

Foods with a high fat quality are essential for healthy diets

**Dr. H. Zevenbergen
Unilever Research&Development**

Agenda

- Main dietary sources of fat
- Basic technology and production of oils, margarines and cooking products
- Improving their nutritional characteristics
- Impact of modern fat and oil products on diet and health
- Conclusions



Main dietary sources of fat

Many different fat-rich products

- Primary:
 - Vegetable/plant oils
 - Butter/milk fats
 - Lard/tallow/suet/dripping (derived from animals)
 - Marine
- Secondary: (made from one or more of the above)
 - Margarine, Melanges, Reduced fat spreads
 - Butter and Ghee
 - Vanaspati
 - Cooking fats/white fats/shortenings
 - Mayonnaise

Main dietary sources of fat

- Major contributors to intake of saturated fat

- Dairy (cheese, butter, milk)
- Meat
- Baked goods and snacks
- Cooking fats/oils

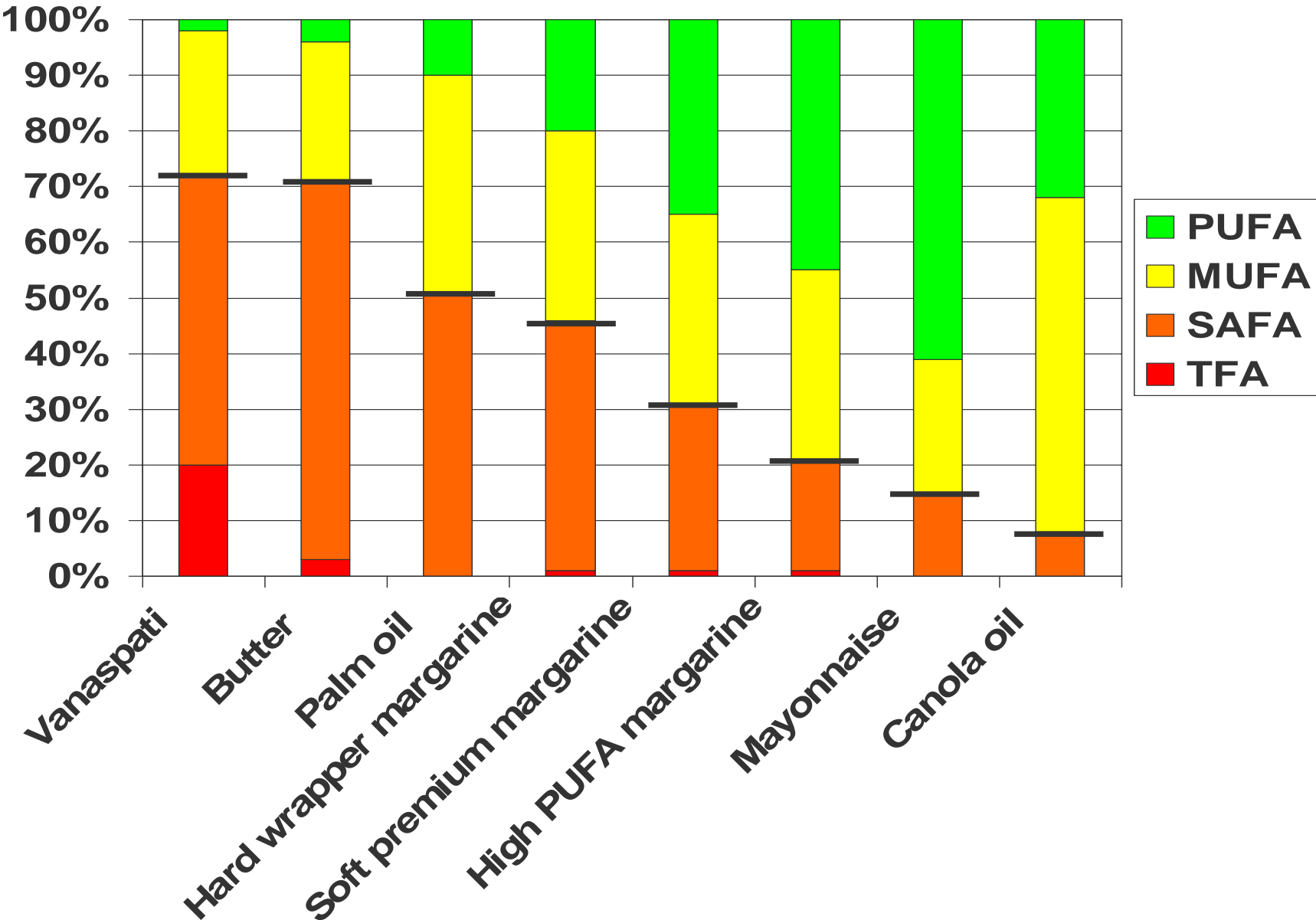


- Major contributors to intake of polyunsaturated fat

- Vegetable oils
- Margarines and mayonnaise

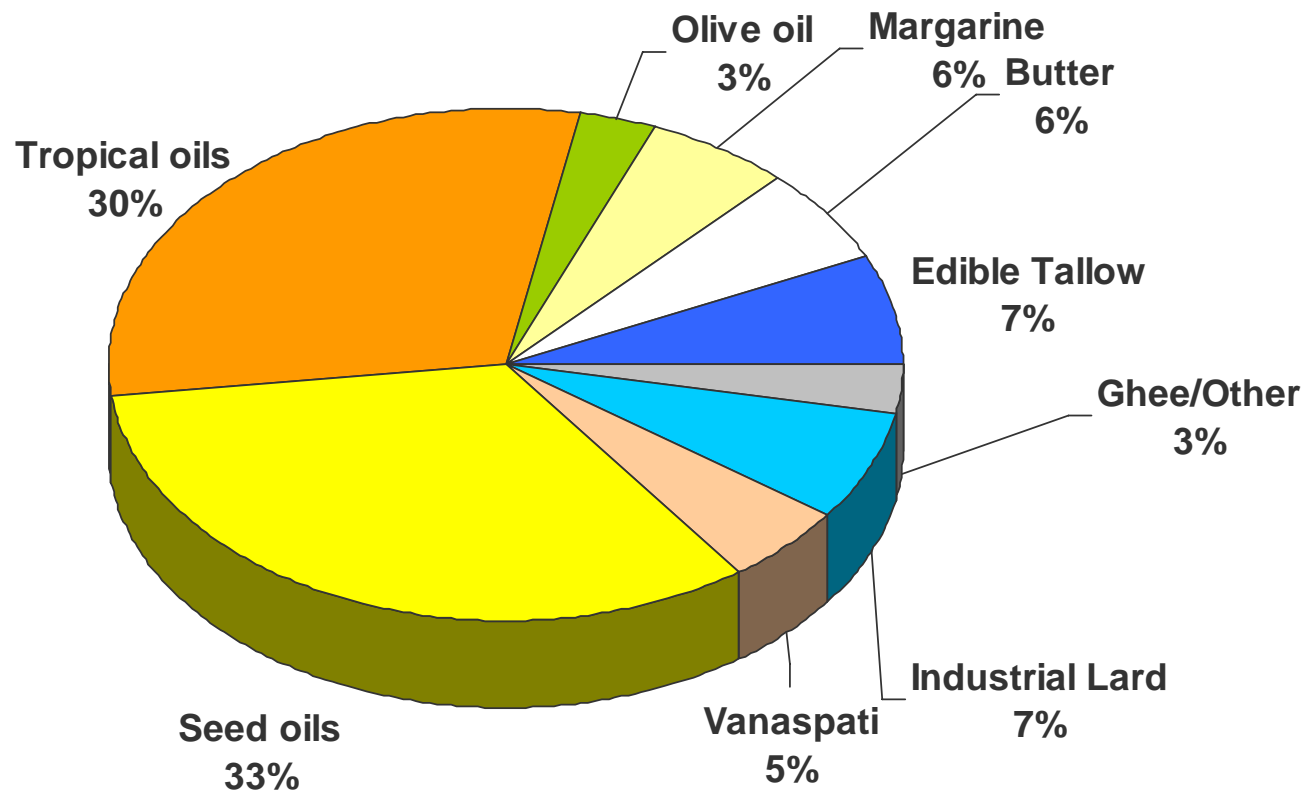


Fatty acid composition of common fat rich products



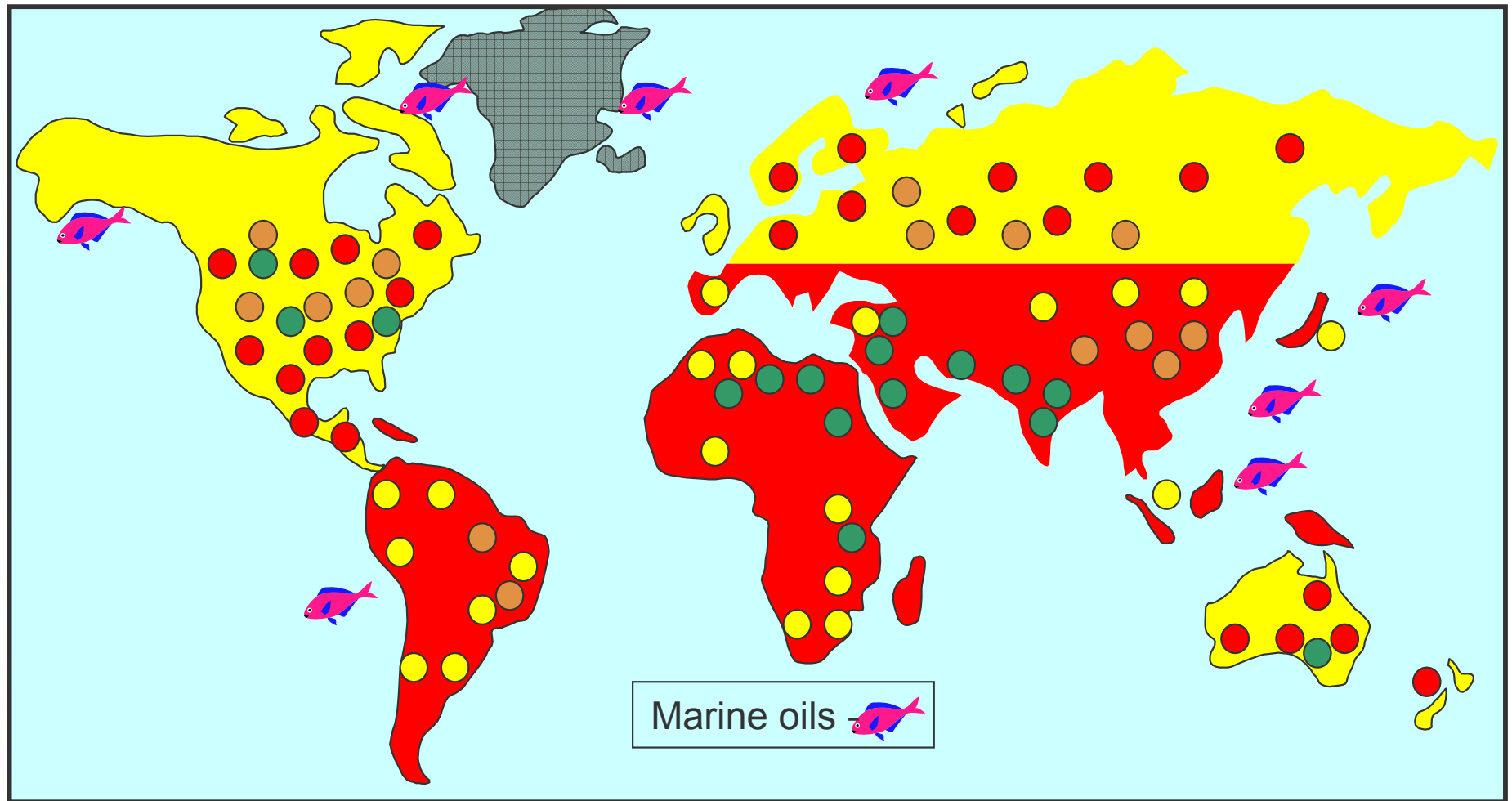
Oils and fats in perspective

**6.5 b people consume about 120 m tons pa
That is almost 20 kg per capita**



Annual value of oils and fats market over €120b

Regional consumption patterns



Liquid Oils - ●

Lard - ●

Ghee/Vanaspati/Cooking - ●

Margarine/Butter - ●



**Basic technology and
production of oils,
margarine and cooking
products**



Vegetable oil sources

Soybean oil



Sunflower oil



Canola oil



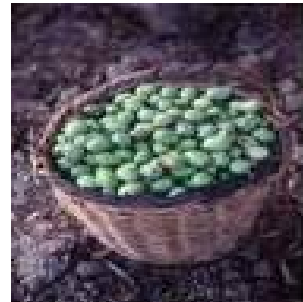
Corn oil



Palm Oil



Olive Oil



Coconut Oil



Vegetable oil products - farm to table

agriculture



oil milling



crude oils
and fats

selective
removal of
undesirable
components

**OIL
PROCESSING**

Table oil



Mayonnaise



Margarine



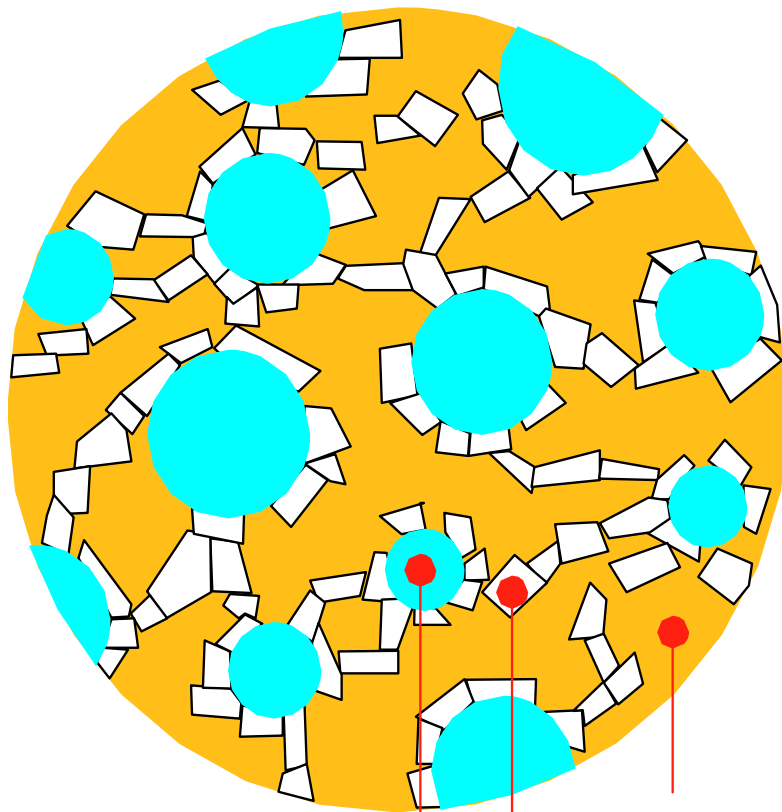
modification
of the
physical
properties



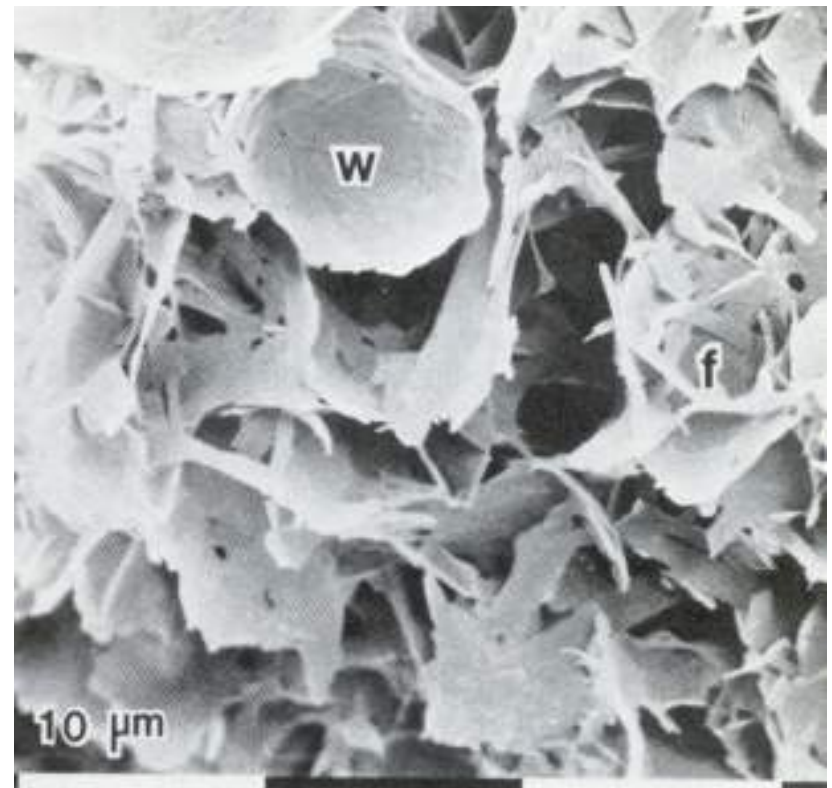
consumer

What is a margarine ?

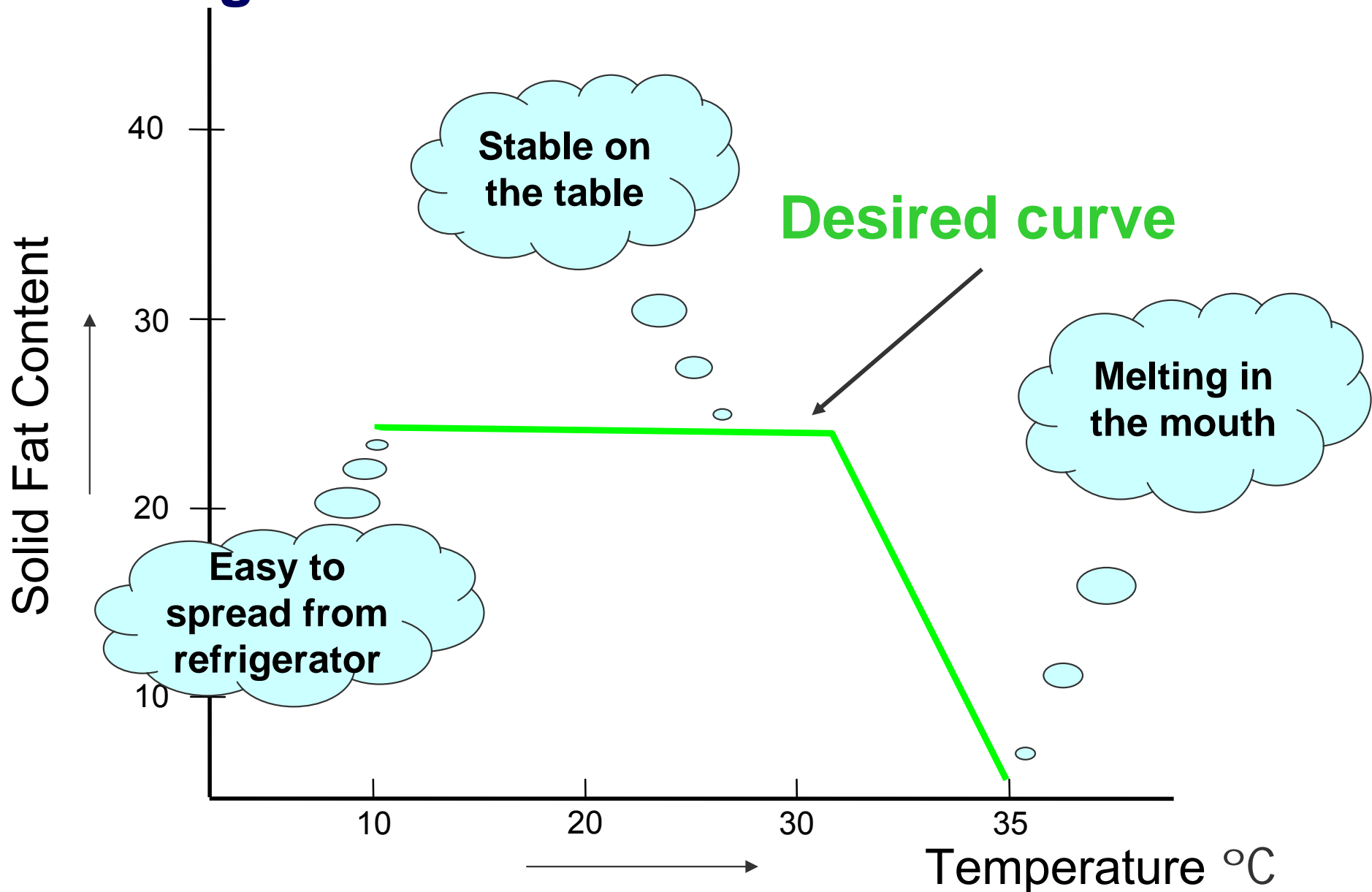
A structured water-in-oil emulsion with properties like spreadability, stability and mouthfeel



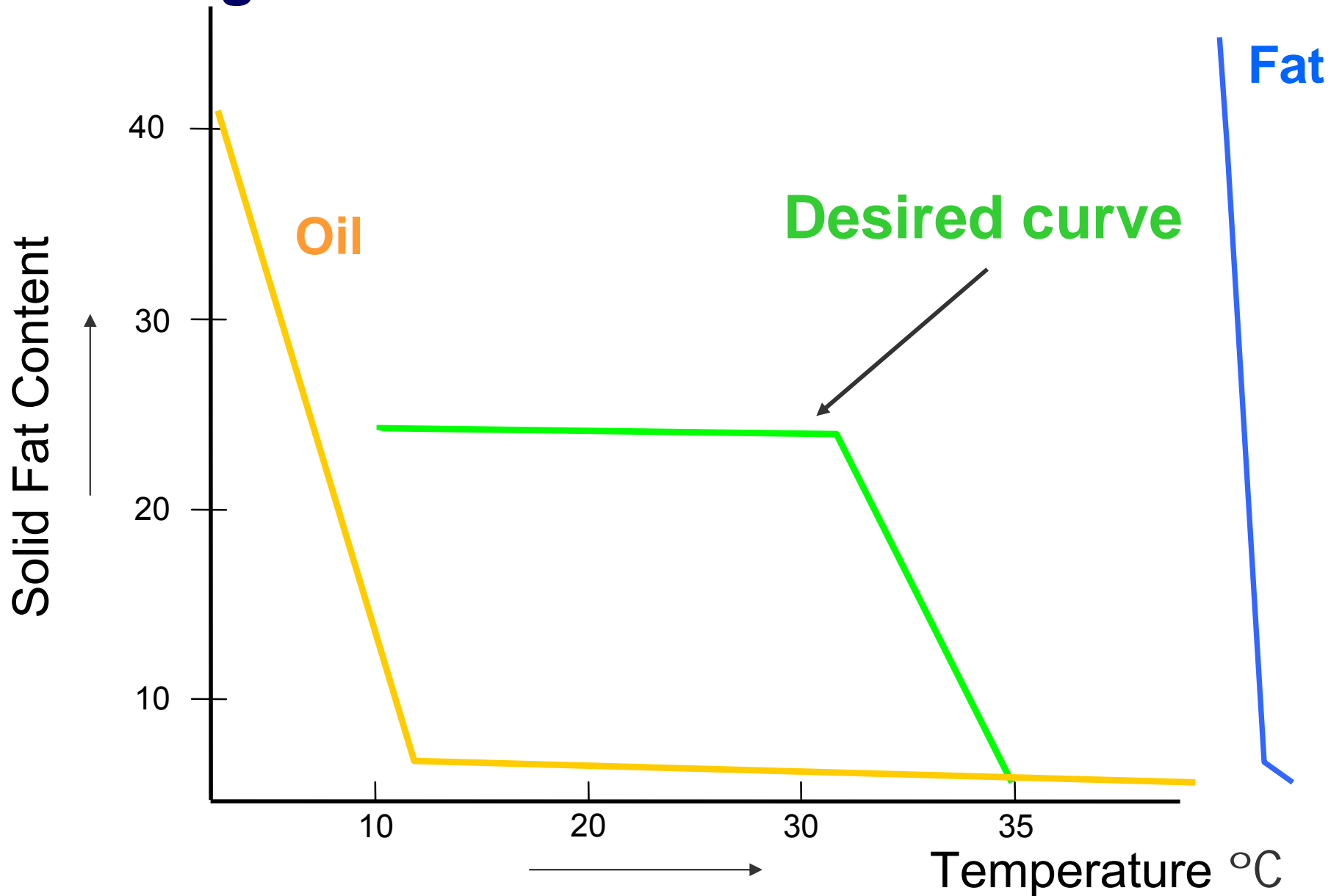
liquid oil
fat crystals
water droplets



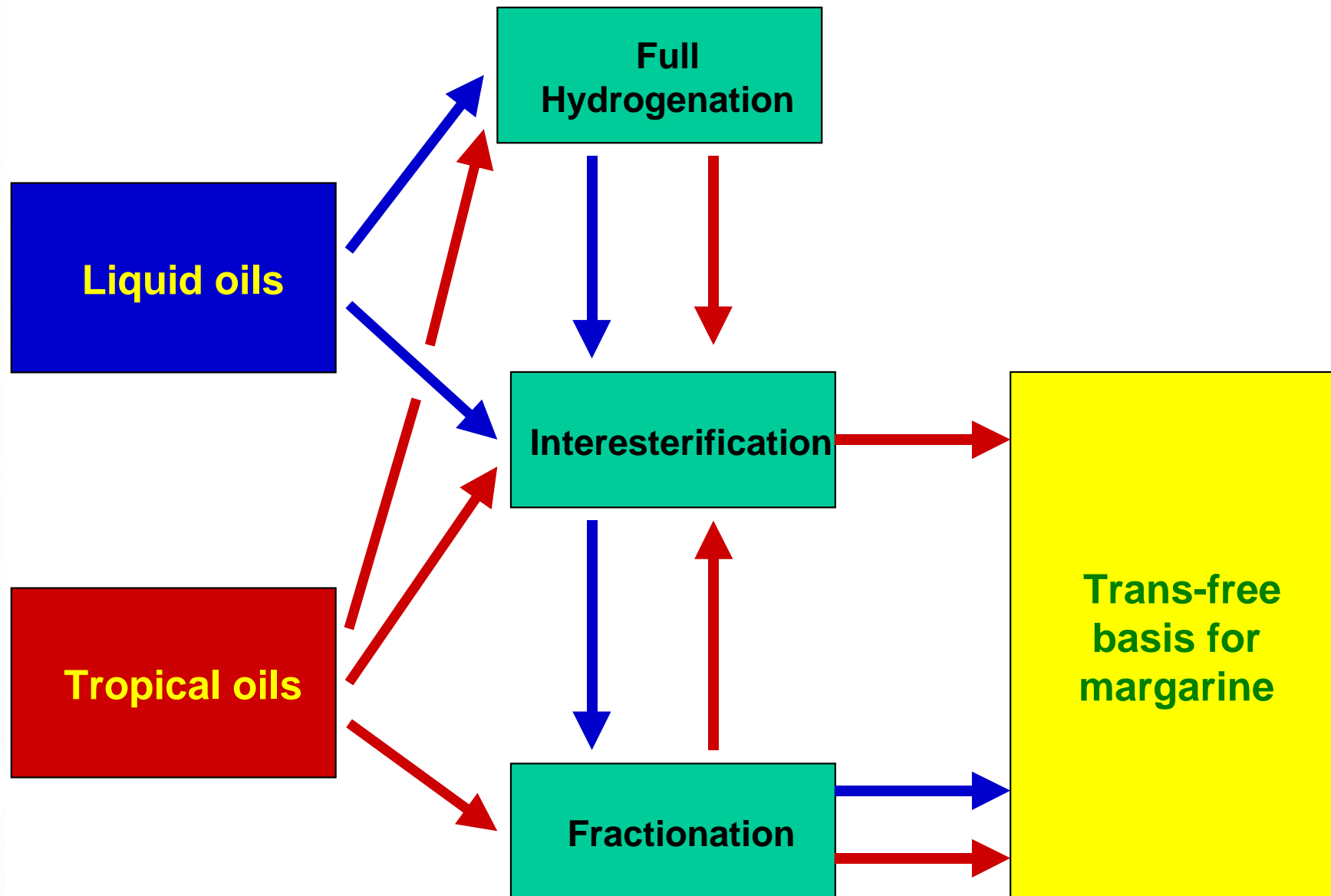
Consumer requirements of solid fat content in margarine



Consumer requirements of solid fat content in margarine



Modifications and blending of oils for optimal margarines



Modification of natural fats and oils

Partial or full hydrogenation

cis-unsaturates →



trans-unsaturates →

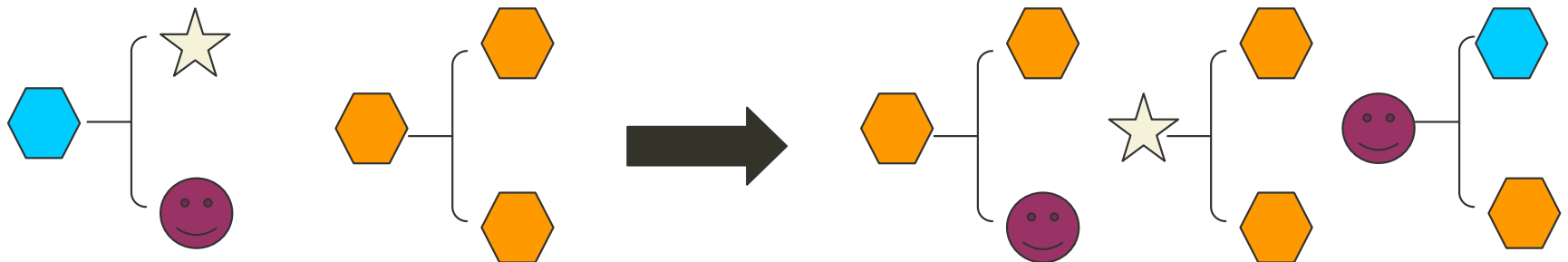


saturates




→ Full hydrogenation does not lead to trans !

Interesterification



→ Interesterification leads to rearrangement of the fatty acids on the glycerol backbone

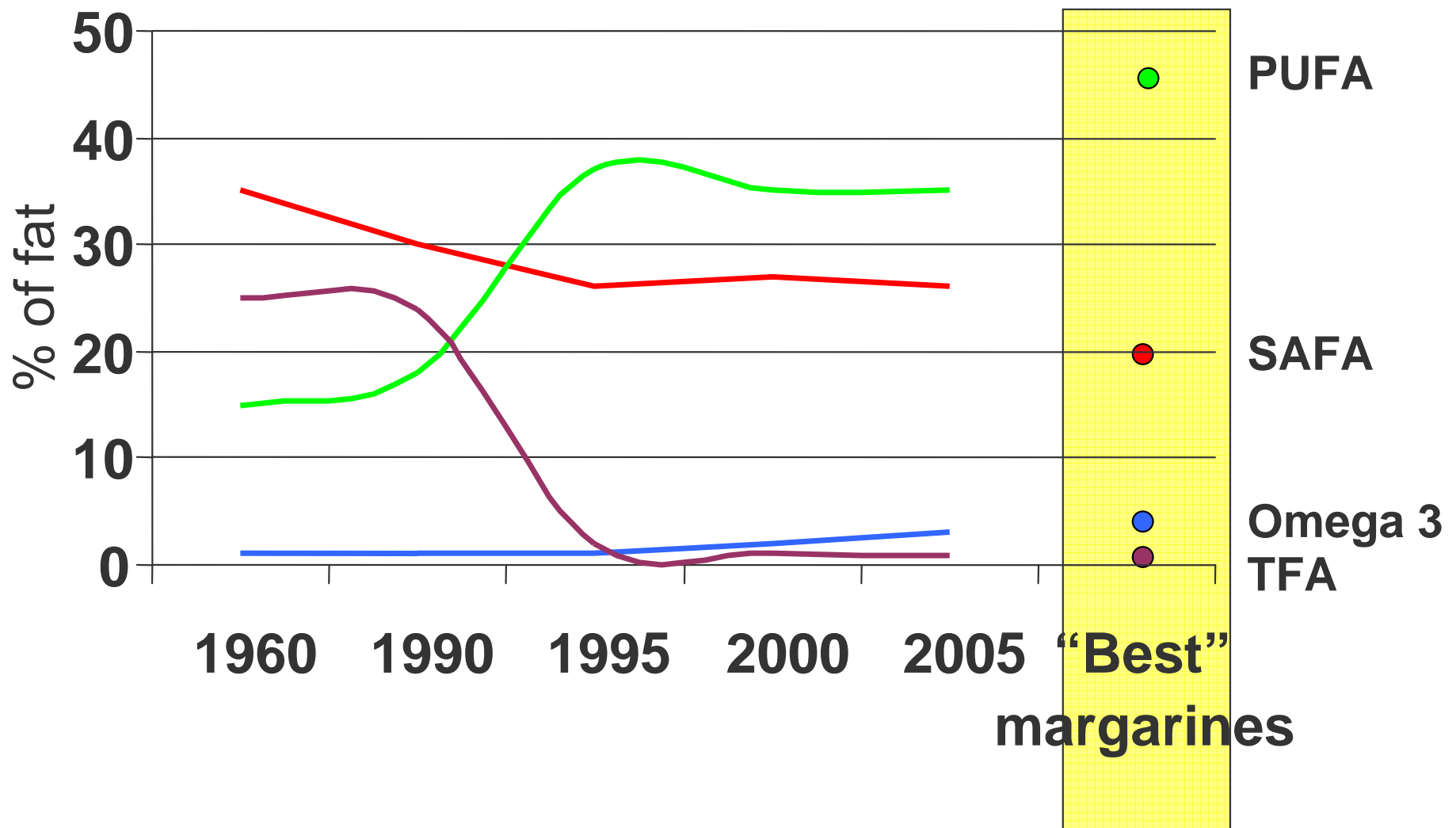
The image features a variety of glass containers filled with yellow oils. From left to right, there is a small vial, a tall rectangular bottle, a standard glass bottle, a wine-style bottle, and a glass pitcher. The background is white with a decorative yellow and white swirl pattern on the left side. The text is centered over the bottles.

Improving the nutritional characteristics of products made from oils and fats

Drivers of nutritional improvements for food industry

- Replace SAFA by MUFA or preferably PUFA
- Practically eliminate TFA
- Ensure delivery of essential Omega 3 and 6
- Fortify with fat soluble vitamins A and D
- Preserve natural antioxidants (e.g. vit E)

Improvements in margarine



Trans fat removal: example of industry action for better health

Special Article

Nutrition Reviews®, Vol. 64, No. 6

June 2006: 275–279

The Elimination of Trans Fats from Spreads: How Science Helped to Turn an Industry Around^a

Onno Korver, PhD, and Martijn B. Katan, PhD

- Based on reports showing an untoward effect of trans on blood lipids in 1990 (studies sponsored by Unilever) Unilever started an extensive development program
- Margarines with very low trans fat content were developed 1993
- Implemented by 1995 in most regions using tropical oils and in US with non – tropical oils.
- Unilever led; most of industry followed

Normal heating does not affect the nutritional quality of oils

- shallow frying for 20 mins at 150-180 C
 - Relative loss of linoleic acid < 1% and α -linolenic acid < 2%
 - No formation of trans-isomers



→ As long as excessive temperatures are avoided, EFA survive cooking.

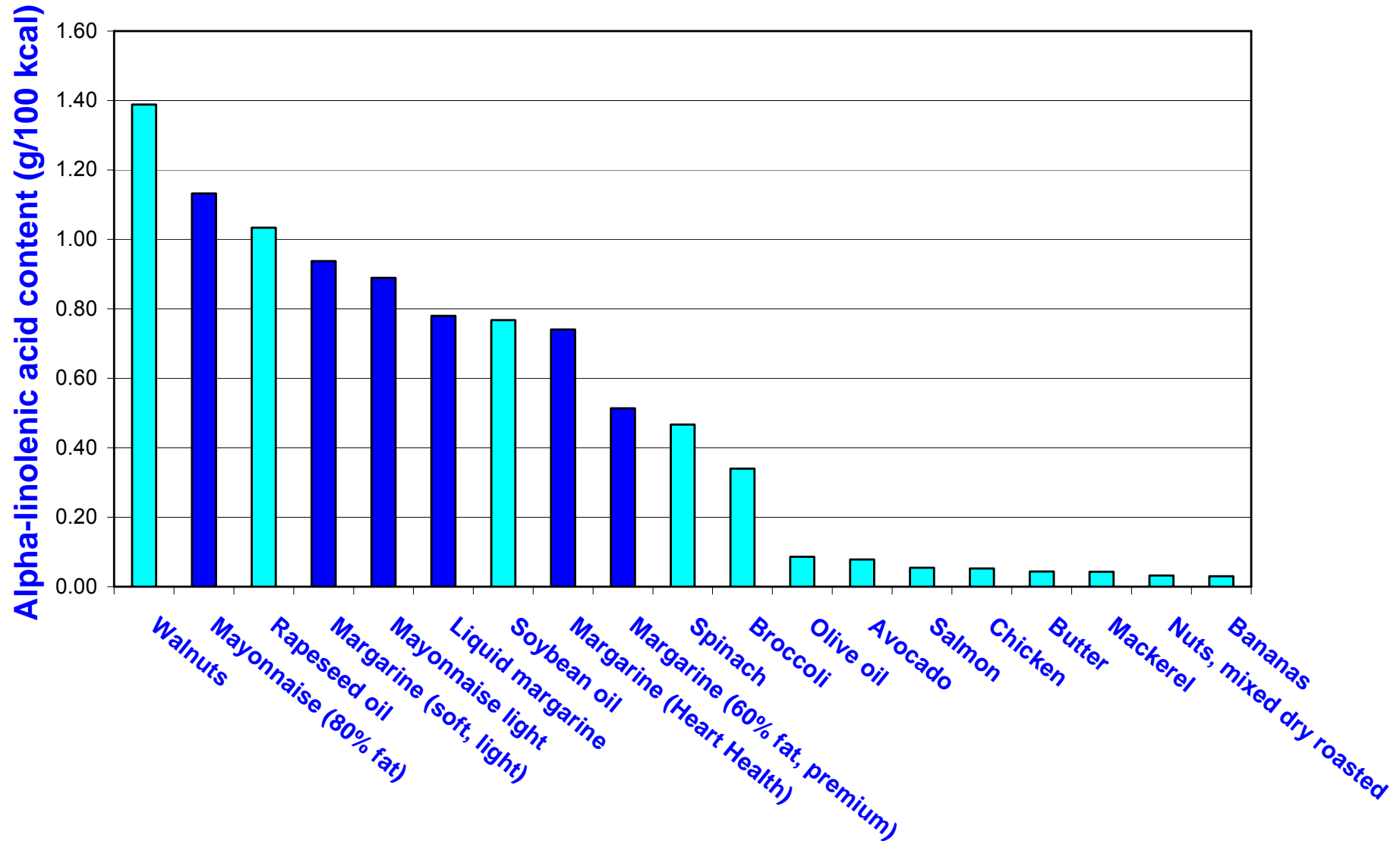
The image features a variety of glass containers filled with yellow and golden oils. From left to right, there is a small vial, a tall rectangular bottle, a standard glass bottle, a wine-style bottle, a tall slender bottle, and a glass pitcher. The background is white with a decorative yellow and white swirl pattern on the left side. The text is centered over the bottles.

Impact of modern fats and oils products on diet and health

Impact of modern fat products on health: three examples

1. Oils, margarines and mayonnaise are nutrient-dense sources of essential fats
 2. Significant contribution to the required intake of vitamins A,D and E via margarines
 3. Relevant impact on LDL-cholesterol level and hence on CHD incidence by soft margarines
- Potentially significant impact on public health from oils, margarine and mayonnaise

1. Margarine, mayonnaise and vegetable oils are nutrient-dense source of ALA



1. Role of margarine recently confirmed by the Netherlands Nutrition Centre

Intake of ALA for large part of the Dutch population is below recommended level

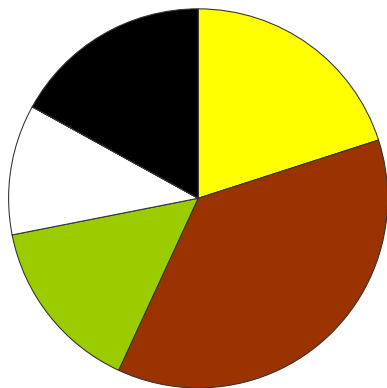
- Margarines (40% fat) are nutrient-dense source of ALA
- Margarine is also nutrient-dense source of fat soluble vitamins
- Therefore Dutch nutrition policy makers have increased the recommended amount of margarine (40% fat) from 20g/d to **30-35g/d (6-7 slices of bread with margarine every day)**

Based on Guidelines good nutrition, Oct 2007 www.voedingscentrum.nl

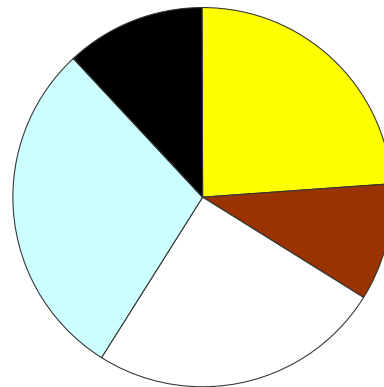
2. Margarines can be significant providers of fat soluble vitamins in the diet

Finnish men 25-64 years

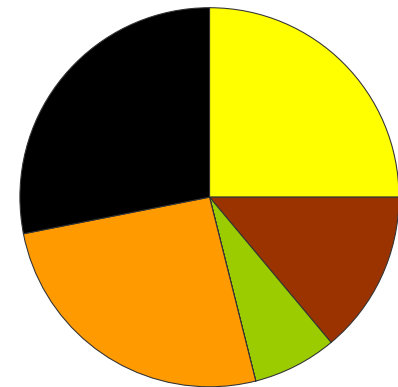
Vitamin A



Vitamin D



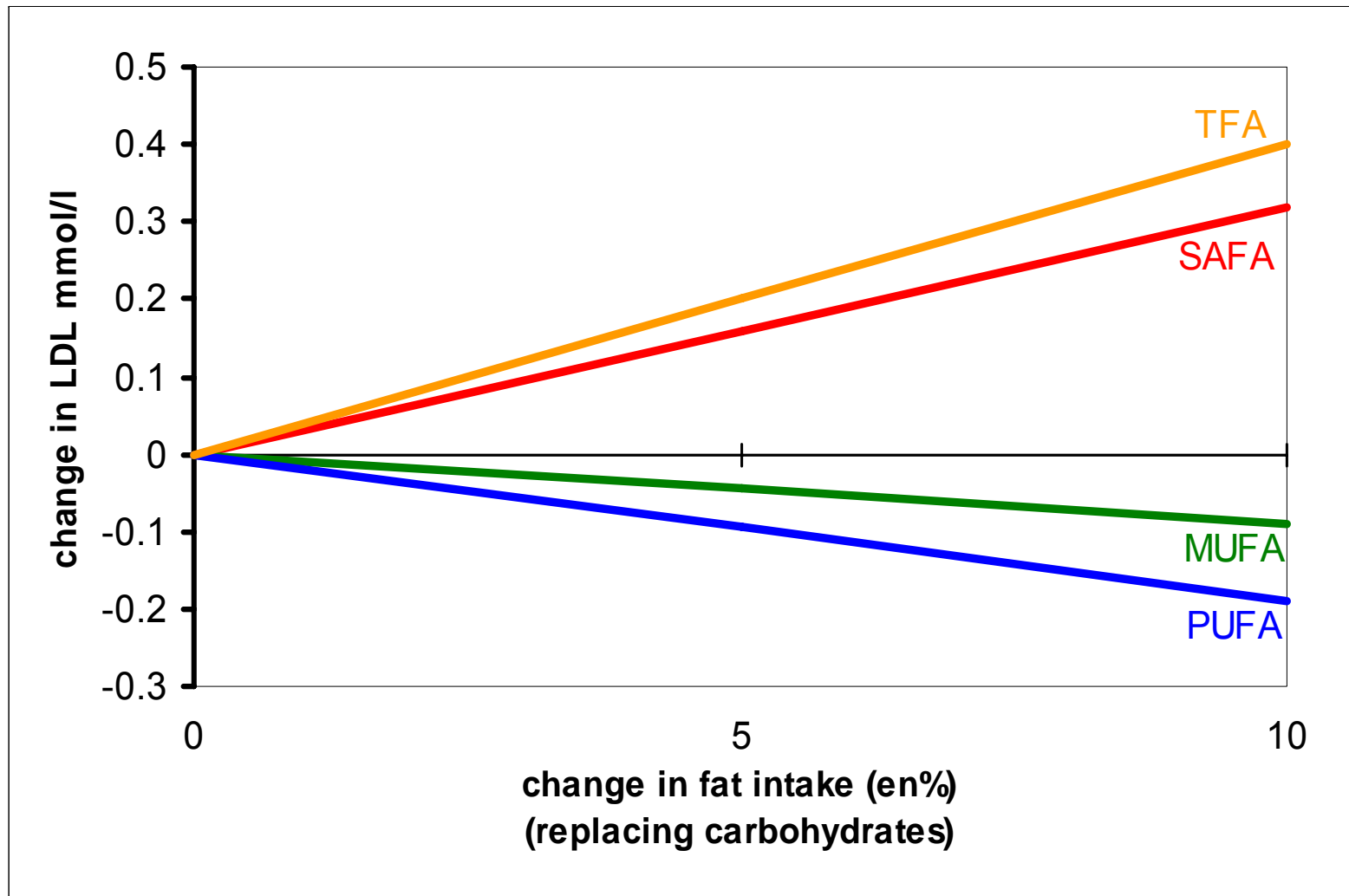
Vitamin E



From National FINDIET 2007 Survey, 2008

3. Assessing the impact of fat products on blood cholesterol

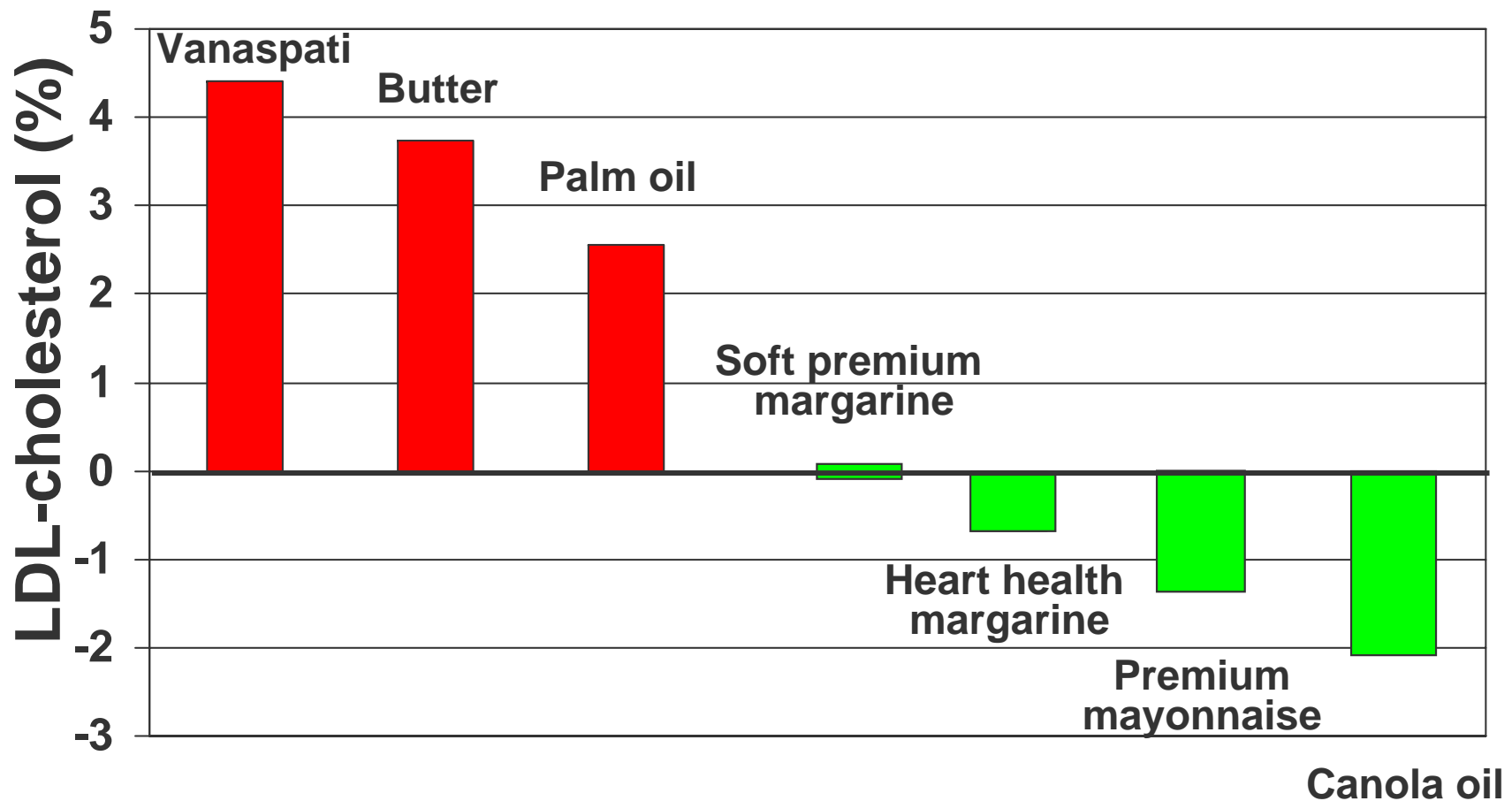
Meta-analysis of Mensink et al. 2003



Mensink, Zock, Kester, Katan. Am J Clin Nutr 2003;77:1146-55.

3. Butter and fats raise LDL-cholesterol; soft premium margarines and mayonnaise don't

Fat composition of foods influences their ability to lower or increase blood cholesterol: predicted effect of consumption of 20 g per day



Adapted from Mensink, Zock, Kester, Katan. Am J Clin Nutr 2003;77:1146-55.

3. Switching butter, vanaspati and palm oil for soft margarines can reduce the risk of CHD

- Per year nearly 8 million people die of CHD
 - 1% reduction in LDL-cholesterol level translates to ~1-2 % reduction in CHD risk (NCEP, 2001)
 - Switching 20 g /day soft margarine for butter or cooking oils/fats is predicted to lower LDL-cholesterol by 3-4%
- using soft margarines instead of butter or cooking fats worldwide could mean a reduction of annual CHD deaths by more than half a million !

Conclusions

- Oils and fats and products made thereof play an important role in our diets worldwide
- The food industry has made significant improvements to the nutritional quality of products like margarines and cooking products
- Switching products from animal fats or cooking fats to soft margarines or oils contributes positively to a healthy diet
- Despite wide differences in dietary habits, modern products made from fats and oils are essential for healthy diets for children and adults worldwide
- Many people are not aware of the benefit of soft margarines and cooking products:
time to educate and motivate for better health !

Thank you

