IMCD Business Group Personal Care

VEGETABLE OILS AND FATS

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Value through expertise
Western civilization has successfully exploited a number of these oils which became readily available as reasonably priced food oils and applied these, amongst others, in cosmetic formulations. As a result useful minor oils, which were well known in ancient times were phased out in the last decades by economical, larger volume oils or synthetic products.

As science started to explore more systematically all available seeds and their oils, many very interesting oils were discovered and brought back into prominence. Also hitherto completely unknown oils with very unusual properties and chemical structures were discovered. Due to the increasing demand for natural, non-animal derived products as well as the vastly improved knowledge of the mode of action of the individual components of products of natural origin, the interest for vegetable oils is resurgent.

This compilation of well known exotic oils and fats is intended as a brief guide for technical and marketing people in the cosmetic industry to assist them in the proper choice of one of the main ingredients of their formulations.
Vegetable oils and butters offer the cosmetic formulator and marketeer an interesting field to exploit. Not only does the oils serve as a useful ingredient from a ‘technical’ point of view in the product itself, it can also contribute to the attractiveness of the product when it stands on the shelf. The choice of vegetable oil can easily contribute to the ‘theme’ of the product.

Vegetable oils offering a lot of ‘depth’ to their approach as cosmetic ingredients. What about the beautiful names such as gold of pleasure, the nice tropical countries many butters come from, the taste of the avocado fruit, or e.g. the beautiful flowers of passionflower or sesame! A lot of opportunities here!

**Confidence**

Even in food, the general public has recognised the importance of fatty seeds and fats in our food, as reflected in diets relying on food sources that has been part of our diet since thousands of years. An example is the respected avocado oil, obtained from a delicious fruit, eaten as guacamole. An intimate relationship is seen between vegetable oils and our own body - fatty acids are part of the human skin surface lipids! Vegetable oils (we should also read ‘butters’) show we can use nature’s benefits just as nature has intended it.

**Basic efficacy**

Oils can do a lot more than just moisturise, and their biological efficacy is not just based on the unsaponifiable fraction or trace components, but also on their triglyceride fraction, as we will see.

**Omega oils**

When talking about oils, the term ‘omega’ often appears, even among the general public. Chemically speaking it indicates the position of the first double bond from the tail. The different ‘omega types’, e.g. 3 or 6, are metabolised within their own pathway, but enzymes are shared over the two pathways, possibly enabling manipulating with supplementation to push certain pathways in a more anti-inflammatory direction. A short ‘omega countdown’ follows here.

**Omega-9**

Oleic acid is the most well-known omega-9 fatty acid, and is found in many vegetable oils, like olive and hazelnut oil. Some oils occur both as a linoleic-and oleic-rich version’, such as safflower and sunflower oil, differing in oxidative stability, but also e.g. skin feel.

**Omega-7**

Examples of omega-7 fatty acids are the monounsaturated palmitoleic acid (C16:1n7) and cis-vaccenic acid (C18:1n7). Palmitoleic acid occurs in relatively high quantities (approx. 20 %) in macadamia nut oil, an oil which easily has a monounsaturated fatty acid content (80 %) higher than e.g. olive oil.

Macadamia nut oil has been the subject of several studies investigating the health benefits, as shown on cholesterol profile in humans (Greil et al 2008). Palmitoleic acid has shown to improve insulin resistance in mice, partly owing to supressing proinflammatory gene expressions (Yang et al 2011).

An important advantage in skin care is the superb penetration of macadamia nut oil, and the velvety feel, making it a highly desired ingredient in personal care formulations.

An additional advantage of the oil is the oxidative stability. Although it is already quite stable, stability can even be improved easily by adding antioxidants, as inhouse studies have shown, contributing to the confidence in the freshness of the final product.

**Omega-6**

Omega-6 is a well-known omega type among the vegetable fatty acids. They play an important role in the skin as well, and are part of the skin barrier. An essential fatty acid deficiency has a large effect on the skin barrier function, and will lead to a scaly skin.

Oils such as sunflower, safflower, grape seed offer a high level of the well-known omega-6 essential fatty acid linoleic acid (C18:2).

Linoleic acid is metabolised in the body to gamma-linolenic acid (GLA, C18:3n6). However, the conversion of linoleic acid to GLA is poor, and rate-limiting. Moreover, many factors such as illness and age impair the conversion. Oils high in GLA are e.g. from the seeds of evening primrose (Oenothera biennis) (approx. 9.5 % GLA), blackcurrant (Ribes nigrum) (approx. 14 % GLA) and borage (Borago officinalis) (GLA over 20 %). Many health advantages are connected to GLA. Oral consumption of GLA improved dry skin (Kawamura et al 2011), and evening primrose oil improved skin moisture, TEWL, elasticity, firmness, fatigue resistance and roughness in healthy adults (Muggli 2005). Topically applied GLA reduced itching (Chen, Chiu and Wu 2006), and GLA (as borage oil has also been studied in a test as a possible transcutaneous delivery system for the delivery of agents against breast cancer (Karia et al 2004).

The effect of topical borage oil on the skin barrier function is nicely illustrated in a test using volunteers. A cream with 3 % borage oil yielded a smoother, more hydrated skin than with 3 % safflower oil. Same pattern was seen after SDS treatment, while borage oil restored the TEWL to lower values than safflower oil (Nissen, Blitz and Muggli 1995).

There is no active conversion from linoleic acid to GLA in the skin. Therefore, we have to rely on ‘preformed’ GLA when we want to profit from this in the skin. The route to arachidonic acid (C20:4n6), which is the precursor of proinflammatory substances, however, is suppressed in the skin as it requires the action of delta5-desaturase. In the body, GLA can be further metabolised into anti-inflammatory eicosanoids, such as prostaglandin of series 1 (Kapoor and Huang 2006).
Omega-3 fatty acids are very important for human health, and often the omega-6/omega-3 ratio is too high.

In vegetable oils, omega-3 is mostly represented by alpha-linolenic acid (ALA, C18:3n3), present in very high concentrations in e.g. linseed oil. Diets have an effect on the skin - upon linseed oil supplementation, many skin parameters have improved after 12 weeks in a study, more than with safflower oil (Neukam et al 2011). Eicosapentaenoic acid (EPA, C20:5n3), which contains anti-inflammatory properties, has a potential as an anti-ageing ingredient. Topical administration of EPA reduced UV-induced epidermal thickening and inhibited UV-induced decrease of collagen. EPA attenuated UV-induced MMP-1 and MMP-9 expression. EPA also increased collagen and elastic fibers expression in aged human skin (Ho Kim et al 2006).

It makes sense, e.g. because of the lack of desaturase activity, to start from higher metabolites. Blackcurrant oil for instance, apart from GLA, it contains approx. 2.6 % stearidonic acid, a higher metabolite, and serves as a nice way of providing the desired fatty acids in one oil.

Stability
Of course, highly unsaturated oils are very susceptible to oxidation, and heavily rely on the use of antioxidant for an optimal stability in the final product.

Sustainability and fair pricing
In some cases, the supply chain is constructed around a system which maximises the revenues of the people involved in production in the countries of origin. A very good example of this fair pricing is shea butter. When working together with local women organisation in Burkina Faso or Ghana, we can increase the revenues for the women, by paying a fair pricing reflecting their effort in wildpicking and/or crude butter manufacturing.

Trainings and preference can be part of this system. As a result, their financial independence is increased, they can pay e.g. for medicines for their children, or buy a bicycle. Our company has participated in such programs.

Shea butter would also be suitable for a more technical approach, as it contains a high level of soothing anti-inflammatory unsaponifiables, partly consisting of anti-inflammatory triterpenes (Akihisa et al 2010), which are very useful in anti-ageing personal care formulations. No surprise, shea butter is known for its soothing effects - very beneficial after sun exposure. It has shown to reduce redness of the skin in guinea pigs after UV exposure (Eggensperger 1995). It might also smoothen the skin and reduce wrinkles (Renard 1990).

REFERENCES


APRICOT KERNEL OIL

(Prunus armeniaca)

Apricot Kernel Oil is a light yellow oil with a relatively dry non greasy feel, being lower in saturated fatty acids than other triglyceride vegetable oils. The oil is obtained by pressing of the kernels.

Origin

It was probably the Chinese who first cultivated apricots before 2,000 B.C. Presumably the fruit was spread westward by silk traders, which resulted in its reaching Persia by the 1st century B.C. and Greece and Rome soon afterwards. The Greeks wrongly supposed the fruit to have originated in Armenia and called it Armenian apple, hence its botanical name. The Romans, impressed by its early ripening, named it "praecocum" (precocious) and from this comes apricot. Nowadays the apricot is grown extensively in all regions with a warmer temperate climate. Outside the Mediterranean large plantations are also found in California, South Africa, Australia and China. Apricots are mainly cultivated for their delicate fruits which can be eaten fresh, dried and canned. Apricot kernels are similar to almonds, but cost less and have many uses in confectionary items. The Italian "Amaretti di Saronno" owes its flavour and texture to apricot kernels. Apricot kernels are also used in traditional Chinese medicine.

Properties

Apricot Kernel Oil is a useful emollient as it has a good "slip" and good occlusive properties. These properties enable the oil to act as a moisturising agent by preventing excessive loss of moisture through the epidermis. The oil is characterized by a somewhat dry feel.

AVOCADO OIL

(Persea gratissima)

Refined Avocado Oil is obtained by pressing and centrifugal extraction of the soft flesh of the avocado. Crude Avocado Oil is a dark green oil with a nutty taste. After refining an oil is obtained which is a very valuable ingredient for many cosmetic products.

Origin

Avocado is most probably originating from southern Mexico. In contrast to most other vegetable oils, Avocado Oil comes from the flesh instead of the stone of the fruit and was therefore one of the easiest oils to extract by the early civilisations. It was a traditional beauty oil used by the tribeswomen of Mexico and well known to ancient Mayan and Aztec Indian civilizations. In the early 16th century a Franciscan priest recorded its use in Mexico and wrote: among the fruits found in the mountains is one they call "ahuacatl", i.e. that which hangs on the tree and looks like a large pear. The origin of the word is the Aztec: ahuacatl, which refers to its shape. Avocado trees are now widely grown in many tropical and subtropical countries, mostly for the fresh fruits which are a well known and highly appreciated delicacy.

Properties

Avocado Oil is more easily absorbed by the skin than many other cosmetic oils, assumed to be partly due to its content of palmitoleic acid, a fatty acid which is relatively rare in vegetable oils. Avocado Oil is also appreciated for its unsaponifiable fraction. Avocado Oil is regarded as one of the most suitable and effective cosmetic oils.
CASTOR OIL
(Ricinus communis)

Castor Oil is a very light viscous oil with a slight but characteristic odour. It is the only triglyceride oil with up to 90% ricinoleic acid which gives it its unique property of being soluble in alcohol. Furthermore, it is an extremely stable oil with a unique solubilisation power.

Origin
Castor is an annual or perennial plant indigenous to Eastern Africa but now widely grown in tropical and sub-tropical countries with low rainfall. It is a bushy plant with soft spiny fruits somewhat like chestnuts which contain gray and black mottled seeds. Castor Oil intended for cosmetic applications is obtained by pressing followed by parification treatments.

Properties
Castor Oil is being "rediscovered" by the cosmetic industry. It can be described as a substance with a triglyceride structure so uniform that it outperforms most oil and fat derivatives now used in cosmetics. Its viscosity is higher, it is light in color and resists oxidation very well. Castor Oil has a favorable toxicology profile with respect to topical use. Castor is a mild moisturiser and is non-comedogenic, with excellent film forming and pigment-wetting properties. It is used in lip balms, massage oils, creams and a wide range of stick products. The high solubilisation power of Castor Oil gives it a unique position among the vegetable oils.

Crude Cocoa Butter has a distinct chocolate flavor and aroma. Cocoa Butter is one of the most stable fats known, containing natural antioxidants that prevent rancidity and give it a long storage life, making it a good and confident choice for non-food products. The smooth texture and emollient property of Cocoa Butter make it a popular ingredient in cosmetics and skin care products, such as creams, soaps and lotions.

Origin
The cacao tree is a small, tropical, evergreen tree which grows to approximately between 4 to 8 meter in height. The tree is native to Central and South America and the West Indies. Today the cacao tree is cultivated in West Africa, Java, Ceylon, Costa Rica, Brazil, Peru, Venezuela, Ecuador and other tropical places. The cacao tree is a member of the Sterculiaceae plant family. The seeds of the cacao tree were considered to be very valuable and in ancient times, the seeds were used as an early form of money; the Mayan people of Mexico traded cacao seeds extensively throughout their empire. Cocoa was named Theobroma and means ‘food of the gods’.

Properties
Cocoa Butter has been used in high quality cosmetics for centuries. More and more, the constituents of cocoa, such as polyphenols, are linked to favourable health effects, in particular related to their anti-inflammatory properties and the antioxidant properties which may help to reduce oxidation of LDL-cholesterol and fight reactive oxygen species. In other words, they can form a factor against atherosclerosis, heart diseases and a large variety of illnesses related to reactive oxygen species. In addition, cocoa has also been linked to a favourable effect on the immune system.

Benefits:
Cocoa Butter contains natural antioxidants that give it a long shelf life. Cocoa Butter is mainly used as a thickening agent and is a common ingredient in lipsticks, soaps and emollient creams. It is used as a superb moisturiser in many formulations. It is also a folk remedy for burns, cough, dry lips, fever, malaria, rheumatism, snakebite and wounds.
Evening Primrose Oil is obtained from the tiny seeds of the Oenothera biennis, in which the oil is present in a ca. 20% concentration. Recently Evening Primrose Oil has received a great deal of attention, because it contains the rare essential fatty acid gamma-linolenic acid, which is found in only a few other plant species.

**Origin**
American Indians used the native Evening Primrose plant for centuries. It is introduced about 400 years ago in Europe. The Evening Primrose has since flourished as both an ornamental flower and a medical herb in Europe, enjoying such names as "Beauty of the Night" in France and "Virgin Night Candle" in Germany, because its luminous, four petalated yellow flowers open only in the evening. Evening primrose is grown in countries with a continental or temperate climate.

**Properties**
Evening Primrose Oil is rich in two very important polyunsaturated fatty acids, as it contains over 70% linoleic acid and over 9% of the rare gamma-linolenic acid (GLA). In the body, GLA is metabolised to hormone-type substances which play key roles in a wide range of physiological functions in the human body, especially in the skin. Omega-6 fatty acids like linoleic acid and gamma-linolenic acid (GLA) play an important role in the barrier function of the skin, and oils containing these fatty acids can work in more ways than occlusion alone. In this way, these fatty acids can really be considered as actives, with the skin as one of the target organs. GLA can be formed from linoleic acid, but the epidermis is deficient in the enzyme, delta-6 desaturase, responsible for this metabolism. Furthermore, this metabolism is impaired by age, stress, alcohol intake and diabetes. An impaired omega-6 metabolism contributes to a scaly skin with a reduced barrier function. GLA can be seen as a conditionally essential fatty acid for a healthy skin, as it is shown by studies. Evening Primrose Oil intake has been linked to an improvement of the skin. Evening Primrose Oil is characterised by a light skin feel.

Gold of Pleasure Oil is characterised by an interesting fatty acid profile, with a high level of beneficial omega-3 fatty acids. Its superb, light skin feel, with a good penetration makes it a valuable ingredient in cosmetics.

**Origin**
Gold of Pleasure Oil is the oil obtained from Camelina sativa. Other names include false flax or Camelina, German sesame or Siberian oilseed. The old name for the plant in Dutch refers to the yolk-yellow colour of the flowers. It is a flowering plant from the Brassicaceae family. It is native to southeast Europe and southwest Asia, and has been introduced to other parts of the world, such as Northern America. It often occurs as a weed accompanying flax, hence the name ‘false flax’. The main growth area was from East Europe to Central Asia.

**Properties**
The oil is a rich source of omega-3 fatty acids. It contains high levels (ca. 34%) of alpha-linolenic acid (C18:3n3). Omega-6 fatty involve linoleic acid, present in ca. 18%. Furthermore, it contains omega-9 fatty acids. It contains oleic acid (ca. 14%), and, which is quite rare, eicosenoic acid (ca. 15%). Omega-3 fatty acids are known for their anti-inflammatory effects and the inhibitory effects on platelet aggregation. The longer, more unsaturated metabolites of linolenic acid have important functions in the human body, such as in the brain and retina. Gold of Pleasure is a nice example of an oil containing omega 3, 6, and 9 fatty acids in significant quantities.

Omega-6 fatty acids play an important role in the skin. An essential fatty acid deficiency (EFAD) would result in a scaly skin with a high water loss. It has even been shown that the supplementation of certain oils improve the barrier function of elderly people. Gold of Pleasure Oil has been an edible oil in Europe, up until the 1950’s after which rape took over the role.

Unfortunately, this change has not been hindered by the knowledge we now have about the beneficial role of e.g. omega-3 fatty acids and the importance of an optimal balance between the fatty acids. Gold of Pleasure Oil is also appreciated for its potential health benefits in food, as shown in oral intake studies.
GRAPE SEED OIL
(Vitis vinifera)

Grape Seed Oil is a yellow-greenish oil with virtually no odour. It is obtained from grape pips and is subsequently refined. The oil is characterized by its high content of linoleic acid (up to 70%).

HAZELNUT OIL
(Corylus avellana)

Hazelnut Oil is obtained from pressing hazelnuts. Hazelnut Oil is characterised by a very high content of (mono-unsaturated) oleic acid, making it a very stable oil suitable for many cosmetic applications.

Origin
Although the grapevine has been around for thousands of years, commercial oil extraction from the pips is a fairly new process, probably because unrefined Grape Seed Oil is considered unpalatable and adequate refining processes were not available until this century. Virtually all Grape Seed Oil is produced in France and Italy, and most of it is used as a fine cooking salad oil.

Properties
Grape Seed Oil is a relatively quick-penetrating oil with a dry skin feel. It has an extraordinary high content of linoleic acid, an essential fatty acid (EFA) which is readily taken up by the skin and reduces the Trans Epidermal Water Loss (TEWL) and thereby restores the elasticity of the skin.

Unlike other oils which work by occlusion only, Grape Seed Oil functions curatively by incorporation of the EFA into the stratum corneum, which might give a much longer lasting effect than occlusive oils.
**JOJOBA OIL**  
*(Simmondsia chinensis)*

Jojoba Oil is obtained from the beans of the jojoba shrub by mechanical pressing. Unrefined Jojoba Oil has a golden colour, whereas refined Jojoba Oil can reach very low colour values.

**Origin**
Jojoba is an evergreen shrub, about 1 - 2 metres high, with opposite, oblong-ovate 2 - 4 cm long dull-green leaves. The beans are nutlike and leathery, about 2.5 cm long with an ovoid shape. The seed contains ca. 50% of Jojoba Oil. It grows in California, Arizona and South America in deserts and other dry places. The shrub is a real miracle when it comes to survival - it has to cope with very low night temperatures as well as temperatures up to 45˚C during daytime. The shrub has very long roots, which can reach water-containing parts. Despite the high temperatures and drought, it is believed to reach ages of 200 years.

Originally one mistakenly thought that the species came from China, which is reflected in the name Buxus chinensis. The name Jojoba is derived from the Indian word ‘Jojowi’.

Jojoba Oil has deserved its place in traditional medicine. Indians in Mexico have used the oil for their hair, and it is externally applied to head sores. The oil has replaced an animal oil similar to Jojoba Oil.

**Properties**
Jojoba Oil has a quite unique composition. It does not have the triglyceride structure which is usually found in vegetable oils, but it consists of very long straight-chain wax esters, the major fatty acid component being eicosenoic acid (C20:1). It is known for its extremely high stability to oxidation.

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**MACADAMIA NUT OIL**  
*(Macadamia ternifolia)*

Refined Macadamia Nut Oil is a light yellow oil. It is characterized by a high content of mono-unsaturated fatty acids with, for a vegetable oil, an unusual high quantity of palmitoleic acid (ca. 20%). It is therefore an excellent replacement for the animal derived mink oil. The old name Macadamia ternifolia is still often used, the species used are actually Macadamia integrifolia or Macadamia tetraphylla.

**Origin**
The macadamia tree is indigenous to an area around Brisbane in Queensland, Eastern Australia. However, it was introduced to Hawaii and other subtropical countries in the late 19th century and now Hawaii and Australia are the world largest producers of macadamia nut. The macadamia nut is called “the king of the nuts” and is being considered “the crème de la crème” of nuts. The oil is produced by cold pressing of the nuts and is refined after pressing. The old name Macadamia ternifolia is still often used, the species used are actually Macadamia integrifolia or Macadamia tetraphylla.

**Properties**
The major fatty acids of Macadamia Nut Oil are oleic acid (about 59%), and palmitoleic acid (about 20%). One of the ideas behind the use of Macadamia Nut Oil in skin care cosmetics is to replenish components which decrease with ageing. It is one of the most penetrating oils known, and therefore sometimes called a “vanishing oil” because of its rapid absorption by the skin. Thus it is a valuable component in a broad range of skin care cosmetics. It has a remarkable, rich, velvety skin feel. The relatively high level of palmitoleic acid fits well into the awareness of the possible healthy influence of monounsaturated fatty acids.
Mango Kernel Butter is a soft butter, obtained from the mango kernels. The butter is subsequently refined, bleached and deodorized to meet the stringent requirements for cosmetic applications.

Passionflower Oil is a yellow oil, obtained by careful expeller pressing of the seeds of the passion fruit. To obtain a good quality oil, suitable for cosmetic applications, Passion Flower Oil is refined, bleached and deodorized.

Mango Kernel Butter
(Mangifera indica)

Mango Kernel Butter is a soft butter, obtained from the mango kernels. The butter is subsequently refined, bleached and deodorized to meet the stringent requirements for cosmetic applications.

Most of it is being used as Cocoa Butter replacer in the chocolate industry. Meanwhile, the excellent emollient properties of this butter have also attracted the attention of the cosmetic industry.

Properties
Mango Kernel Butter is characterised by a high content of stearic acid (up to 45%) giving it physical properties comparable with Cocoa Butter. It combines excellent emolliency with good oxidative stability, making it a very suitable replacement for many synthetic emolliency enhancers.

Origin
The mango, one of the world finest tropical fruits, has been cultivated in India for several thousand years. Although mangos are now grown in all tropical countries, India remains the world largest producer. The mango is considered having great religious significance, for instance by the Hindus. The mango tree plays a role in many myths and traditions in India. After the pulp has been eaten the stones are thrown away as waste. However, the kernels within the stones contain about 6 - 10% of a very valuable butter. This source of good quality butter went unnoticed for a relatively long time. Most of it is being used as Cocoa Butter replacer in the chocolate industry. Meanwhile, the excellent emollient properties of this butter have also attracted the attention of the cosmetic industry.

Properties
Passionflower Oil is a relatively quick penetrating oil with a dry skin feel. It has an extraordinary high content of linoleic acid (up to 75%). Linoleic acid is an essential fatty acid required for the synthesis of stratum corneum membrane lipids. It helps providing a permeability barrier and has a large effect on the transepidermal water loss (TEWL). It plays an important role in the maintenance of epidermal integrity, and the elasticity of the skin. The moisturisation effect of Passionflower Oil might occur via other routes than occlusion alone, and might therefore generate a more long-lasting moisturising effect.

Origin
The passionflower is a climbing plant, native in tropical Brazil and is now grown in tropical areas. It has very remarkable crowned flowers. Jesuit missionaries considered the flowers to symbolise the crucifixion of Christ, because of the similarities between the floral structure and the wounds and nails. The fruits are purple fleshy berries of the size of hen’s eggs and are highly appreciated in exotic desserts. The soft, yelloworange coloured pulp is often used in fruit juices.

Properties
Passionflower Oil is a relatively quick penetrating oil with a dry skin feel. It has an extraordinary high content of linoleic acid (up to 75%). Linoleic acid is an essential fatty acid required for the synthesis of stratum corneum membrane lipids. It helps providing a permeability barrier and has a large effect on the transepidermal water loss (TEWL). It plays an important role in the maintenance of epidermal integrity, and the elasticity of the skin. The moisturisation effect of Passionflower Oil might occur via other routes than occlusion alone, and might therefore generate a more long-lasting moisturising effect.
**RICE BRAN OIL**  
*(Oryza sativa)*

Refined Rice Bran Oil is a yellow oil, obtained from the hulls of rice. It is characterised by a high content of mono- and polyunsaturated fatty acids and a high percentage (ca. 2.5%) of unsaponifiables, which are very valuable for many cosmetic applications. The presence of these unsaponifiables makes it also a very stable oil.

**Origin**

Rice Bran Oil is obtained by solvent extraction. The oil is still mainly produced in the Far East, in particular in Japan, and is there highly appreciated as a superior cooking oil with an excellent stability and more recently also as a valuable ingredient for cosmetic applications.

**Properties**

The fatty acid profile of Rice Bran Oil is characterised by almost equal amounts of oleic and linoleic acid, the latter being an extremely important component for maintaining the moisture and elasticity of the skin. Rice Bran Oil is of special importance for the cosmetic industry due to its high content of very valuable unsaponifiables. It is a very rich source of tocopherols, tocotrienols and phytosterols. Of particular interest in Rice Bran Oil is the compound γ-oryzanol. γ-oryzanol is a mixture containing several phytosterols linked to ferulic acid. It exerts various important activities on the skin, e.g., it enhances the peripheral blood flow and it filters UV light. The interest in Rice Bran Oil is partly based on the recognised beneficial properties of γ-oryzanol.

**SAFFLOWER OIL**  
*(Carthamus tinctorius)*

Refined Safflower Oil is an oil obtained from safflower seeds. Safflower Oil is characterised by an extremely high level of linoleic acid, easily up to 76%. It is highly appreciated as a premium cooking oil, but is also very suitable for cosmetic products.

**Origin**

Safflower is a thistle-like plant with attractive orange-red flowers, which favours semi-arid conditions. Safflower is the world’s oldest crop grown for thousands of years. It has been grown for a very long time in parts of Africa and Asia, involving India, the Middle East, and Ethiopia. It provided a source of red and yellow dyes used as colorant for fabrics and for food. Remains of safflower were even found in the tomb of Tutankhamun. Although safflower is still grown as a source of natural dyes, once the exceptional quality of the Safflower Oil was recognised in the course of this century, the interest for this crop gradually shifted to the production of oil. Currently it is cultivated as a commercial seed crop in many semi-arid parts of the world, like India, Mexico, California and Australia.

**Properties**

Safflower Oil is relatively quick-penetrating oil with a dry skin feel. Because of its low oxidative stability, it would require a proper stabilisation to ensure an acceptable shelf life. It has an extraordinary high content of linoleic acid, an essential fatty acid (EFA) which is readily taken up by the skin and reduces the Trans Epidermal Water Loss (TEWL) and thereby restores the elasticity of the skin. Unlike other oils which work by occlusion only, the EFA in Safflower Oil is anticipated to be incorporated in the skin barrier, which would result in a longer lasting effect than occlusive oils.
Refined Sesame Oil is the refined oil obtained from the seeds of sesame. It is characterised by a high content of natural sesame oil-specific antioxidants such as sesamin and sesamolin, resulting in a high stability of the oil.

**SESAME OIL**
(Sesamum indicum)

**Origin**
Sesame is one of the oldest oil seeds known to human race. A 4,000 year old drawing on an Egyptian tomb illustrates a baker adding sesame seeds to the dough. Sesame was used in funeral and other ceremonies as a purifier and a symbol of immortality. The Vedic scriptures (ca. 1,000 BC) contain frequent references to sesame. Sesame was also known to ancient Greek and Roman authors. Sesame is an annual crop grown in semi-arid regions such as India, Sudan and Mexico.

**Properties**
Sesame Oil has an excellent balance of mono- and polyunsaturated fatty acids giving it very good emolliency properties. Its high content of natural antioxidants not only enhances its stability but also provides extra sun protection.

Shea Butter is a somewhat soft butter, obtained from the kernels of the shea tree. Refined Shea Butter is a highly appreciated butter in the field of cosmetics.

**SHEA BUTTER**
(Butyrospermum parkii)

**Origin**
The shea nut tree is indigenous to the savanna belt in West Africa, from Senegal to Uganda. Its height is up to ca. 10 m. Shea Butter has been used for centuries by the African people as a source of edible fat and for body care. Traditionally, the Africans use it as a medical balm as a protectant or to treat various illnesses related to inflammation or skin damage, with astonishing results.

**Properties**
Shea Butter readily melts at body temperature, making it a very attractive emollient for many skin care applications. The strength of Shea Butter lies in its very high content of unsaponifiables. Many effects of Shea Butter can be attributed to the presence of these unsaponifiables, mostly consisting of triterpene alcohols. Shea Butter has been shown to reduce the redness upon sunburn, in addition to having a sun protection factor itself. On the skin, it has been used to improve skin moisturisation, improve the skin texture and suppleness and to diminish skin wrinkles, but also to obtain a healing effect in cases related to hand dermatitis, sun burns and scars. In conclusion, Shea Butter is an appreciated ingredient to combat the signs of skin ageing.
SHOREA BUTTER
(Shorea robusta)

Shorea Butter is obtained from the fruits of the sal tree. The butter is carefully refined, bleached and deodorized to get a white or slightly yellow butter which meets the stringent requirements for cosmetic applications.

Origin
The sal tree is a semi deciduous huge forest tree which can be 18-30 m tall and with a width of 1.8 - 2.0 m. This typical jungle tree is found in many parts of the Indian subcontinent. The sal is a tree of great antiquity in India and is mentioned in great epics like the Ramayana and the Mahabharata. The tree is best known for its wood, which is extensively used in north, east and central India as timber. The sal tree begins to fruit only after 25-30 years. The tree's blossoms and bears fruit in March/April. In the periods of profuse flowering the whole forest is adorned in a pleasing white colour. The mature pea-sized fruits with dry brown wings fall from the tree and scatter on the jungle floor.

The butter is locally used for cooking and soap production, but a significant amount is exported to be used as a Cocoa Butter replacement. Increasingly Shorea Butter is also being used as an emollient for cosmetic applications.

Properties
Shorea Butter is characterized by its high content of stearic acid (up to 45%) giving it physical properties comparable with Cocoa Butter. It combines good emolliency properties with superior oxidative stability, making it a very suitable replacement for many synthetic emolliency enhancers.

SWEET ALMOND OIL
(Prunus dulcis)

Origin
The almond tree is believed to have originated in the eastern Mediterranean countries, but is now particularly cultivated in warm, sunny climates of Spain, Italy, California and China. The almonds flower in January with a profusion of frothy white blossom, which makes it a very attractive tree in that time of the year. The almonds are wrapped in a tough green husk, which at harvest splits open to reveal the nut inside. Sweet almonds are used as dessert nut and as almond paste or butter in confectionery products.

Properties
Refined Sweet Almond Oil is widely used as an emollient and carrier in the cosmetic and pharmaceutical industry. It can be used in a wide range of clear products, such as massage oils and bath oils. It has good occlusive properties, enabling it to act as a moisturising agent by preventing excessive loss of moisture through the epidermis.
WHEAT GERM OIL
(Triticum vulgare)

Crude Wheat Germ Oil is a bright orange-red oil with a very characteristic fresh odour. Wheat Germ Oil is much appreciated for its high content of vitamin E.

Origin
Because of the very low oil amount present, most of the oil is solvent extracted. In a few rare cases Wheat Germ Oil is produced by cold pressing only. Because of the huge grain processing facilities in the Mid West of the United States, most of the wheat germ is produced in the U.S.A.

Properties
Since many years Wheat Germ Oil has gained its place in the cosmetic industry, because of its excellent efficacy in many skin care products. The oil is a well known carrier of vitamin E. The tocopherol content of crude Wheat Germ Oil exceeds 2,000 ppm, but even the refined oil still easily contains over 1,000 ppm tocopherol. Apart from vitamin E, Wheat Germ Oil also contains high amounts of phytosterols. Furthermore it contains many essential fatty acids - over 50% linoleic acid (omega-6) and about 6% of alpha-linolenic acid (omega-3).