EFPRA

DRIVING FOOD CHAIN SECURITY AND SUSTAINABILITY IN EUROPE

Edible animal fats

A natural and beneficial part of a balanced diet

Edible animal fats

Humans have eaten animal products, fats included, for millennia, satisfying the body's demand for essential nutrients. Edible animal fats are appreciated as multifunctional food ingredient and for their delicious taste and excellent baking and cooking properties.

Edible animal fats are from animals specifically bred, reared, and slaughtered and are processed for human consumption in accordance with European Food Hygiene Regulations. Premium grade fat is cut from under the skin and from the abdominal cavity. It is purified, filtered and refined to produce high grade oils and fats. The major edible animal fats are tallow, derived from cattle, lard, which is derived from pigs, and poultry oils.

Descriptions such as tallow, lard and poultry oil are widely used, but every country has their own expressions:

Why do chefs choose edible animal fats in their culinary kitchen:

- **Delicious taste and flavor:** animal fats are continuously chosen by culinary chefs for their delicious taste, flavor and creamy texture.
- **Kind of natural taste enhancer:** animal fats increase the intensity of smell and taste perception in food. In this way it can compensate a lower salt content in food.
- **Great stability at high temperatures:** animal fats maintain its characteristics under high temperatures. It performs better at high temperatures than some vegetable oils which deteriorate faster and produce more undesirable by-products like polymeric compounds, dark pigments and unpleasant volatiles.
- **Long-term stability/ shelf life and preservative properties:** The food product shelf life is increased because of the stability of animal fats. Products prepared with animal fats maintain their flavors and structure for a longer period of time.

Tallow		Poultry		Lard	
DE:	Talg	DE:	Gänseschmalz	DE:	Schweineschmalz
UK:	Beef dripping	UK:	Goose / Duck fat	FR:	Saindoux
FR:	Suif	NL:	Kippen-/ gevogelte olie	IT:	Lardo / Strutto
NL:	Ossenvet/ Rundvet	ES:	Grasa de Polo/ Grasa de Pavo	NL:	Reuzel/ Smout/ Varkensvet
ES:	Grasa			ES:	Manteca

Multifunctional food ingredient

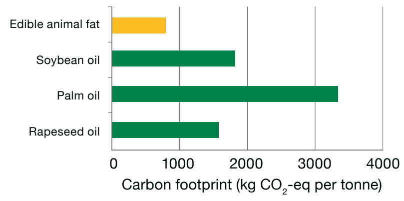
Edible animal fats are used for cooking, baking and frying. It is used as a component amongst others in meat products, margarines, bakery products, sauces and soups. It is appreciated for their delicious taste, texture and flavor and used both at home as well as by culinary chefs in their restaurants. It provides a creamy texture to food and stays stable at high temperatures. Finally it has taste enhancing characteristics, a long-term shelf life and good preservative properties.

Sustainable resource

Once an animal has been slaughtered for the meat, further dissipation is avoided and all parts of the animal is used. Meat by-products are processed into high quality products. One of these products is animal edible fat.

Edible animal fats have a small carbon footprint compared to other fats and oils (Figure 1). For example, palm, soybean and rapeseed oil are crops grown specifically for their oil content. Animals however are reared primarily for their meat, dairy, eggs and wool (Ponsioen, & Blonk, 2010).

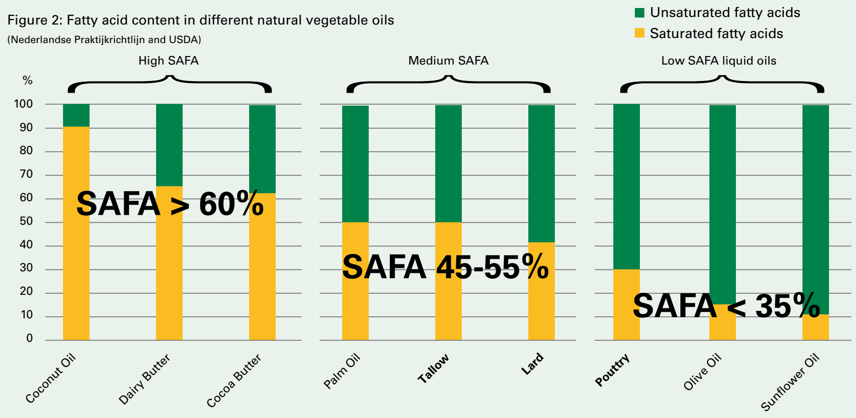
Figure 1: Carbon footprints of edible animal fat, soybean oil, palm oil and rapeseed oil



A beneficial part of a balanced diet

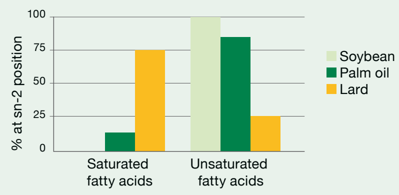
Edible animal fats are a natural and beneficial part of a balanced diet. People need fat in their diet and edible animal fats is a source of it. Fat is a source of energy and is stored in adipose tissue as a fuel reserve. It helps the body absorb the vitamins A, D, E and K and it contributes to the cell membrane structure. According to the WHO/ FAO, in a healthy diet 15 to 30-35% of the daily calories should come from dietary fat.

Figure 2: Fatty acid content in different natural vegetable oils (Nederlandse Praktijkrichtlijn and USDA)



In spite of these useful biological functions, edible animal fats have, mistakenly, a negative reputation concerning health mainly due to their content of saturated fatty acid. However, as all oils and fats animal fats contain both saturated and unsaturated fatty acids. Edible animal fats consist of almost equal amounts of saturated and unsaturated fatty acids (figure 2). Coconut oil, dairy butter, cocoa butter have higher amounts of saturated fatty acids than lard, tallow and poultry.

Figure 3: In Animal Fats, the sn-2 Position is Rich in Saturared Fatty Acids



For decades, saturated fatty acid consumption is thought to increase cardiovascular risk because it increases plasma cholesterol levels. This view is now increasingly being challenged and new scientific data from multiple sources show that saturated fatty acid consumption per se is not associated with cardiovascular risk. It is true that cardiovascular risk is reduced when dietary saturated fatty acids are replaced by polyunsaturated fatty acids, but there is increasing evidence that replacing saturated fatty acids with largely refined carbohydrates does not benefit and even promote the risk of cardiovascular disease. Scientific meta-analysis published last few years show that no positive effects are found by replacing saturated fatty acids with monounsaturated fatty acids or largely refined carbohydrates (Chowdhury, 2014; Siri-Tarino, 2010a, b; Mozaffarian, 2010; Jakobsen, 2010).

Structural and functional differences between animal fats and vegetable oils

In the triacylglycerols (TAGs, formerly called triglycerides) of animal fats, saturated fatty acids are preferably located at the sn-2 (=middle) position of the glycerol backbone and unsaturated fatty acids at the (outer) sn-1 and 3 positions. In vegetable oils, it is the other way around: the middle (sn-2) position is mainly taken by unsaturated fatty acids, whereas the saturated fatty acids are largely located at the (outer) sn -1 and 3 positions. The major intestinal lipase (pancreatic lipase) selectively hydrolyzes fatty acids from the outer sn -1 and 3 positions, resulting in free fatty acids which are mainly saturated when originating from vegetable oil, and unsaturated when coming from animal fats. In general, the absorption of free long-chain saturated fatty acids is lower than that of free unsaturated fatty acids of similar chain length, because the former easily bind to calcium in the intestine to form insoluble calcium salts, which are excreted (Karupaiah & Sundram, 2007). Nonetheless, the fatty acid positional distribution hardly affects the total TAG absorption in adults. Infant studies, however, indicate that fats with a greater proportion of long-chain saturates in the sn-2 position are better absorbed (Berry, 2009).

The intestinal formation of calcium soaps also implies that calcium absorption is reduced by the intestinal presence of free long-chain saturated fatty acids. After digestion, most intestinal saturates from animal fats are present in micelle-embedded mono-glycerides and, consequently, not available for calcium binding and excretion. Long-chain saturates from vegetable oils, however, are present in the intestinal lumen as free fatty acids, which can readily bind calcium. Therefore, reduction of calcium absorption by saturated fatty acids is more pronounced for vegetable oils than for animal fats. This is the reason why calcium absorption and bone mineral density of babies reared on formula (usually containing vegetable oils) is inferior to those of babies given mother's milk, which contain 'animal-type' fats (Koo, 2003).

As reviewed by Berry, animal studies indicate that long-chain saturated fatty acids at the sn -2 position are more atherogenic than at the sn -1 and 3 positions. However, TAG positional isomers do not seem to have different effects on plasma lipoprotein concentrations in adults (Berry, 2009).

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