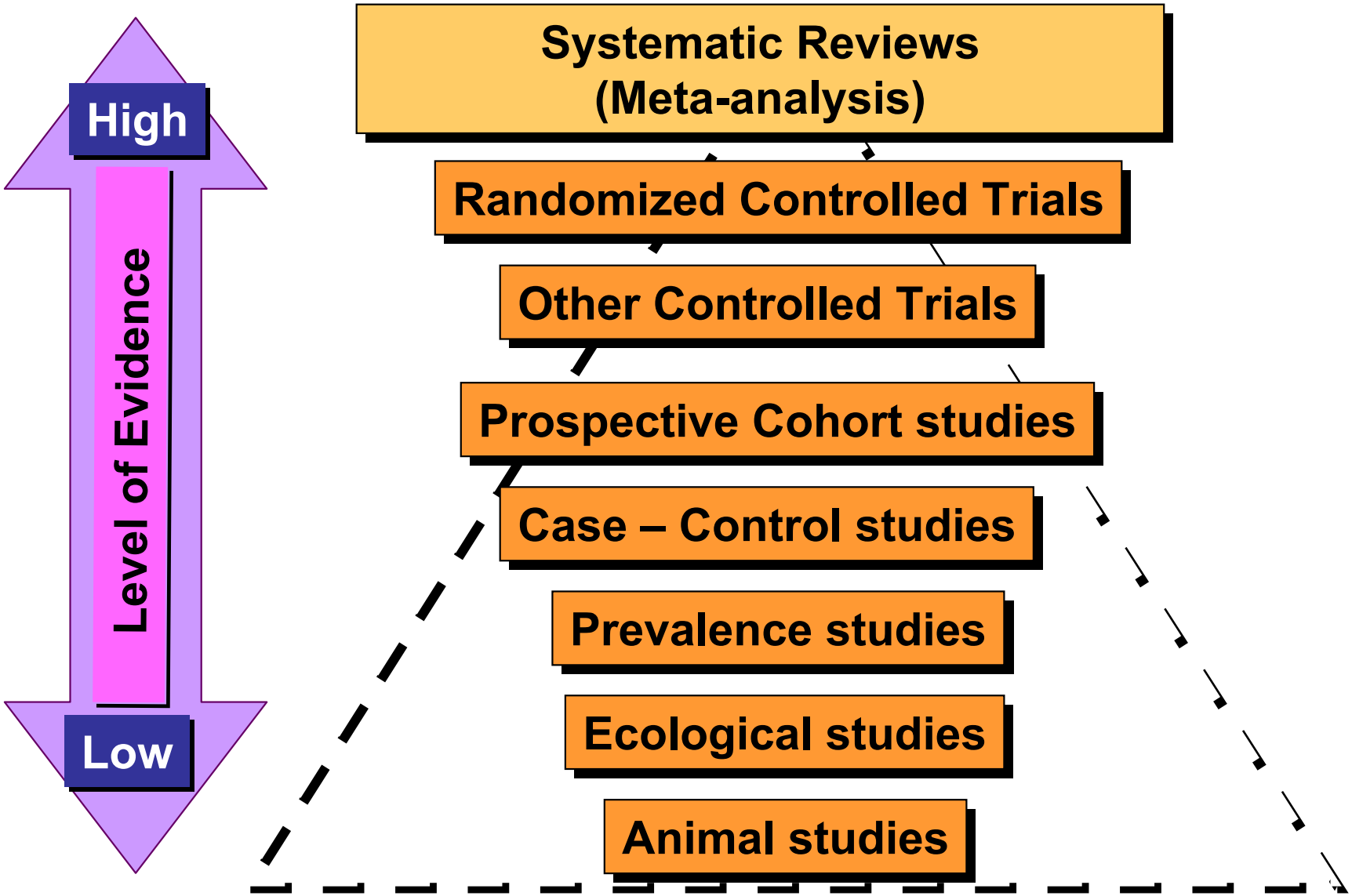
Palm oil

- Palm (mesocarp) oil
  - Crude palm oil – high beta-carotene
    - Refined palm oil – low in beta-carotene
      - Palmolein
      - Super palmolein
  - Palm kernel oil
    - High in medium chain fatty acids

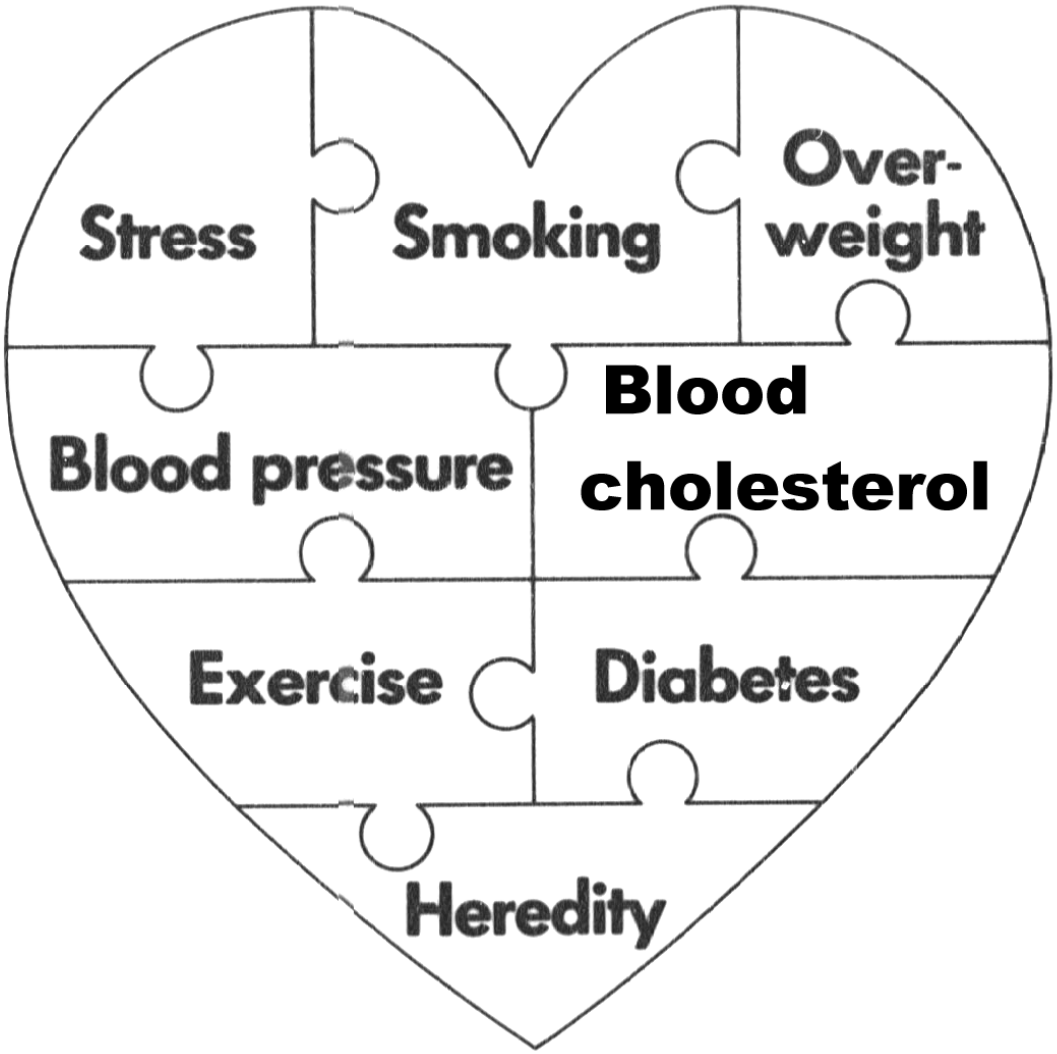
Palm oil and fractions



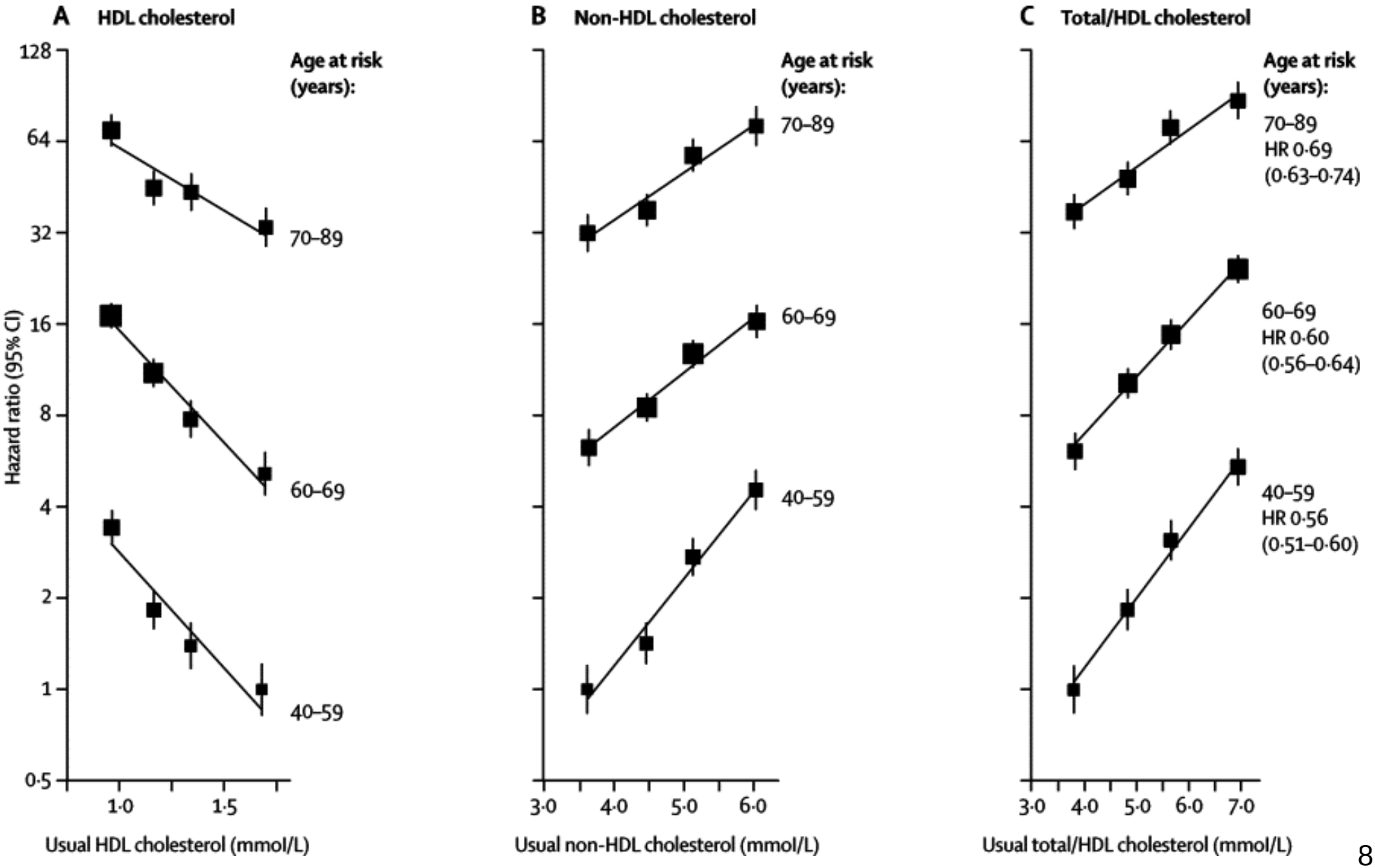
Hierarchy in Scientific Evidence



The Risk Factors



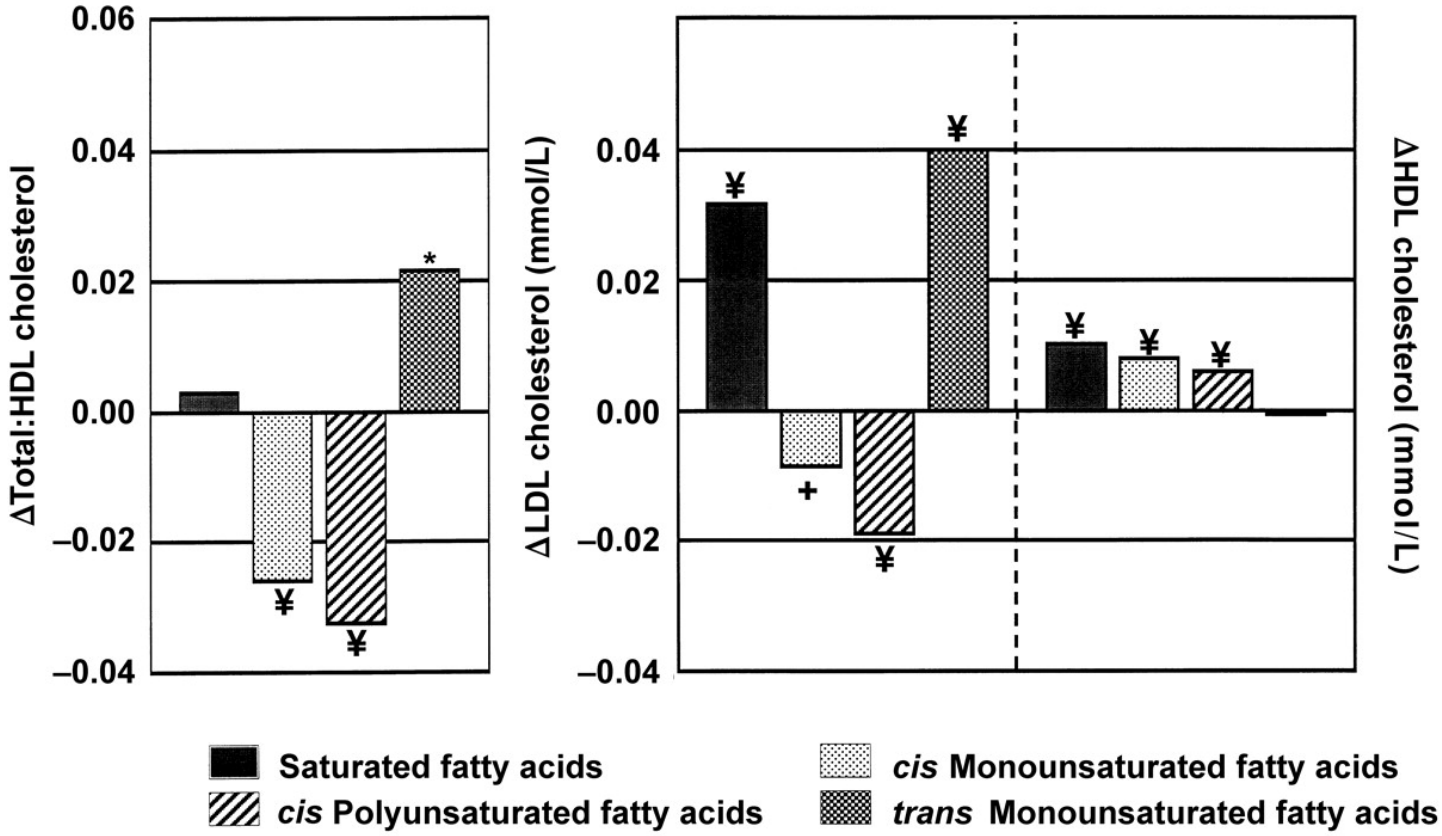
Blood lipid metrics of risk of CHD



Prospective Studies Collaboration. Lancet 2007;9602:1829-1839

The American Journal of Clinical Nutrition

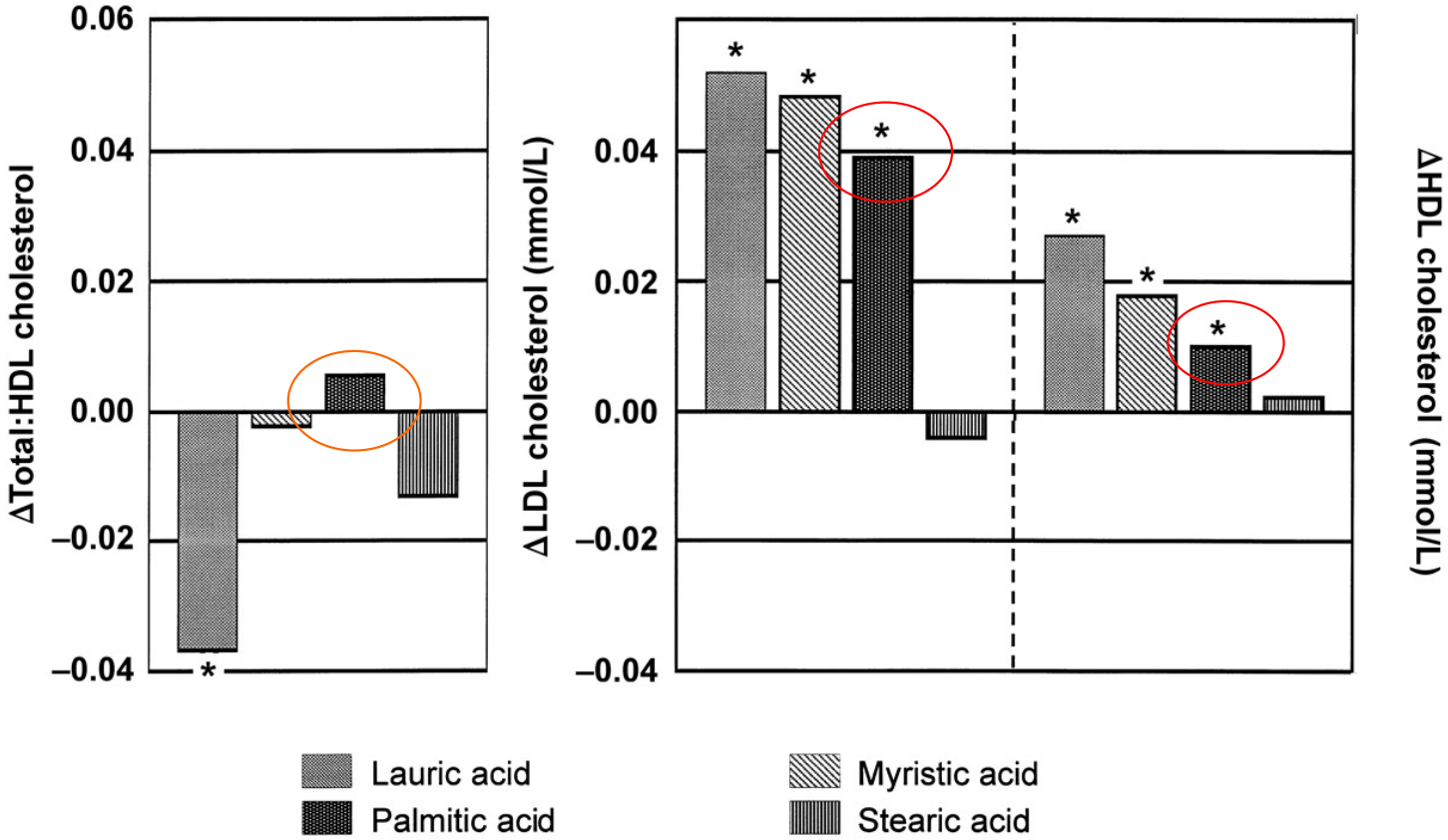
Predicted changes (Δ) in the ratio of serum total to HDL cholesterol and in LDL- and HDL-cholesterol concentrations when carbohydrates constituting 1% of energy are replaced isoenergetically with saturated, cis monounsaturated, cis polyunsaturated, or trans monounsaturated fatty acids



Mensink, R. P et al. Am J Clin Nutr 2003;77:1146-1155

The American Journal of Clinical Nutrition

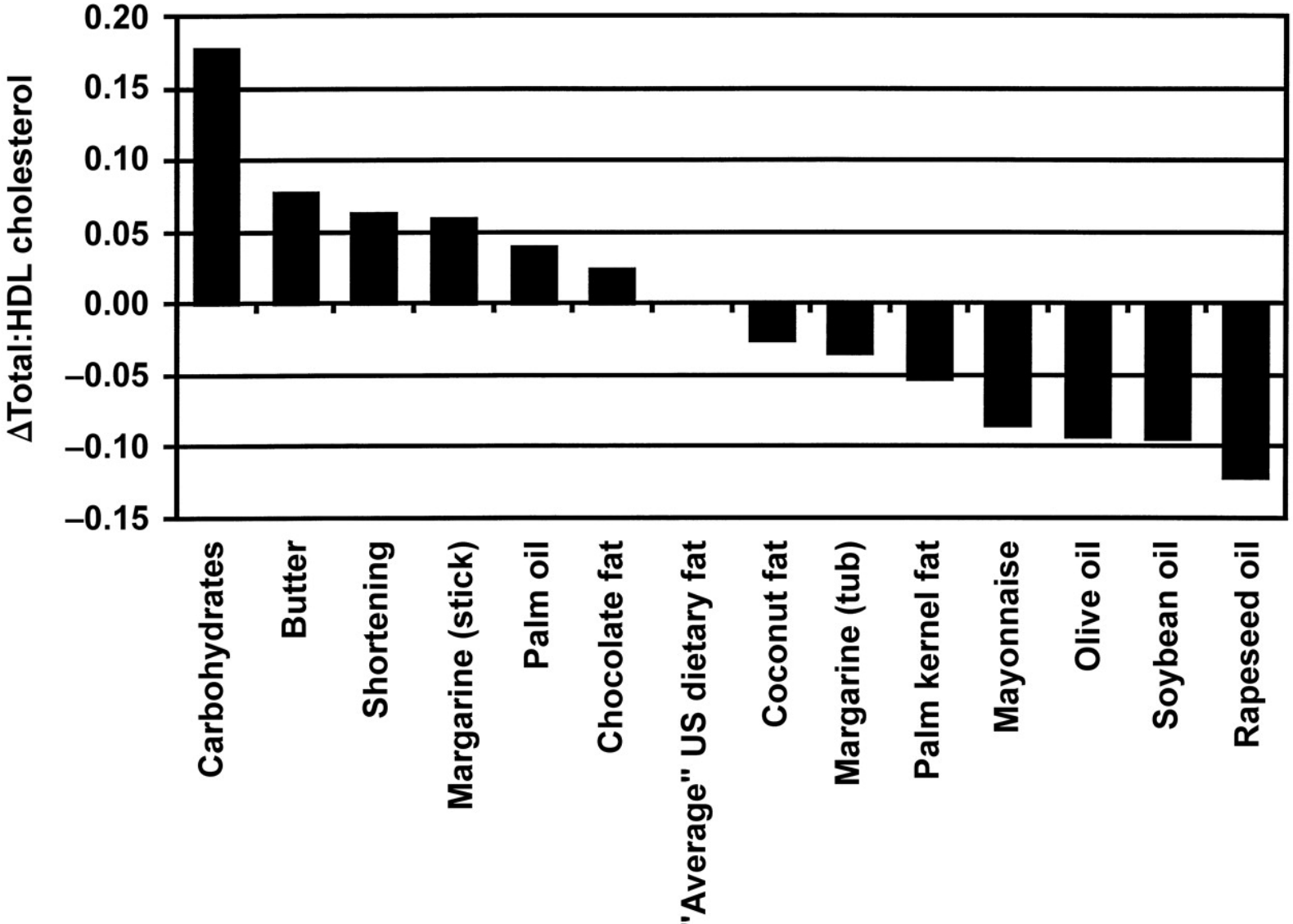
Predicted changes in the ratio of serum total to HDL cholesterol and in LDL- and HDL-cholesterol concentrations when carbohydrates constituting 1% of energy are replaced isoenergetically with lauric acid (12:0), myristic acid (14:0), palmitic acid (16:0), or stearic acid (18:0)



Mensink, R. P et al. Am J Clin Nutr 2003;77:1146-1155

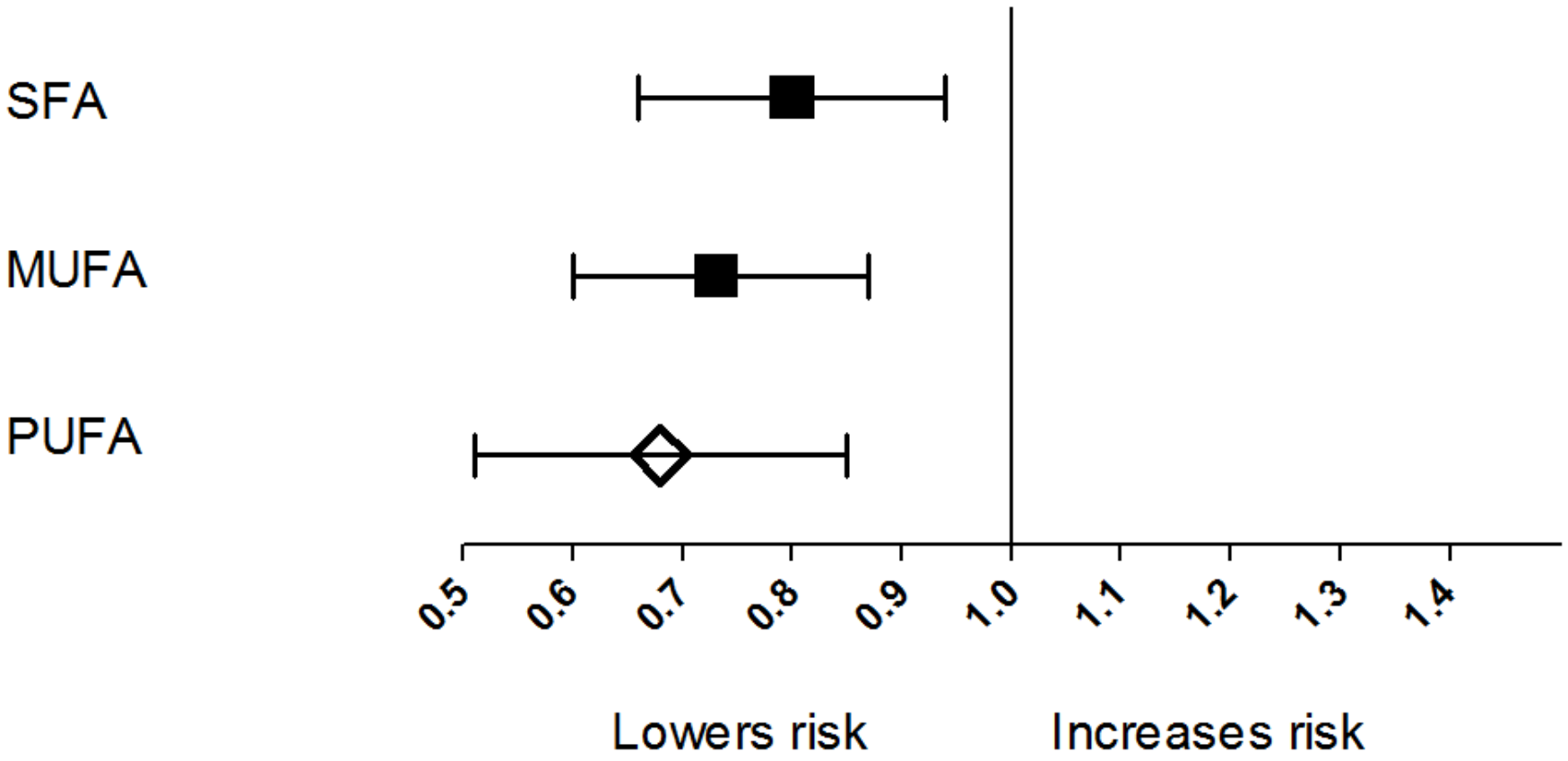
Predicted changes (Δ) in the ratio of serum total to HDL cholesterol when mixed fat constituting 10% of energy in the "average" US diet is replaced isoenergetically with a particular fat or with carbohydrates

The American Journal of Clinical Nutrition



Mensink, R. P et al. Am J Clin Nutr 2003;77:1146-1155

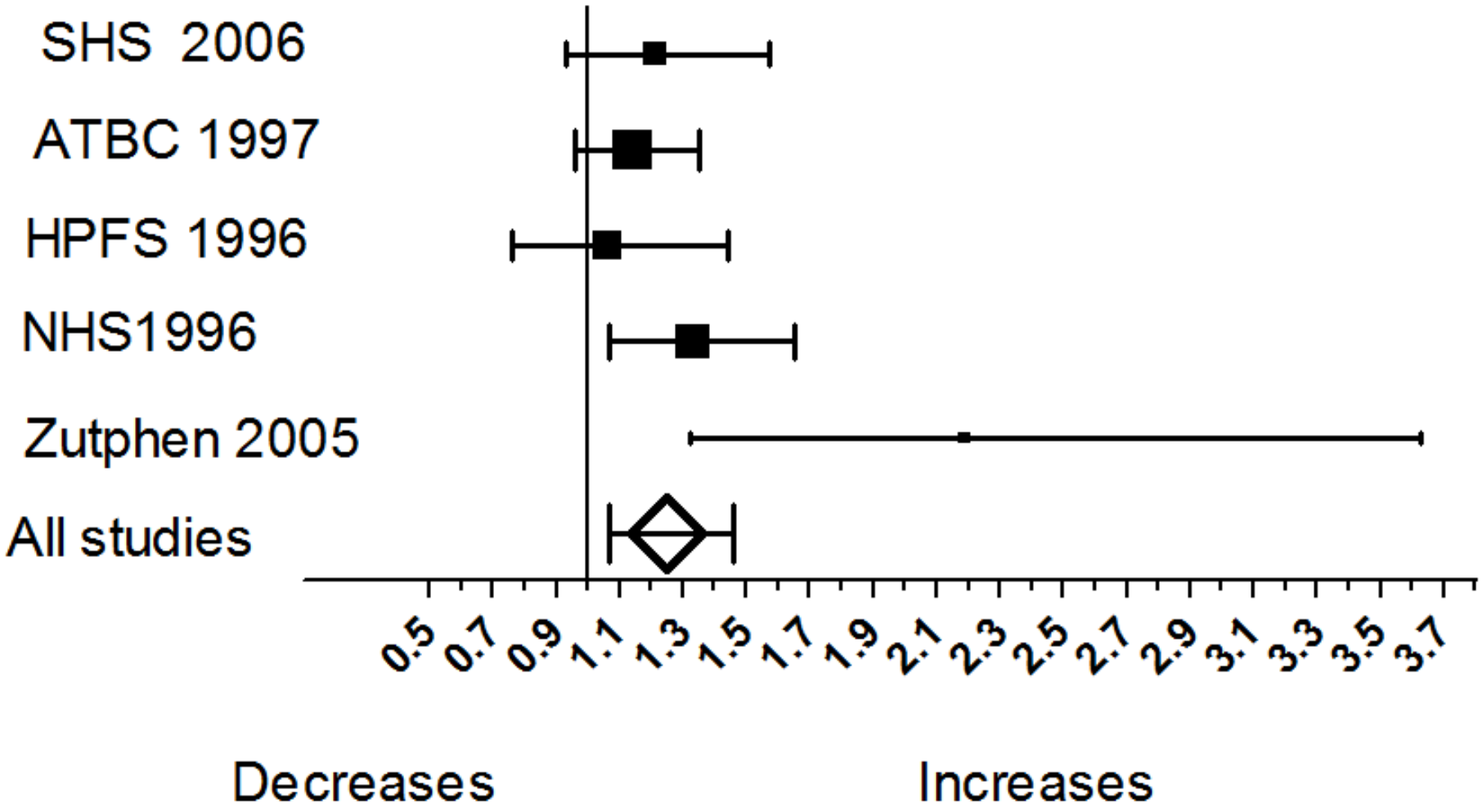
Effect on risk of CHD events of replacing 5% energy saturated fatty acids from pooled analysis of 11 cohort studies



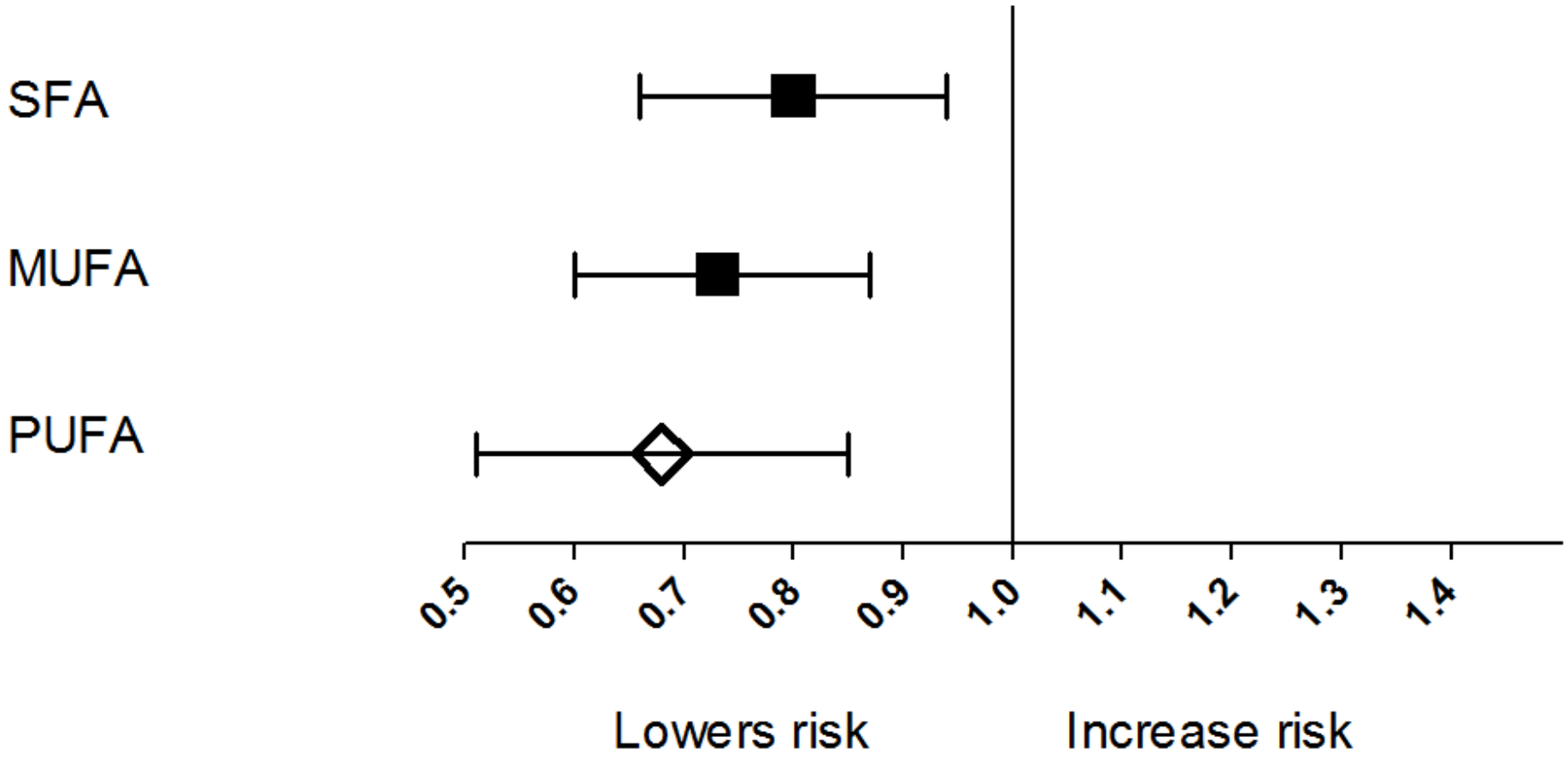
Jakobsen M et al. Am J Clin Nutr 2009;89:1-8.


HELLO
SAT
HELLO
TRANS

Meta-analysis of trans fatty acids on risk of CHD events



Replacing 2% trans fatty acids with saturated or unsaturated fatty acids reduces risk of CHD



WHO/FAO 2009

The technical need for high melting point fats

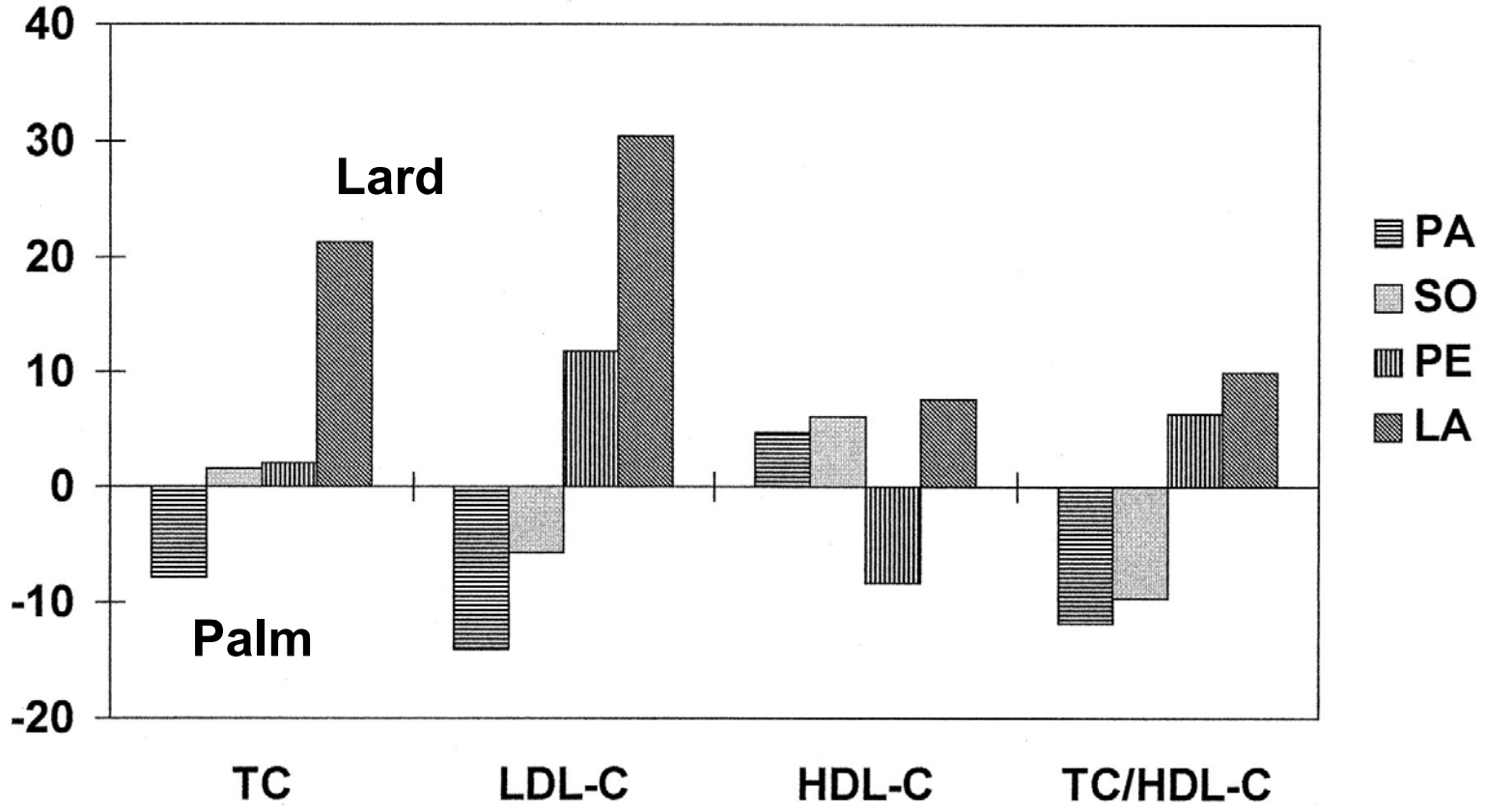
- Bakery products
- Spreads

Sources of high melting point fats

- Animal fats – lard/butter/ suet (cholesterol, trans in ruminant fats)
- Partially hydrogenated vegetable oils (trans 15-50% fatty acids)
- Fully hydrogenated and inter-esterified vegetable oils (low trans, high stearic acid rich, but not clean label)
- Palm oil fractions

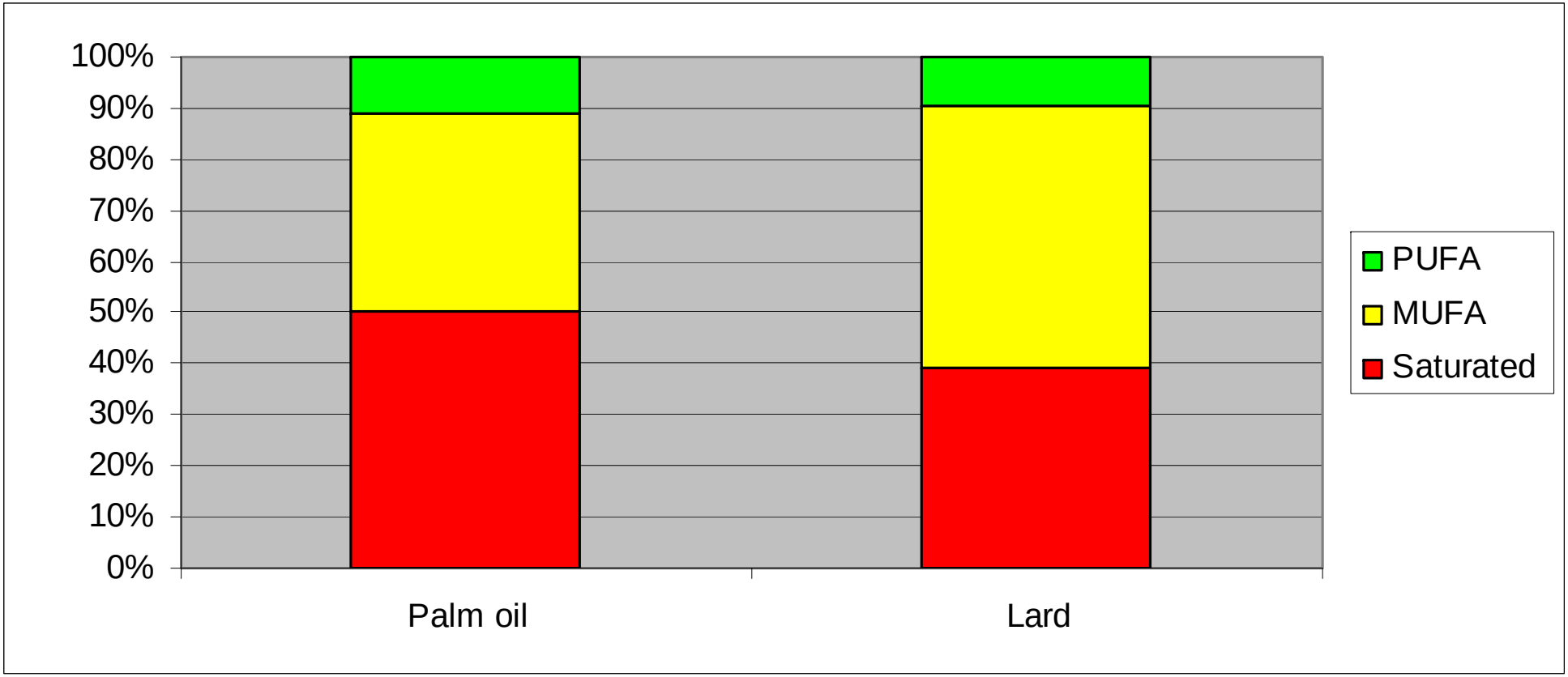
Comparison of palm oil (PA), soybean oil (SO)peanut oil (PE) and lard (LA) on plasma lipids

JN THE JOURNAL OF NUTRITION



Zhang, J. et al. J. Nutr. 1997;127:509S

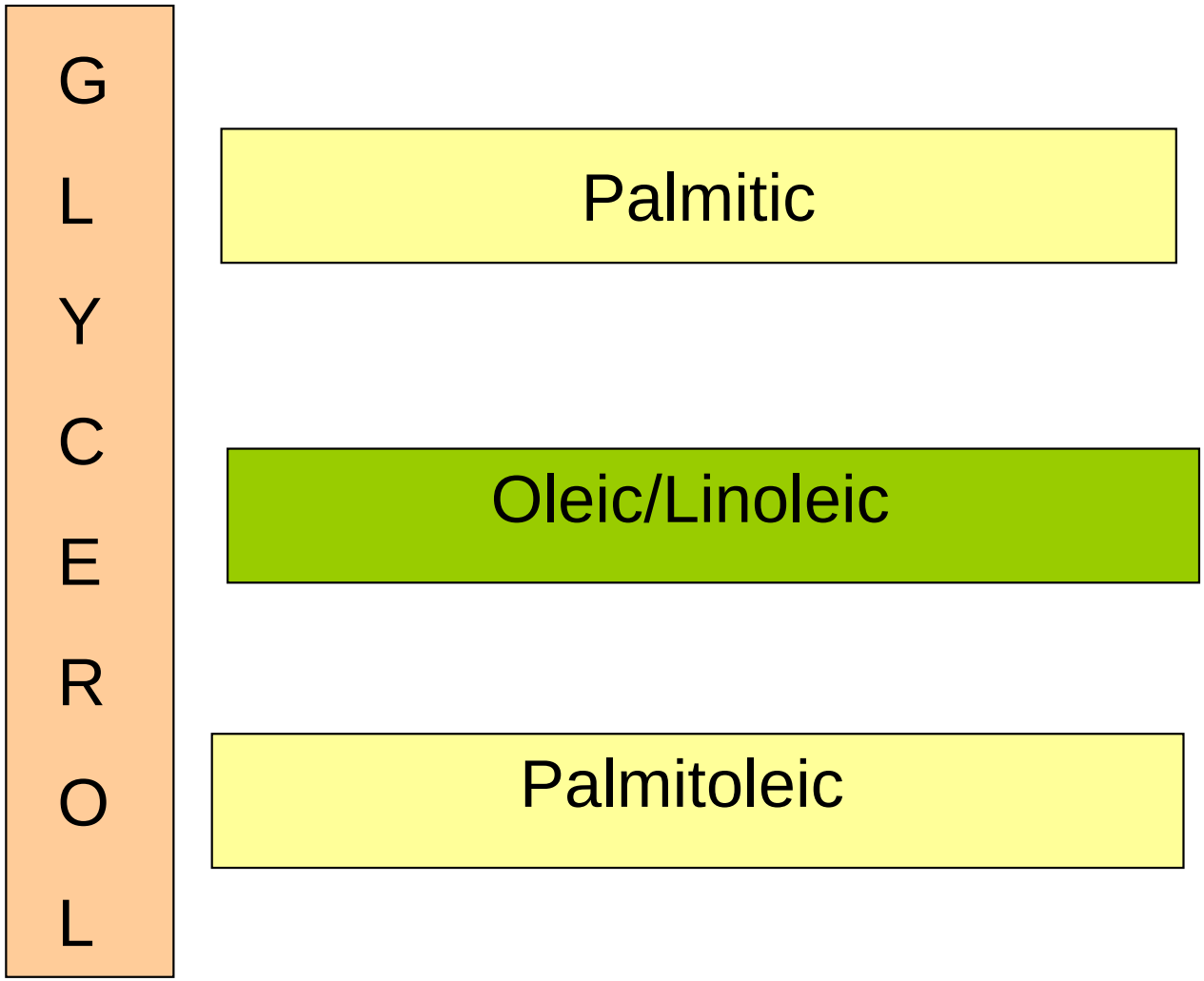
Palm oil vs Lard



The fats differ mainly by the position of saturated fatty acids.

In palm oil they are in the sn-1 and sn-3 position whereas in lard they are in the sn-2 position

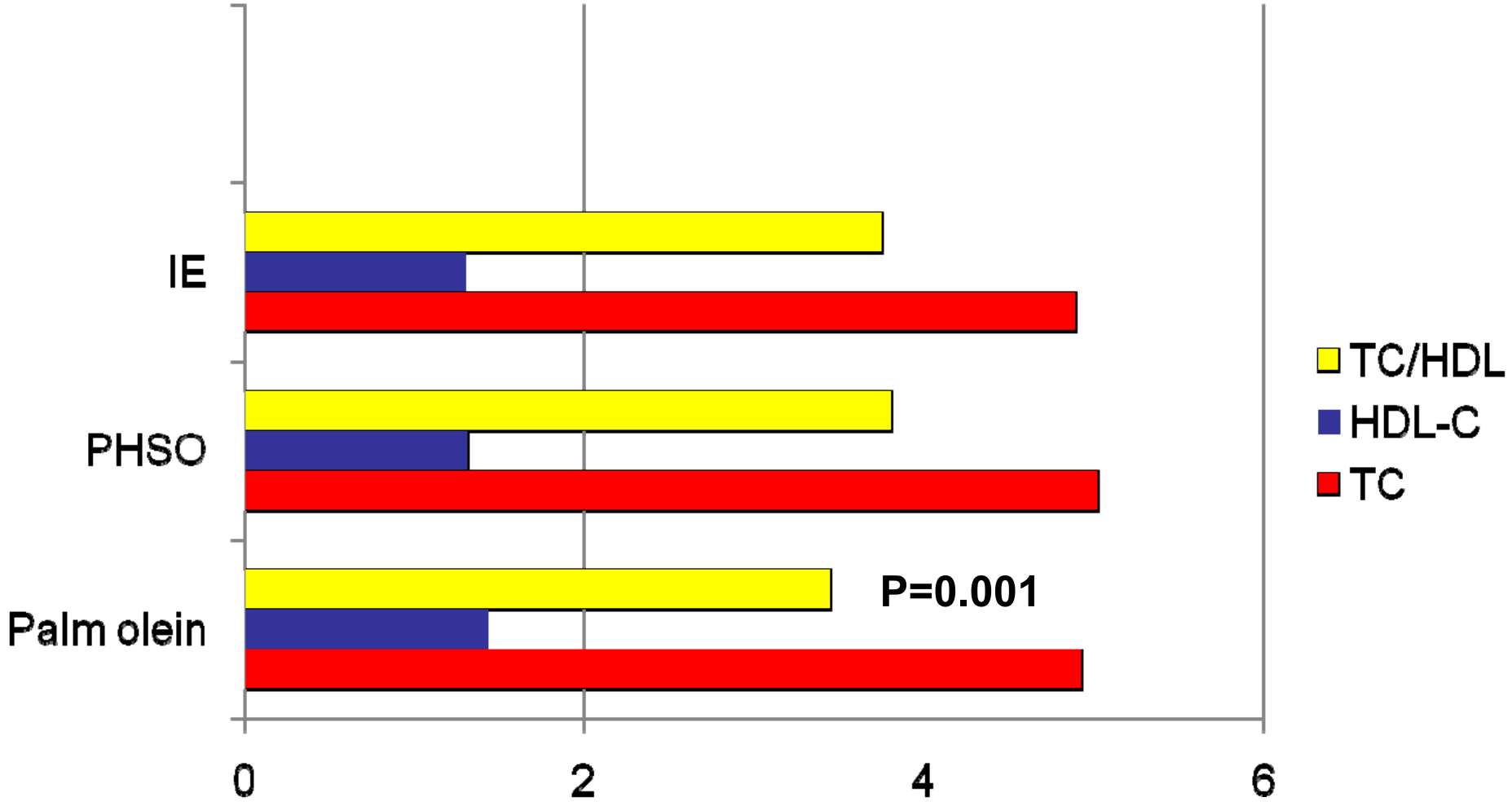
Palm oil



The sn-2 hypothesis

- “The adverse health effects of animal sources of saturated fatty acids are a consequence of the high proportion of saturated fatty acids in the sn-2 position”

Comparisons of palm olein with partial hydrogenated soybean oil and fully hardened (PHSO and interesterified soybean oil (IE) on plasma total cholesterol (TC), HDL cholesterol (HDL-C) and the TC/HDL ratio



Sundram et al. Nutrition & Metabolism 2007, 4:3doi:10.1186/1743-7075-4-3

Summary of effects of palm oil on blood lipids and risk of CHD

- The blood cholesterol raising effects of palm oil fractions are lower than predicted from their fatty acid composition
- Palm oil fractions increase HDL cholesterol compared with carbohydrate or trans fatty acids
- The effects of replacing 5% energy as palm oil in the diet is unlikely to influence risk of CHD