



Food Writers New Zealand

**HANDBOOK**

oils and fats

# OILS AND FATS

## DEFINITION OF OILS AND FATS

All oils and fats belong to a class of compounds called lipids. Lipids, proteins and carbohydrates constitute the major composition of our diet. An accepted nomenclature is that the term 'oil' is used to describe the product if it is liquid at room temperature and 'fat' if it is solid. Palm oil and coconut oils are liquid in the country of origin but solid in New Zealand.

Oils and fats are obtained from the seeds or fruit of plants, ruminant milks or from the rendering of animal tissues such as beef, lamb and pork.

Other lipids in our food supply include natural emulsifiers like lecithin and manufactured products like monoglycerides

## FATTY ACIDS

Oils and fats, i.e. lipids, are made up from a mixture of triglycerides (or more technically triacylglycerols) containing different fatty acids which can either be saturated, monounsaturated (cis or trans) or polyunsaturated. This terminology refers to the structure of the fatty acid molecule. The greater the proportion of saturated and trans-fatty acids the more solid the oil or fat tends to be. Conversely the greater the proportion of unsaturated fatty acids the more liquid the oil or fat will be.

Diets high in saturated and trans-fatty acids have been shown to cause high levels of blood cholesterol which has been associated with heart disease.

Trans-acids were formed by the hydrogenation of liquid oils mainly for use in margarines and spreads. They have been mostly phased out in Australasia. Foods high in polyunsaturated fatty acids increase the body's ability to remove cholesterol from the blood and thereby help to lower blood cholesterol and the incidence of heart disease.

Polyunsaturated fatty acids can be either omega-3 or omega-6. These have different structures and different physiological effects. omega-3 and omega-6 fatty acids cannot be synthesised de nova by the human body. It is therefore essential that they are obtained from the diet. For optimum health the human body needs a balance of omega-3 and omega-6 fatty acids. There is now a great deal of evidence backing up claims of the health benefits of long-chain omega-3 fatty acids from marine sources. Monounsaturated fatty acids are the most abundant in nature. They have little effect on blood cholesterol levels. The most common monounsaturated fatty acid is oleic acid which is known as an omega-9 fatty acid.

### STABILITY OF OILS AND FATS

Stability of oils and fats means resistance to oxidation which produces bad smelling and tasting compounds in the product. Stability is affected by composition, processing and storage. A well-processed oil should be stored away from light and heat.

Stability is also related to the degree of saturation of the fatty acids. The greater the unsaturation the more unstable the oil tends to be.

### RANCIDITY

Rancidity is a characteristic odour and taste associated with foods containing fats and oils that are no longer palatable. It can be caused by the effects of heat and oxygen or by yeast and moulds. The fats and oils act as reservoirs for the bad flavours – anyone will notice that oils easily pick up flavours from the foods around them in the refrigerator.

### STORAGE OF OILS AND FATS

Butter and margarine should be stored in sealed containers in the refrigerator (not for long periods in the conditioner). Butter and margarine have a shelf life of 3–6 months at 4°C and greater in the freezer.

Oils should be stored in the dark, e.g. in a cupboard or pantry. Strong light will cause oxidation of the oil. Oils have a shelf life of 6–12 months depending on their processing and initial stability.

### PROCESSING OF VEGETABLE OILS

Vegetable oils are extracted from the seeds or fruit of plants. The seeds are crushed, the oil extracted by mechanical pressing (expellers) or with solvent, and then they are bleached and deodorised. This produces a clear product with a bland flavour. Because of the high extraction rates the price is low. Oils produced in this way are canola, peanut, safflower, soy Bean, rice bran oil and sunflower. Cold pressing of seeds or fruits is used to produce premium or specialist oils, e.g. olive, avocado, flaxseed, sesame, walnut and hazelnut.

### SATURATED VEGETABLE OILS

Two examples of saturated vegetable oils are coconut oil (92%) and palm oil (48%). Coconut oil is used in the food industry, cosmetics and soap making. Edible uses include industrial biscuit fillings and imitation chocolate coatings. The product Kremelta is coconut oil that has been purified and hydrogenated. Palm oil is used in pastry shortenings, commercial cake margarine and biscuits. The fractionated palm oil known as olein is used in the snack food and fast food industries as a stable oil for use in deep-frying.

### POLYUNSATURATED VEGETABLE OILS

Corn, safflower, soy bean and sunflower oils are all polyunsaturated. These oils are suitable for salad dressings, spreads and shallow pan-frying. They are not suitable for deep-frying. Their predominant fatty acid is linoleic (an omega-6 polyunsaturate).

### MONOUNSATURATED VEGETABLE OILS

Monounsaturated oils include canola, olive avocado and peanut. These oils can be used in salad dressings, spreads, for shallow pan-frying and for deep-frying. The predominant fatty acid in these oils is oleic (an omega-9 monounsaturate), but they do also contain some polyunsaturated fatty acids. Canola contains a significant amount (i.e. 10%) of alpha-linolenic acid (an omega-3 polyunsaturate).

### SPECIALIST OILS

Specialist oils are generally from minor crops and are only available in limited amounts. The oils need to be carefully extracted and refined usually by cold pressing. This retains the distinctive flavour of the oil. Many of the oils are classed as monounsaturated e.g. almond, apricot, avocado, hazelnut, macadamia, and olive. Polyunsaturated specialist oils are grape seed, sesame, walnut and wheat germ. Flaxseed or linseed oil is high (55%–60%) in ALA (alpha-linolenic acid) which is an Omega-3 polyunsaturate. Oils which are rich in GLA (gamma-linolenic acid), an omega-6 polyunsaturate, are evening primrose, borage and blackcurrant. These have been used as dietary supplements.

### OLIVE OIL

Olive oil is a monounsaturated oil extracted from the flesh of the olive (*Olea europaea*). The oil has a clear yellow/green colour and a characteristic flavour and unique stability. Olive oil is available in several grades.

- Extra virgin olive oil is obtained by cold pressing. The fruity flavour, oil colour and natural properties of the olive are all preserved. A wide range of flavours and aromas are available. The free oleic acid content is no more than 1g per 100g of oil.
- Virgin olive oil is obtained the same way as extra virgin. It has a good flavour and an acidity level in terms of free oleic acid of above 1g and less than 3g per 100g of oil.
- Pure olive oil or 100% olive oil is the common name for a blend of refined olive oil and virgin olive oil. Its acidity in terms of free oleic acid is below 1.5g per 100g of oil.
- Extra light olive oil is a blend of refined oil and very small amounts of virgin oil to give a light subtle taste. its acidity is the same as for pure olive oil.

The health benefits of good quality extra virgin olive oil are attributed to both the fatty acids and the natural antioxidants called polyphenols. Refining of olive oil removes these antioxidants.

#### DAIRY AND DAIRY SUBSTITUTE FAT PRODUCTS

- Cream is an oil-in-water emulsion of milkfat. Standard cream contains 40% fat (50% of which is saturated). On whipping it turns into a water-in-oil emulsion.
- Butter is a traditional product made entirely from dairy ingredients. It is produced by churning cream. There is no refining as this would remove the desirable flavour. Butter consists of a minimum 80% milkfat and a maximum 16% moisture. Its key properties are its unique flavour, colour and melting characteristics in the mouth. It is used as a spread, in baking, in pastry and for shallow pan-frying.
- Dairy blends are spreads made from butter and vegetable oils. They combine the benefits of butter flavour, edible oil spreadability and the nutritional benefits of unsaturated fatty acids.
- Margarine is a product that originally was produced as a butter substitute with the butter fat replaced by vegetable oils or edible animal fats. It is an emulsion consisting of a minimum 80% oil or fat and a maximum 16% moisture. The consistency and melting characteristics of margarine are determined by the fat blend which may be saturated, monounsaturated or polyunsaturated. There are no margarines now on the New Zealand market as they are all “spreads” with < 80% fat. Be careful when using these products in baking in place of butter as it is the fat content that has the functionality.

#### PROCESSING OF ANIMAL FATS

Animal fats are produced by rendering animal tissues and carcass cuts. These fats are then bleached and deodorised. The fats produced are lard, tallow and beef dripping. All of these fats are classed as saturated fats even though they are not fully saturated (approximately 50%).

- Tallow is obtained from beef and mutton fat. It can be used for deep-frying and for the manufacture of pastry margarine. Most commercially available products have been deodorised and are bland, e.g. Chefade.
- Beef dripping is obtained from beef fat. It is sold by butchers and in supermarkets. It can be used for deep-frying. It has the characteristic flavour of beef since it is unprocessed.

#### FISH OIL

Fish oil is not commercially available as an oil for culinary use. It is, however, nutritionally important as a source of omega-3 fatty acids. In particular fish oils are a good source of DHA (docosa- hexaenoic acid) and EPA (eicosapentaenoic acid). These fatty acids have been linked to reduced risk of cardiac heart disease. They also act as anti- inflammatories. The fish which have the highest amounts of these fatty acids are oily fish usually found in cold waters, such as mackerel, tuna, salmon, herring or anchovies. Tropical fish have low levels of EPA and DHA. Deep water fish such as orange roughy have zero EPA and DHA. Their lipids are wax esters.

**FAT CONTENT OF COMMON FOODS**

Food	Percentage	Type
Butter	80	Saturated
Margarine	80	Polyunsaturated
Spreads	40–65	Monounsaturated
Peanut Butter	60	Monounsaturated
Nutella	32	Monounsaturated
Biscuits	10–15	Saturated
Cake	12–30	Saturated
Pastry	30–50	Saturated
Milk	3–4	Saturated
Cheddar cheese	33–35	Saturated
Cottage cheese	4	Saturated
Yoghurt	1–3	Saturated
Avocado	22	Monounsaturated
Olives	3.5	Monounsaturated
Nuts	30–50	Polyunsaturated and monounsaturated
Sausages (Beef fried)	17.3	Saturated
Sausages (Pork fried)	24.5	Saturated
Hamburgers	10.2	Saturated
Muesli Bars	10	Monounsaturated
Potato Chips	35–39	Saturated and monounsaturated
Mayonnaise	30	Polyunsaturated and monounsaturated

**FATS AND COMMON FOODS****Saturated**

Butter, Cream, Cheese

Coconut, Palm oil

Meat fat, Poultry skin

Pies, Pastries, Cakes, Biscuits, Croissants

Chocolate, Carob

Sausages, Salamis, Luncheon meats

Eggs

**Monounsaturated**

Canola oil and spreads , Rice bran oil

Olive oil, Olives

Monounsaturated margarines and spreads

Peanut oil, Peanuts, Peanut butter

Avocado

Most nuts

**Polyunsaturated**

Oils – safflower, sunflower, corn, soy bean, cotton seed, walnut, sesame

Polyunsaturated spreads

Seeds – sunflower, pumpkin, sesame, flaxseed

Fish

Walnuts, Brazil nuts, Pine nuts

[For more information:](#)

[www.oilsfats.org.nz](http://www.oilsfats.org.nz)

Our first handbook was produced in 1991, with the purpose of providing a reference tool that in turn would establish standards for New Zealand food writers. In 1999 the handbook was updated to reflect the growing needs of members.

Food Writers New Zealand is indebted to our hardworking, talented, innovative and active contributors who provided their specialist input for this latest edition.

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**KATHY PATERSON, PRESIDENT, 2016**

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