



THE PALM OIL STORY

Facts and Figures

European
Palm Oil Alliance



CONTENT

What is palm oil?	3
Palm oil production	4
Sustainable palm oil	6
Palm oil consumption	7
Palm oil uses	8
A natural and versatile ingredient	9
Fats in palm oil	9
Benefits of using palm oil	9
Alternative to trans fat	10
Part of a balanced diet	11
Saturated and unsaturated	11
Replacing trans fat	11
Importance of a healthy lifestyle	12
Informed by Science	14
About EPOA	14
References	15



Palm oil offers a balance between good nutritional composition and optimal taste and texture of a product. In this brochure you will find information and references on the nutritional composition, value and effect of palm oil in the diet. It also explains how palm oil is sourced from sustainable palm fruit and how it can be used in different food products.



WHAT IS PALM OIL?

Palm oil is the most widely-used vegetable oil in the world. Palm fruit oil, generally known as palm oil, is produced from the pulp of the fruit of the oil palm tree (*Elaeis Guineensis*). This tropical fruit is reddish in colour because of a high beta-carotene content. The fruit is about the size of a large olive. The fruit has a single seed or kernel, which is used to produce palm kernel oil. Each palm fruit contains about 30-35 per cent oil. Palm fruit oil and palm kernel oil differ significantly in their fatty acid composition, but have the same botanical origin.

Provided by nature

The oil palm tree grows in regions around the equator. It is a tropical tree with leaves about 5 metres long. Originally found in West Africa, the oil palm tree is now mostly cultivated in Indonesia and Malaysia, the world's top palm oil-producing nations.

From a tropical climate

Nature plays a big part in the palm oil story. What the tree loves above all, is sun. It thrives on plenty of sunshine, temperatures ranging between 24 and 32 degrees centigrade and rainfall evenly distributed throughout the year. Therefore, the most suitable areas for cultivation are located between ten degrees north and south from the equator. Apart from Indonesia and Malaysia there is an increase in palm oil production in other parts of the world including South and Central America, Thailand and Western Africa.



DID YOU KNOW?

Palm oil and palm kernel oil represent **32** per cent of the global vegetable oil production

54 million tons of palm oil is produced annually
One palm tree produces **40** kilogrammes of palm oil every year

One hectare of oil palm trees can produce on average **3.7** tons of oil each year

Indonesia and Malaysia supply **85** per cent of the palm oil used globally

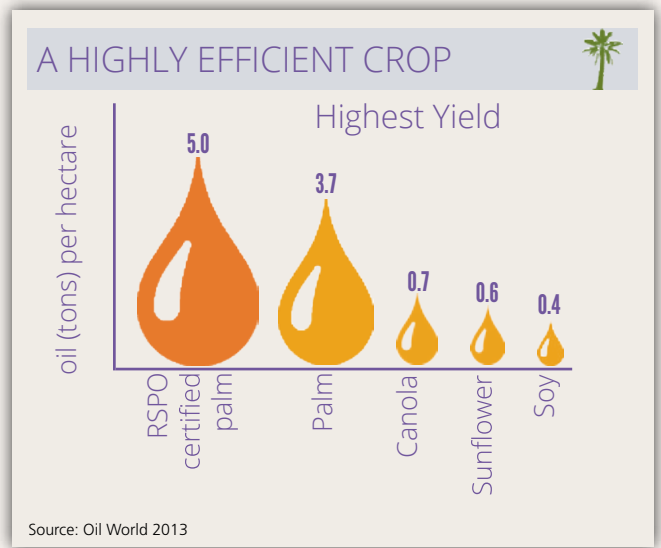
In Indonesia and Malaysia together, approximately **4.5** million people earn a living from palm oil

The use of palm oil in human nutrition dates back **10,000** years

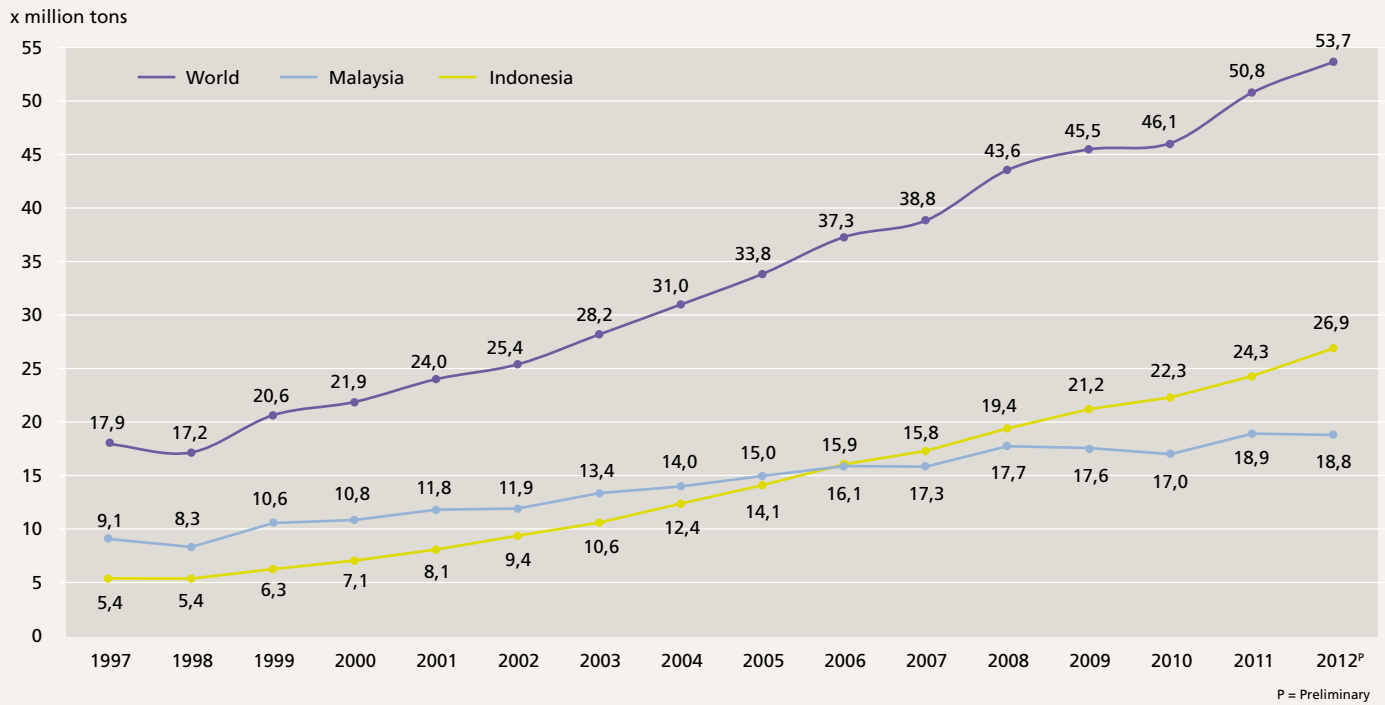
PALM OIL PRODUCTION

The oil palm tree is the most efficient oil crop in terms of land use. It has the highest yield compared to other oil crops per hectare of land. It also requires the lowest amount of fertilizer per planted hectare. When the oil palm trees are three to four years old the fruits are harvested monthly.

Global palm oil production has increased from 15.2 million tons in 1995 to 54 million tons today. This is the highest production volume of all vegetable oils, exceeding the second biggest oilseed crop by more than 10 million tons. This volume was mainly produced by Indonesia (50 per cent) and Malaysia (35 per cent). There has also been a marked increase in palm oil production in other parts of the world. Most of the additional volume was generated in South and Central America (2.8 million tons), Thailand (1.6 million tons) and Western Africa (2.2 million tons).



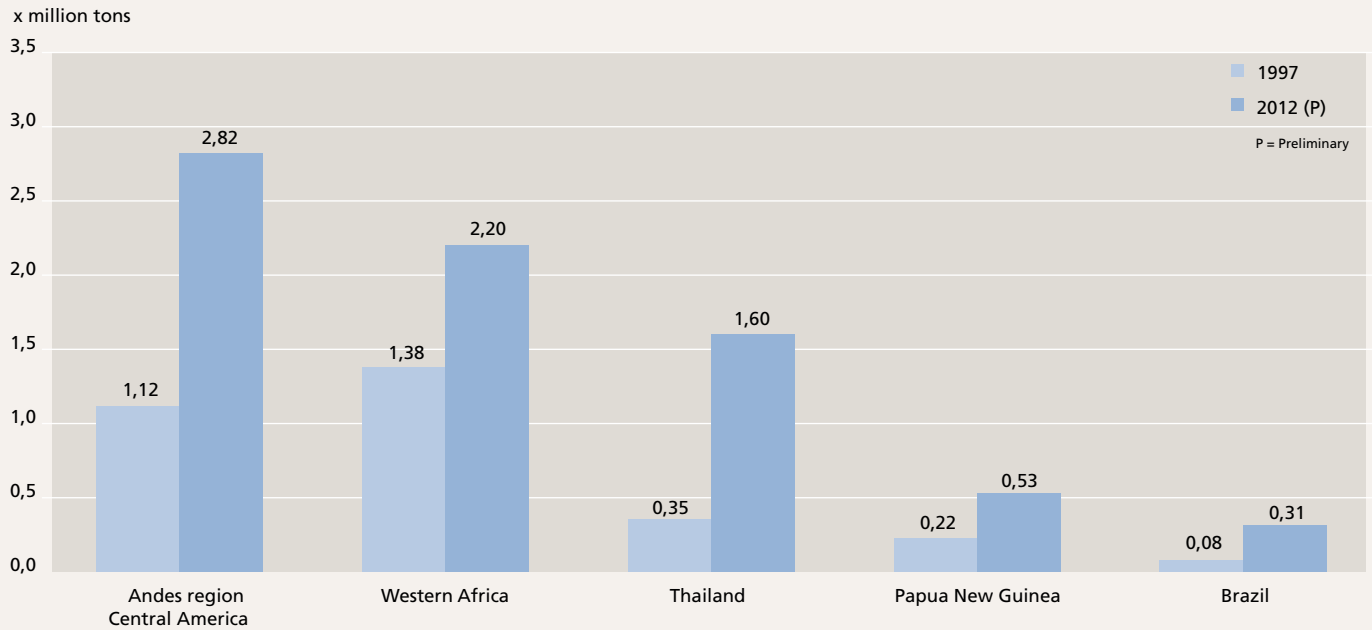
Global production and major origins of palm oil, 1997-2012 (Oil World 2013)



Indonesia & Malaysia provide
85%
of the world production

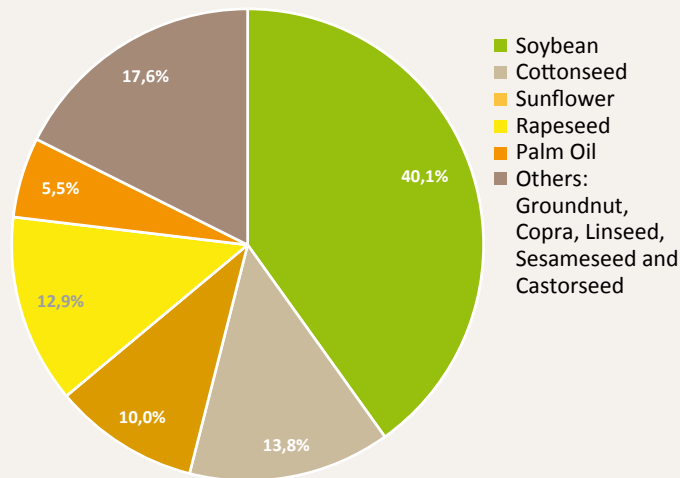


Other palm oil producing countries/regions with the strongest volume growth, 1995-2012 (Oil World 2013)

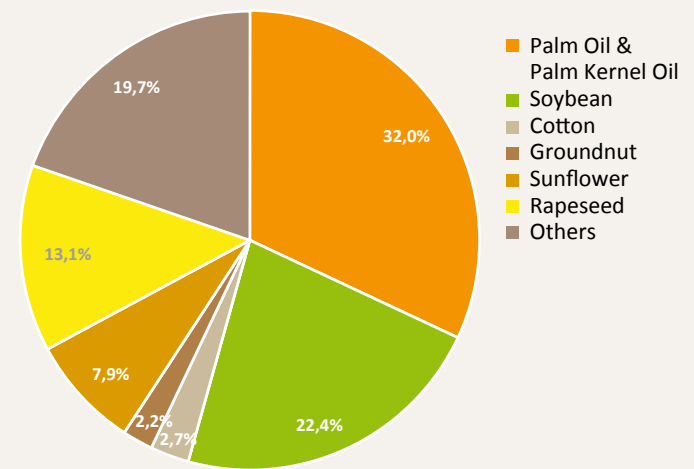


Among major oilseed crops, oil palm accounts for the smallest percentage (5.5 per cent) of all the cultivated land globally, but produces the largest percentage (32 per cent) of total output. It uses less than half the land required by other crops (such as sunflower, soybean or rapeseed oil) to produce the same amount of oil.

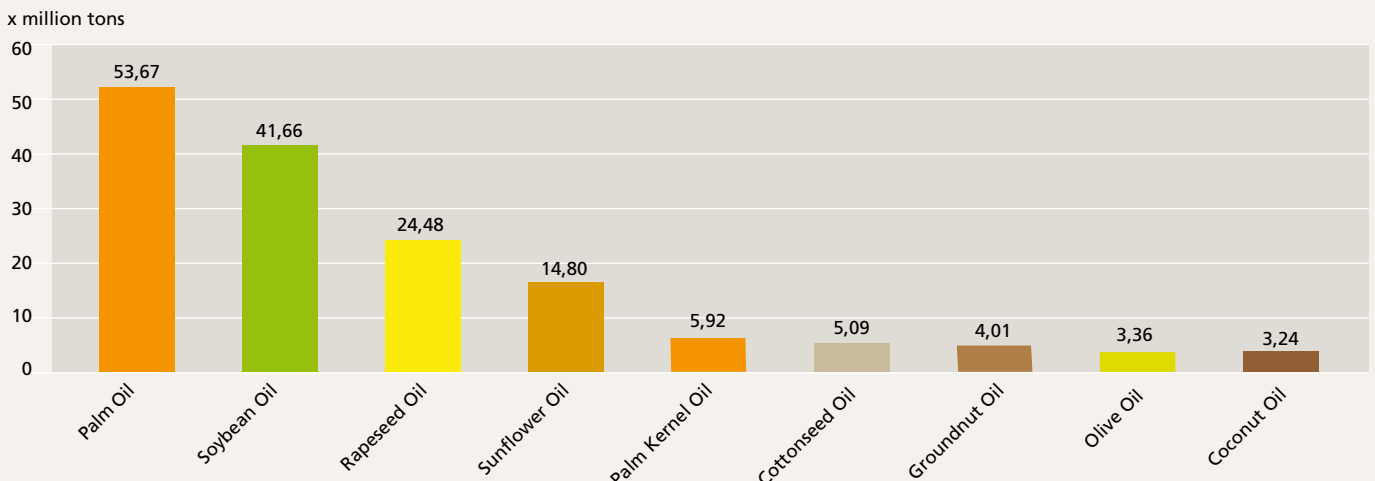
10 Major Oilseeds: Area in 2012
(Total is 258.9 million hectares) (Oil World 2012)



Global production of oils and fats in 2012
(Total is 186.4 million tons) (Oil World 2013)



World production of major vegetable oils in 2012 (Total is 161,15 million tons) (Oil World 2013)



SUSTAINABLE PALM OIL

Oil palms are grown on both large-scale plantations and small-scale family farms. The challenge of their cultivation is two-fold: achieve the highest yields while impacting nature as little as possible. As a result of population and prosperity growth in countries such as China and India, the demand for palm oil continues to grow strongly. Palm oil production is expected to grow by more than 25 per cent by 2020 to a global level of more than 68 million tons. In most palm oil-producing countries, palm oil trade has the potential to contribute significantly to economic growth and poverty reduction.

The long-term focus

With this global rise in the demand for palm oil, the areas of land dedicated to palm oil cultivation are expanding rapidly. The challenge is to ensure that the expansion takes place sustainably, with respect for people and nature in countries with some of the most bio-diverse regions of the planet. If not properly managed, large-scale palm oil productions can adversely affect valuable nature, cause infringements of the land rights of the local population and may lead to excessive use of pesticides.

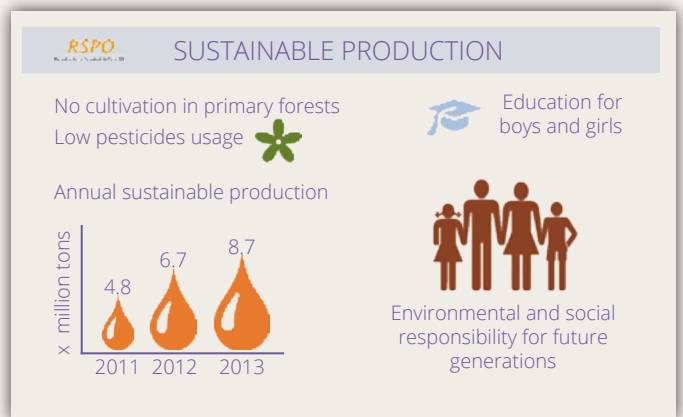
Sustainable palm oil

In response to the urgent and pressing need to address these concerns and meet global demand for sustainably-produced palm oil, a group of companies and NGOs joined forces in 2004. They established the first sustainability standard to certify the production and use of sustainable palm oil and founded the Roundtable on Sustainable Palm Oil (RSPO).

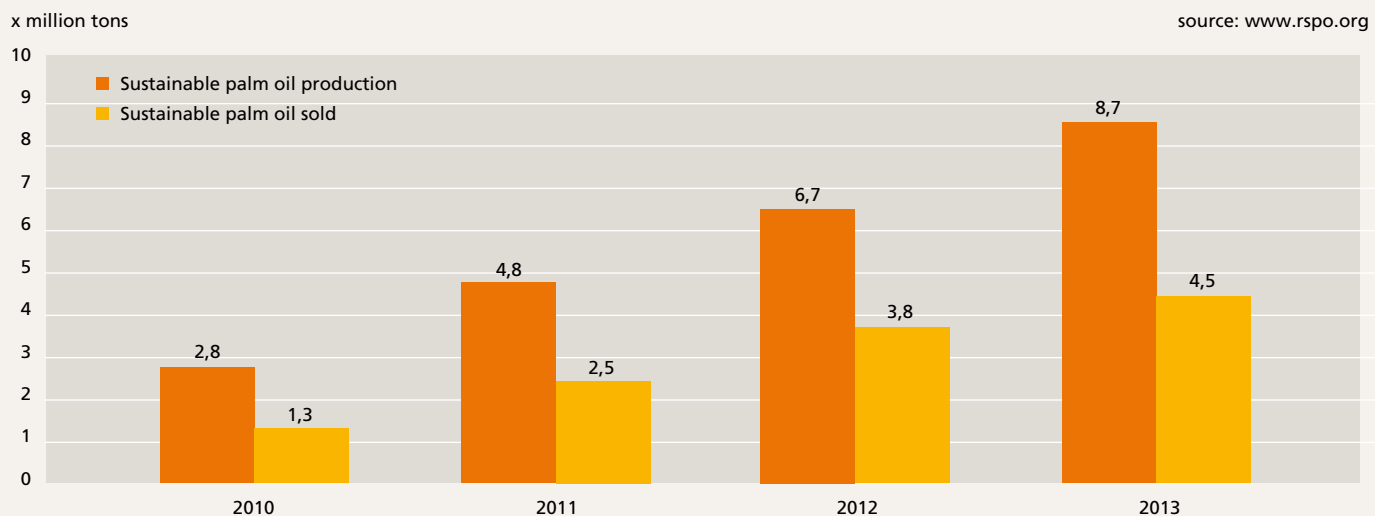
Roundtable on Sustainable Palm Oil (RSPO)

RSPO is a not-for-profit association that unites stakeholders from seven sectors of the palm oil industry: palm oil growers, palm oil processors or traders, consumer goods manufacturers, retailers, banks and investors, environmental or nature conservation NGOs and social or developmental NGOs.

Through an open and intensive dialogue between its seven stakeholder groups, RSPO has developed a global standard for sustainable palm oil known as the RSPO Principles and Criteria (P&C). Currently RSPO has 1,500 members from more than 50 countries and RSPO certified sustainable palm oil accounts for 16 per cent of global palm oil production. Many European refiners, consumer goods manufacturers and retailers are RSPO members. An increasing number of members have committed to switch to 100 per cent certified sustainable palm oil. The production of certified sustainable palm oil has increased considerably during recent years, as has the uptake of certified sustainable palm oil.



Production and uptake of sustainable palm oil

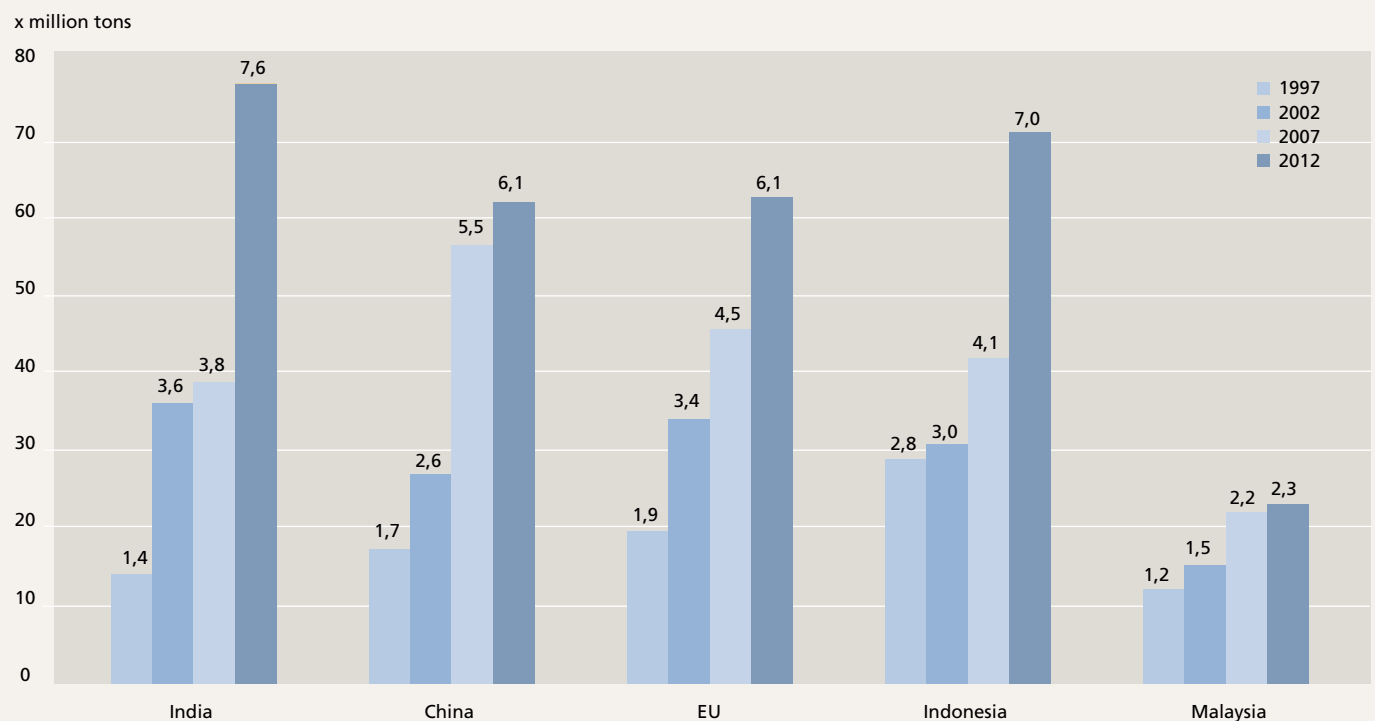


PALM OIL CONSUMPTION

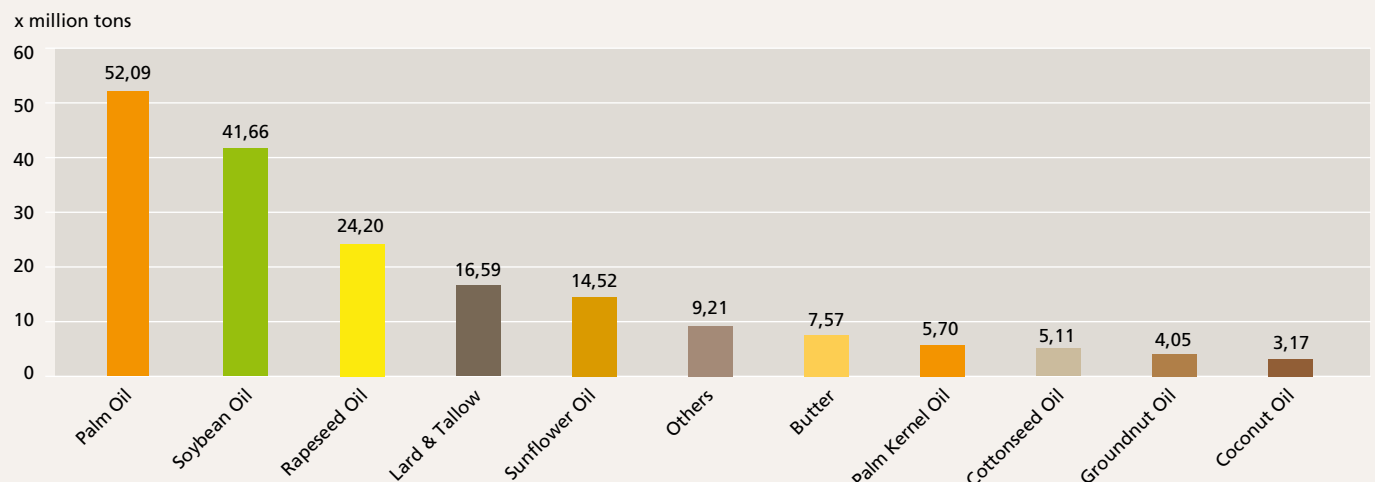
Global consumption rose from 17.7 million tons in 1997 to 52.1 million tons between 1997 and 2012, making it the most consumed oil in the world. The main consumers of palm oil are China, India, Indonesia and the European Union. India, China and the EU do not produce crude palm oil and their demand is entirely met by imports. In 2009, India (8.8 million tons), China (6.6 million tons) and the EU (5.4 million tons) accounted for 52 per cent of global imports.



Global consumption and major users of palm oil (Oil Word 2013)



World consumption of oils and fats in 2012 (Total is 183.9 million tons) (Oil Word 2013)



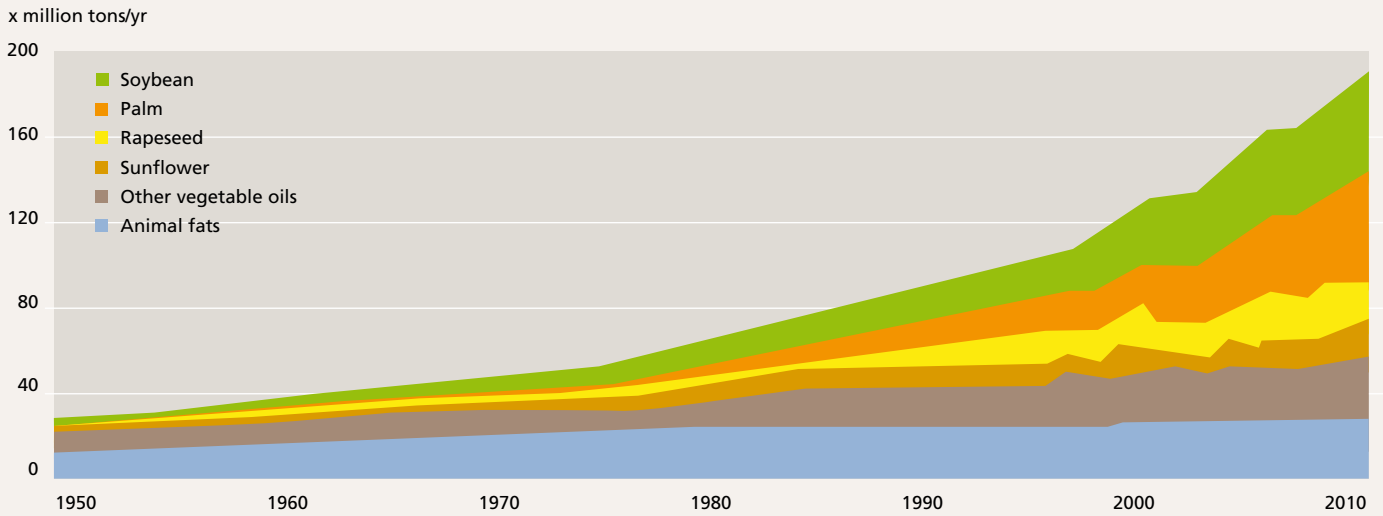
PALM OIL USES

Palm oil can be used both in its raw state as in the refined form. Only one quarter of the palm oil and palm kernel oil worldwide is used in its raw state. In Southeast Asia, Africa and parts of Brazil, palm oil is widely used for domestic cooking.

In Europe and the United States palm oil is mostly used in its refined form, which is pale yellow. Palm oil is a very useful ingre-

dient because of its consistency. It is semi-solid at European and North American room temperatures and widely used by food and non-food manufacturers because of its favourable impact on taste and quality of end products. It is used as a natural ingredient in many food products, such as margarine, confectionery, chocolate, ice cream and bakery products, as well as non-food products such as soap, candles, and cosmetics.

Explosive growth in use vegetable oils 20th century, due to growth of world population



More than half the products on sale in the supermarket are made with palm oil

A NATURAL AND VERSATILE INGREDIENT

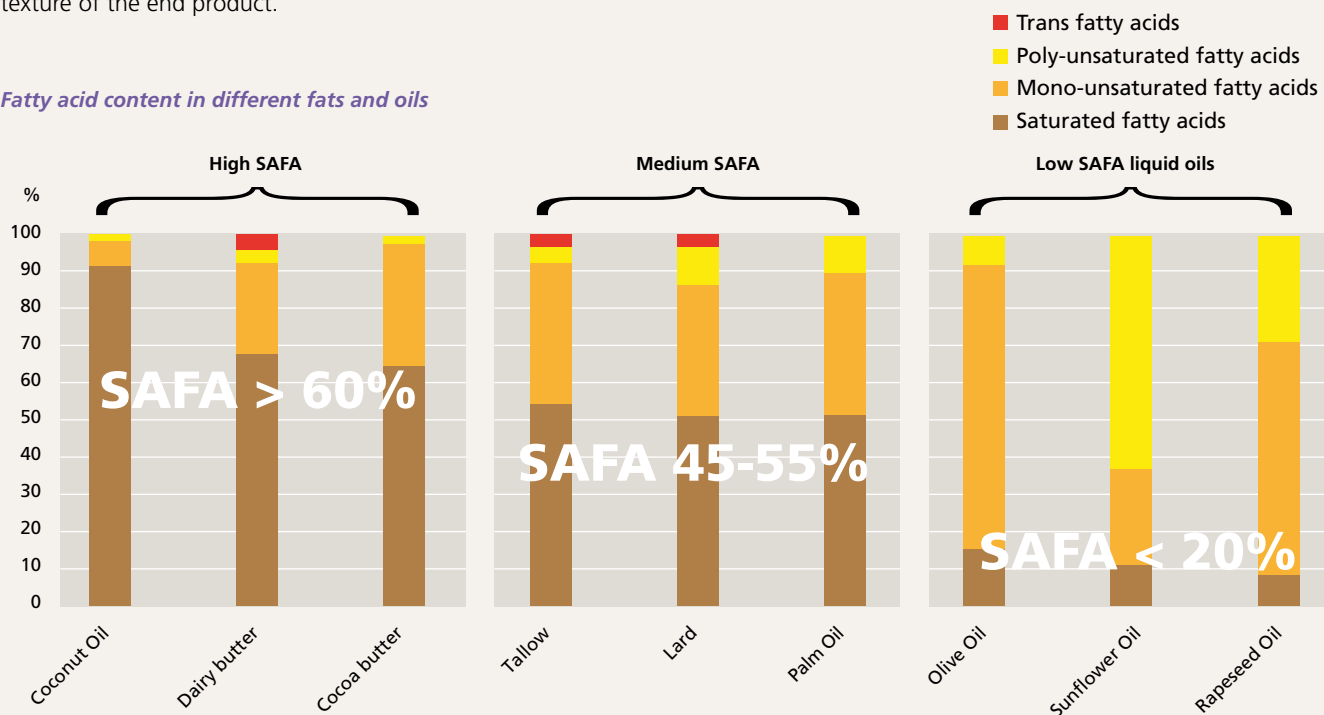
Oils and fats serve many functions in the food we eat, impacting flavour, texture, nutrition and the extent to which we feel full after eating a meal. In food products, palm oil is often combined with other oils and fats, which together determine the fatty acid composition and functionality of the end product.

FATS IN PALM OIL

All oils and fats, irrespective of their origin, contain both saturated and unsaturated fatty acids. The ratio depends on the type of oil or fat. Oils and fats which are rich in saturated fatty acids will have a higher melting point and a denser structure and thus will be more solid at room temperature. Oils which are rich in unsaturated fatty acids generally are liquid, like our cooking oils. In products that require hard fats, palm oil offers a good compromise between a good nutritional profile and an optimal taste and texture of the end product.

On average, palm oil has almost equal amounts of saturated and unsaturated fatty acids. Coconut oil, butter, palm kernel oil and cocoa butter have higher proportions of saturated fatty acids. Because of its plant origin, variability in nutritional composition may occur due to geographical factors, for example soil, weather and the type of palm tree.

Fatty acid content in different fats and oils



BENEFITS OF USING PALM OIL

Palm oil is a unique ingredient for many products because it has excellent cooking properties. It provides long-term stability and preservative properties, positively impacting food product shelf life. It also provides great performance at high cooking temperatures and its smooth and creamy texture and absence of smell make it a perfect ingredient in many recipes.

In many food products, palm oil offers versatile and functional benefits and optimal taste and texture of the end product. Its main advantages are:

- **Great stability at high cooking temperatures:** palm oil maintains its characteristics even under high temperatures. It performs better at high temperatures than some other oils and fats which lose their quality and produce harmful by-products;
- **High stability over time:** the food product shelf life is increased because of the stability of palm oil. Products containing palm oil maintain their flavours and structure – such as crispiness or crunch - for a longer period of time;

The Palm Oil Story

- **Neutral taste and smell:** palm oil can be used in many different foods without affecting their taste;
- **Solid or semi-solid state at room temperature:** a higher solid content, as a result of the presence of saturated fat, is needed for the physical and chemical properties of certain food products; for example, margarine without saturated fat would be liquid at room temperature.
- **Smooth and creamy texture:** palm oil is the most suitable solution for increasing solidity and improving the consistency of the product. Food products with palm oil have an excellent mouth feel with specific characteristics for each product. For example, palm oil is responsible for the smooth and creamy texture and spreadability in margarine and chocolate spreads.

A VERSATILE INGREDIENT

Neutral taste & smell

Smooth creamy texture

Crispness & crunch

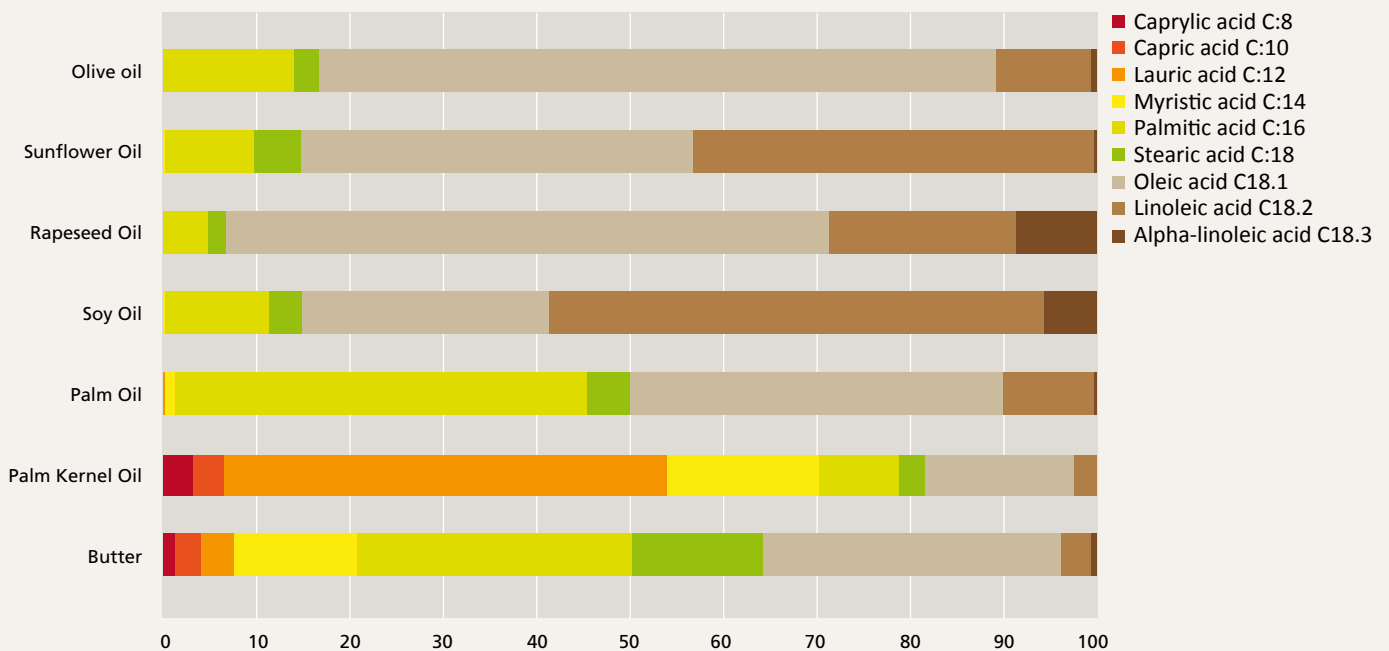
Long shelf life

Excellent cooking properties

Excellent mouth feel

Variability in fatty acid composition in natural oils and fats

Fatty Acid Composition



ALTERNATIVE TO TRANS FAT

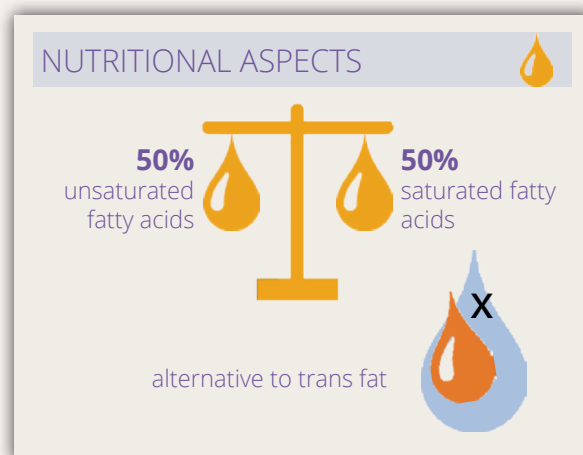
The recent increase in palm oil use in the food industry has been the result of a move away from using unhealthy trans fats. Because palm oil is naturally smooth and stable, it does not need to be partially hydrogenated. Therefore, like most natural seed oils, palm oil only contains very little amounts of trans fats (<1 per cent).

PART OF A BALANCED DIET

Everyone needs fat in their diet and palm oil is a good source of fat. Fat is a source of energy, keeps your skin healthy, enables the production of certain hormones and will help the body absorb the vitamins A, D, E and K. Oils and fats provide essential building blocks for the cells in the body.

Fats are provided in the diet as part of the macronutrient intake along with carbohydrates and proteins. To achieve a healthy diet, the European Food Safety Agency (EFSA) advises that a minimum of 20 per cent and a maximum of 35 per cent of daily energy intake should come from fat (EFSA 2010).

Similar recommendations are provided by the 2010 guidelines of the Food and Agriculture Organization of the United Nations (FAO-WHO 2010), which recommends that a minimum of 15 per cent and maximum of 35 per cent of the daily energy intake should come from fat. The French Food Safety Authority (ANSES) recommends that the minimal physiological need of fat should be 30 per cent of daily energy intake (ANSES 2011).



SATURATED AND UNSATURATED

Fats are composed of different types of fatty acids, known as saturated fatty acids and unsaturated fatty acids. This fatty acid composition gives fats their specific nutritional properties. The fatty acids that circulate in the blood are mostly part of triglycerides. Fat that is stored in the body can originate from the diet or is produced by the body itself from carbohydrates and alcohol (Wu 2011, Volek 2012). The fats and oils that we consume have an animal or vegetable origin.

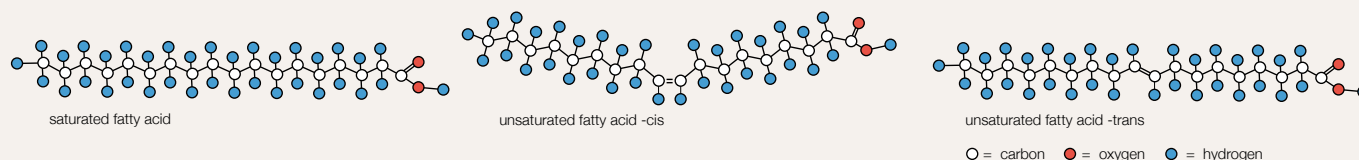
The chemistry of fat

Fatty acids can be referred to as either saturated or unsaturated. The term saturated fatty acid is often written in shorthand as SAFA. In a saturated fatty acid the carbon atoms are connected with only single bond, which enables the fatty acids to pack

closely together. Fats that are largely composed from saturated fatty acids are therefore often solid at room temperature.

Unsaturated fatty acids can be either mono-unsaturated (MUFA) or poly-unsaturated (PUFA). Unsaturated fatty acids contain one or more double bonds in their hydrocarbon chain. The double bond introduces a kink in the hydrocarbon chain, which makes it more difficult for the fatty acids to pack tightly. Fats that contain large amount of mono- or poly-unsaturated fatty acids are therefore often liquid at room temperature.

In trans fatty acids the carbon chain extends from opposite sides of the double bond. This results in a straight molecular structure.

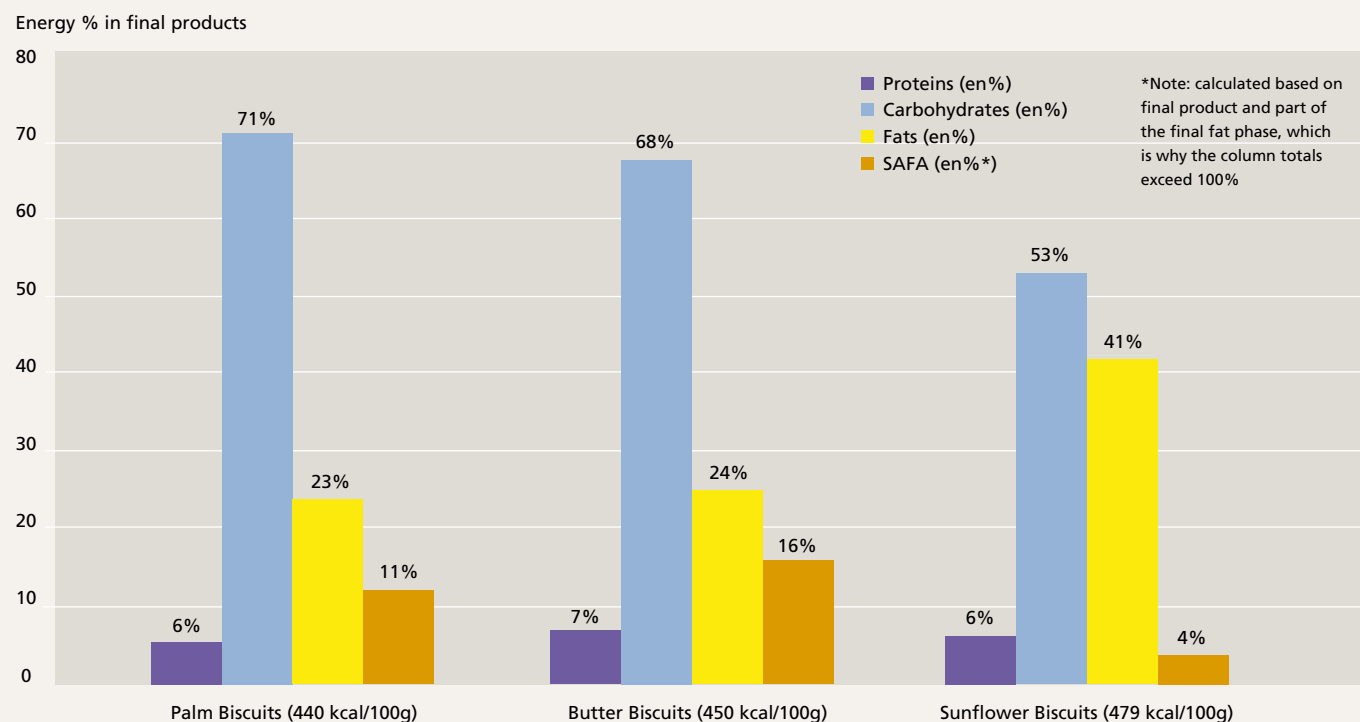


REPLACING TRANS FAT

Trans fatty acids have been proven to be unhealthy as they raise LDL and lower HDL cholesterol levels and increase the risk of developing coronary heart disease and possibly stroke (Mozafarian 2009, Bendsen 2011). Palm oil is a natural ingredient and a good replacement for partially-hydrogenated fat that contains

trans fatty acids. In many food applications, the use of palm oil and palm fractions has been instrumental in lowering trans fat levels. The successful reduction of trans fatty acids in margarine for example, has been the result of using specific combinations of palm oil and liquid oils.

The choice of fats and oils influences the nutritional composition (energy percentage) of commercially-available plain biscuit



IMPORTANCE OF A HEALTHY LIFESTYLE

The relationship between nutrients and health is largely dependent on the diet and lifestyle of a person. Saturated fatty acids are being criticised because of their impact on the plasma cholesterol profile and on increasing the risk of cardiovascular diseases. In fact the plasma cholesterol is also impacted by the intake of other fats, carbohydrates, fruits and vegetables, fibre, and alcohol and non-dietary lifestyle factors. These lifestyle factors, including physical activity, mental stress, obesity and smoking, may have greater impact on the plasma cholesterol and cardiovascular risk than moderate saturated fat intake.

SAFA recommendations

For many years, recommendations by international and national authorities focused on reducing the dietary intake of SAFA with the consistent message that saturated fat is “unhealthy.” A recent meta-analysis indicated that dietary SAFA in itself is not associated with an increased risk of cardiovascular diseases (Siri-Tarino 2010a). The scientific literature shows that the macronutrients that are used to replace saturated fatty acids with, play a critical role (Jakobsen 2009, Jakobsen 2010, Siri-Tarino 2010b, Micha 2010) and that the impact of SAFA on the risk of cardiovascular diseases will depend on the overall diet and life style (Astrup 2011).

Individual SAFA have specific effects on blood lipids (Mensink

2003). However, there is lack of evidence from studies that investigated the effect of individual SAFA on the risk of other diseases. By nature, saturated fatty acids occur as a mix in different type of fats and oils. In many foods different fats and oils are also combined and the resulting specific saturated fatty acids always occur as a mix. This makes it difficult to draw conclusions about the impact of specific fatty acids.

It’s all about balance

Saturated fatty acid intake reduction in itself is unlikely to reduce the risk of cardiovascular disease. In addition to lifestyle factors, the reduction of the risk depends significantly on what the saturated fatty acid is replaced with and on the overall diet of the person. Not taking into account the nutrients that a saturated fat is replaced with may lead to little or no reduction in the risk of cardiovascular diseases (Siri-Tarino 2010b, Micha 2010, Astrup 2011). In some cases replacing palm oil with other fats or nutrients will not benefit the nutritional profile of a product, for example when replacing with partially hydrogenated fats.

Based on human studies, the FAO stated (FAO-WHO 2010) that there is convincing evidence to conclude that replacing SAFA with PUFA decreases the risk of coronary heart disease (CHD); there is probable evidence that replacing SAFA with largely refined carbohydrates has no benefit on cardiovascular disease

(Kuipers 2011); there is insufficient evidence relating the effect of replacing SAFA with either MUFA or largely whole grain carbohydrates on the risk of CHD (FAO-WHO 2010).

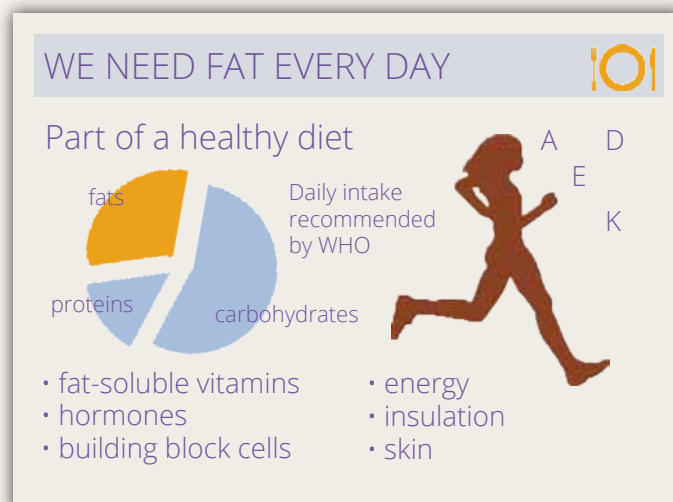
National and international dietary expert panels recommend that saturated fat consumption in the diet should not exceed 10 per cent (Germany, the Netherlands, the Nordic nations, WHO/FAO) to 12 per cent (France) of the overall daily energy intake. The WHO recommendations on fat intake for healthy adults in % of energy are mentioned in the table below.

Don't overdo it

Simply put, a healthy lifestyle is based on three elements: variation in foods and meals, a balanced energy intake and enough physical activity to prevent weight gain. But a balanced diet is crucial. It should be based on total energy intake and expenditure and not focus on specific food components such as fat or carbohydrate intake alone. The balance between energy intake and energy expenditure is important in obtaining and maintaining a healthy body weight. A healthy diet includes ample fruits and vegetables, a balanced carbohydrate, fat and protein intake, equal amounts of saturated, mono-unsaturated and poly-unsaturated fats and limited salt.

The risk of being overweight

Weight management is crucial for overall well-being and health. The risk of being overweight is one of the concerns associated



with the total amount of fat in food. Recent reviews showed that caloric restriction rather than macronutrient restriction is the key determinant of weight loss (Mozaffarian 2011).

The 1997 FAO/WHO Expert Consultation on Carbohydrates in Human Nutrition indicated that excessive calories are identical, no matter whether they are provided by carbohydrates, proteins, fats or alcohol (FAO 2007). Weight management should therefore be based on total energy intake and expenditure, rather than focusing on specific food components such as (saturated) fat intake alone.

WHO recommendations on fat intake for healthy adults (FAO-WHO 1994, FAO-WHO 2003)

Dietary ingredient	Abbreviation	% of energy
Total oils and fats		15 – 30
Saturated fatty acids	SAFA	< 10
Cis poly-unsaturated fatty acids	cis-PUFA	6 – 10
Omega-6-poly-unsaturated fatty acids	n-6 PUFA	5 - 8
Omega-3-poly-unsaturated fatty acids	n-3 PUFA	1 - 2
Trans fatty acids	TFA or Trans	< 1
Mono-unsaturated fatty acids	cis-MUFA	By difference with rest

ABOUT EPOA

The European Palm Oil Alliance was founded to create a platform for palm oil-related issues and discussions.

Our goal is to create a balanced and objective view on health and nutritional aspects of palm oil, by providing science-based information, rebalancing the discussion around the health and nutritional facts about palm oil and communicating on industry commitments. EPOA is committed to sustainable palm oil production.

Current participants are the Dutch Oils and Fats Association (MVO), IOI Loders Croklaan, Wilmar, Cargill, Sime Darby, New Britain Oils, Unigra and MPOC (Malaysian Palm Oil Council). New participants are welcome to join us.

For more information, please contact us at:

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IOI Loders Croklaan



INFORMED BY SCIENCE

Scientific Advisory Panel

The European Palm Oil Alliance (EPOA) is supported by a scientific advisory panel (SAP). The SAP was established in 2013:

- to gather together European experts in nutrition and health;
- to facilitate the scientific debate on palm oil and health; and
- to provide scientific and nutritional guidance and advice on the communications programme of EPOA.



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European Palm Oil Alliance

Creating a balanced view on palm oil and food



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