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Essential fatty acids (EFA)

Fats and oils

Fats and oil are probably the most misunderstood components of our diet and indeed of our culinary culture. We are constantly bombarded with mixed messages:

- Reduce the fats intake - we should probably not eat fats at all - fats are dangerous - we need to eat more fats. **We should eat fats with the right content and in the right volume.**

Scientists have established that the human body shall have fats and oils in order to function properly, so that is a fact.

How much then? Science is still debating this and they will probably never reach a final consensus.

However, most people would probably agree that 20 - 25% or maybe a maximum of 30% of the body energy should come from fats or oils.

Of these 20 - 25 - 30% of the total dietary energy supply we should have 1/3 coming from saturated fats and the rest 10 - 15 - 20% of the dietary energy supply shall be divided between monounsaturated and polyunsaturated fats or oils in natural unrefined form, preferable from organic production, cold pressed, without refining, bleaching, deodorizing or any other industrial processing.

Facts about fats and oils

All edible fats both from plants and animal tissue are lipids and these exist in our food.

Lipids that are solid at room temperature are called fats and lipids that are liquid at room temperature are called oil.

In both cases approximately 95% of these fats/oil substances are triglycerides (triglycerol).

The remaining components of edible fats/oils consist of phospholipids, sterols, for example cholesterol, and others.

In the remaining approximately 5% there are a small amount of very major plant substances that are soluble in lipids, as for example the vitamins A - D - E and carotene.

There are three main groups of fats/oils:

1. Triglycerides, which consists of 1 glycerol molecule and 3 fatty acid molecules. Triglycerides are a storage form of fats/oils and are the visible part (approx. 95%) in oils and fats, and the visible fats on meat of any kind.

2. Phospholipids almost resemble triglycerides, but have other properties and are essential for all cellular functions as the membrane enclosing all cells is made of these.

3. Sterols are also fats that among others include cholesterol, which we all know. Sterols contain certain hormones and hormone-like substances and some precursors of vitamin D.

Fats and Oils are many things

Oil is fat in liquid form and a fat is oil in solid form, for example margarine, butter, lard, etc.

Fats/oil can be divided into three main groups (fatty acids):

1. Saturated fats, for example margarine, butter, cheese, lard, coconut oil, meat, etc.

2. Monounsaturated oil such as olive oil, rapeseed oil, etc.

3. Polyunsaturated oils, for example oil from nuts, corn oil, sesame oil, soybean oil, sunflower oil, thistle oil, grape seed oil, flax seed oil, evening primrose oil.

The different fats and oil types have the following estimated content of these three types of fats/oil fatty acids:

	Saturated Fatty acid %	Monounsaturated Fatty acid %	Polyunsaturated Fatty acid %
Mixed products	52	37	11
Margarine with 80% fats	49	32	19
Butter	68	30	2
Coconut oil	92	6	2
Pork lard	44	46	10
Corn oil	12	29	59
Sesame oil	14	42	44
Olive oil	15	76	9
Soybean oil	15	22	63
Rape seed oil	7	58	35
Sunflower oil	11	23	66
Grape seed oil	10	19	71
Thistle oil	9	13	78

All the above and more fats and oils may be found in different varieties on the supermarket shelves and it is almost always industrially processed, which unfortunately, have removed the most important and healthiest part of these fats/oils and when these are stored on the shelves in limp bottles with no protection against light (UV) in the form of coloured glass and cardboard boxes, even more nutrients will be lost, because during the industrial treatment the oil is either heated to a very high temperature or chemically treated to produce a saleable super market friendly product with a long shelf life. These oils, together with industrially processed spreadable products, are generally the dangerous fats that we consume, also classified as 'Killer Fats'. This clearly illustrates how important it is to choose our daily fats intake wisely and to combine this with an extra intake (supplement) of the Essential Fatty Acids (EFA), N3/Omega 3, N6/Omega 6 and GLA (Gamma Linolenic Acid also an N6 fatty acid). This will assure the best balance between the LDL cholesterol (the bad) and HDL cholesterol (the good).

Killer Fats

The manufacturing processes of several commercially used oils convert healthy fatty substances into killer fats. The main categories of such processes are:

Fat hydration (hydrogenation) - this process converts liquid oils into cheap, spreadable fats with long shelf life. During this process the essential fatty acids change into abnormal molecules, so-called trans fatty acids (known as trans fats) that never have existed naturally in such a combination as we find them today in margarine, fats, oil margarine and partly steeped vegetable oil and vegetable fats.

Degumming - treated with window cleaning agent (phosphoric acid, a very caustic acid). This process removes phospholipids and lecithin, a kind of fibre (true gums), protein-like substances and complex carbohydrates (polysaccharides) are also removed from the oil. Further the process removes chlorophyll, calcium, magnesium, iron and copper from unrefined oils. Degumming is performed at about 60°C.

Refining - treated with sodium hydroxide (NaOH caustic soda) a very caustic base used to clean blocked drainpipes. During this process the oil is mixed with sodium hydroxide. The refining removes free fatty acids from the oil. The free fatty acids form soap with NaOH, which is dissolved in the watery part of the mixture. Phospholipids, protein like substances and minerals are also removed during refining. The refining temperature is approximately 75°C.

Bleaching - treated with bleaching clay. The bleaching removes colouring, chlorophyll, beta-carotene and residual soap. The process generates rancidity (peroxide) that gives an unpleasant odour and flavour to the oil. Bleaching process is made at 110°C and lasts from 15 to 30 minutes.

Deodorisation - Heated to higher than frying temperature, 240°C to 270°C for 30 to 60 minutes to remove any peroxides that were generated during the bleaching process. The process destroys the nutritional value of the oil and produce transfatty acids. Other toxic chemical changes occur at such high temperatures. We can only speculate on the damage caused by frying oils to the future generations and in a possible link between these and the development of new permanent genetic changes that unfortunately are detected more frequently among infants.

The above procedures create oils that are colourless, odourless, tasteless and almost completely

without nutrients. They can be compared with white sugar and white flour, products from which most of the essential nutrients are removed. Apart from virgin olive oil that is unrefined and not deodorized and maybe rapeseed oil, if this is untreated, then most oils on the supermarket shelves have undergone some of the above-mentioned harsh processes.

Fats and Health

Another contributor to health problems is the surplus of hardened fat (saturated fat). Fat that originates from pork, beef, lamb, and dairy products are natural non-synthetic and not affected by processing. The body uses this fat in the structure of the cell membrane, in fat deposits and as fuel. However, too high an intake generates more sticky blood platelets, upset the production of insulin, and destroy the essential fatty acids - the good part of the fat.

How much saturated fat is it safe to eat?

If we worked as physically intensely as our grandparents did, then we could burn, digest and convert much of the saturated fats into energy. But as our daily activities mostly are deskbound work and our leisure time often is without noteworthy exercise, then we must limit the intake of industrially hardened fats/saturated fats and instead use nature's pure saturated fatty acids and increase the intake of monounsaturated and polyunsaturated fats/oil.

The more industrialised saturated fats we eat the more of the essential fatty acids we need to eat in order to create a balance between the LDL (bad) versus HDL (good) cholesterol.

Sugar is also “fat”

Sugar is not directly fat; however, if we do not burn up the energy we get from our sugar intake it is converted and stored as fats for possible later energy consumption. We must be aware that a high intake of sugar is harmful.

All large-scale consumers of sugar, especially children and juveniles consuming high quantities of soft drinks, coca-cola, etc., can get so big a sugar intake that it causes mortal obesity. As we know and can monitor, obesity is and will remain one of the major problems of civilization. More than 25% of the population in the industrialized countries already suffer from obesity followed by the work and health-related diseases that create catastrophic health- and socioeconomic problems. Therefore, we should discuss the removal of sweets, sodas and coca-cola vending machines from schools and other places where children and juveniles assemble. These machines have no place in such locations as a possible future obesity is established in early life.

In 2003, the World Health Organization (WHO) set up rules and guidelines for the maximum sugar intake in relation to total energy consumption and suggested that all countries introduce regulations limiting the sugar intake per person to a maximum of 10% of the daily energy intake.

This resulted in strong protests from the major sugar industries and manufacturers of products high in sugar content, such as soft drinks, sweets and cakes, and they may have so big an economical power that the recommendations from WHO may not be implemented, especially in the USA. So the USA will probably continue to be the fattest country in the world.

Trans fatty acids

Fast Food, whole and semi-cooked dishes

We must carefully distinguish and evaluate which type of fats and oils and in which quantity these are to be a part of our daily food.

Our industrialized world and highly processed food production have developed techniques where even substantial quantities of cheap fats can be hidden among other products used to give a tasty and competitive end product, with far too high a content of fats and additives. Our normal food intake can, therefore, contain five to ten times more saturated fats than we are aware of (in the USA it is 20 times more). We are most likely not told the whole truth about the fats content or type of fats from the food declaration on the labels on the food, often it is simply described as vegetable fats and sometimes not declared at all, making it very difficult to know exactly what we are eating. The result is far too many overweight people with diseases created by being overweight and obese. Even though the USA statistically has reduced the average fats intake, the occurrence of obesity has risen with alarmingly speed. It is well documented that the consumption of unhealthy fats, saturated fat from fast food, ready-prepared and semi-cooked dishes is the real cause of obesity, especially when this is combined with lack of exercise. Obesity may even become the biggest cause of premature death in the future.

There are Fats - but some are fatter than others.

In these industrial products it is nearly always hydrogenated fats in their “trans” form and thereby

damaging to our biological system.

The majority of all the fats we use on a daily basis and in our daily cooking are industrially processed and hydrogenated to convert them to a solid form (e.g. like margarine, etc.) and to make these more transport and user friendly.

During the industrial processing the molecular structure changes from the CIS form to the trans form. The Trans form is the basis for the development of LDL cholesterol (the bad cholesterol) whereas the CIS form and polyunsaturated fatty acids develop and stimulate HDL cholesterol (the good cholesterol). LDL cholesterol (the bad cholesterol) is the major cause of cardiovascular disease, including artery clotting (atherosclerosis), which is one of the biggest and possibly the most common causes of death in our modern, technological and synthetic world. We have in general eaten too much fats/oil with too high a content of trans fatty acids. In recent years the governments and health authorities have demanded that the food industry drastically reduce levels of trans fatty acids in foods within a short period of time. **But these dangerous trans fatty acids are still used.**

Trans fatty acids (Hydrogenated or partially hydrogenated oils) are found in the following food products: bread, candy, cakes, cookies, salty biscuits, biscuits, pancake mix, cereals, instant soups, chocolate, desserts, fruit cakes, chips, junk food, peanuts and peanut butter. The law bans the use of trans fatty acids in baby food because it is considered dangerous.

Research has shown that trans fatty acids have the following common damaging side effects on the human body:

- Increases the Lp (a) level - the most common risk factor for cardiovascular disease.
- Changes the functions of the immune system.
- Reduces testosterone, increase the number of abnormal sperm cells and interferes with animal's pregnancy.
- Are linked with low birth weight in babies.
- Reduces the quality of breast milk.
- Disrupt the liver enzymes that are necessary for detoxification.
- Changes the state of the cell membranes making them hard, delay their reactions, lower the cell vitality and make the cell membrane more permeable.
- Changes the way that the fats cells are working.
- Increase cholesterol; increase LDL (the bad cholesterol) and decreases HDL (the good cholesterol).
- Interrupts the function of the essential fatty acids that we need to be healthy and well.

Frying and Trans fatty acids

Studies show that fried oils may increase the risk of atherosclerosis (cardiovascular disease, high blood pressure, etc.). When we fry food, we burn it. We change the molecular chemistry of the oil when it is heated until it smokes. These chemically altered molecules do not suit the human body's molecular structure, therefore, the cell function is disrupted and we experience symptoms and diseases as mentioned above. Best for health are the oils that are the richest in essential fatty acids and these are the ones that get most toxic when they are heated or fried. **BUT** even hardened, stable, saturated fats and butter are damaged when heated.

Fats/oils are necessary, but the wrong fats (killer fats) are dangerous.

When we cook at home and fry using fats it is very important to be conscious of the frying temperature, as the higher the temperature the more harmful the fats in the food will be. By deep-frying or for example barbecuing, which gives burned meat on the surface, the fats in the meat or the fats used to grease the meat becomes toxic.

In reality we should never eat barbecued food or fry at high temperature but primarily prepare our food by cooking in a pot and thereby never higher than 100°C for maintaining most favourable cholesterol balance, LDL versus HDL and thereby reducing the risk of cardiovascular diseases.

For the optimal balance of cholesterol we should aim to consume polyunsaturated fats and oils, either in food or as a supplement containing OMEGA 3/N 3, OMEGA 6/N 6 and Gamma Linolenic Acid (GLA), which also is an N6 oil found in evening primrose oil. If frying is necessary, pure unrefined organic virgin coconut oil should be used. The structure of virgin coconut oil is the most heat stable of all frying oils. Olive oil (OMEGA 9/N 9 oil) and organic butter are also acceptable for frying; food fried in butter is a treat! Use diligence and good sense to reduce our fats and oil consumption and seek the best possible biological balance, also in the fats and oils we use.

Fats, Cholesterol and Atherosclerosis (fats deposits in the arteries)

When our consumption of oils and fats becomes too large and we do not use the energy that it

contains, we will, depending on the types of fats and oils we eat, have a serious risk of dangerously increased fats content in the blood (hyperlipidemia).

Fats in the blood can be divided into two main groups, namely:

1. **Triglycerides**, as described earlier.
2. **Cholesterol**, which can be HDL, the good cholesterol, or LDL, the bad cholesterol.

Both types of fats/oil are necessary for the cells in the body and they form part of the cell walls and are used as an energy source.

Fats/triglycerides are both an energy source and the insulating body fats protecting against the cold and temperature fluctuations.

Hyperlipidaemia is an increase in triglycerides and cholesterol in the blood. We distinguish between four types of hyperlipidaemia:

1. Only an increase in cholesterol (isolated hypercholesterolemia)
2. Both an increase of triglyceride and cholesterol (combined hyperlipidemia)
3. Severe elevated triglyceride
4. Only low HDL cholesterol

Hyperkolestrolaemi and hypercholesterolemia with elevated triglyceride is by far the most common modes.

Excessive fats in the blood only become a problem after many years of a high intake of saturated fats. This fat comes mainly from dairy products, meat and animal products, frying margarine, hard fats, including lard and industrial margarine that are used in bakeries and other industrial manufactured food.

Also a low use of energy due to a sedentary lifestyle and lack of exercise develops atherosclerosis, which is the depositing of fats in the arteries. This can result in blood clots, both in the brain, the cardiovascular system and other places, heart cramps, strokes, ulcers (wounds) on the feet and shinbones that heal with difficulty.

Everybody should be very observant of one's own fat intake and reduce the eating of saturated fats as much as possible and increase one's intake of mono and polyunsaturated fatty acids, N3/Omega 3 and N6/Omega 6, which are polyunsaturated fatty acids, bring a better balance in the fats account and in many cases decrease the harmful LDL cholesterol and increase HDL cholesterol.

The Essential Fatty Acids (EFA)

The fundamental function of the fatty acids is their role in the protection of the cells in the human body; keeping the cell walls and membranes flexible for the essential cell function. This protects against physical and visible signs of ageing.

EFAs are the essentially fatty acids that the body cannot produce but shall be supplied through our diet. The modern and industrialized produced food only contains a limited amount of the essentially fatty acids, also called N3/Omega 3 and N6/Omega 6, and also containing GLA/N6 B 18-3-w6 Gamma Linolenic Acid. These fatty acids are, therefore, necessary as a supplement for maintaining the fatty acid balance in the body and the cells. This fatty acids/oil is not fattening but stimulates and increases the metabolism, increase oxidation rate in the blood and increase the energy level.

These essentially fatty acids can be found in great quantities in seeds from a very few plants, among these are:

Evening Primrose (*Oenothera Biennis*), Flax (*Linum usitatissimum*), which have the largest content and the best combination of N3 and N6 oils, including GLA.

The EFA oils from these two plants can be mixed in a ratio that provides the best effect in the body cells and the cell membranes and may delay both the visible and physical symptoms of aging. This beauty and wellness, which comes from within can be improved and strengthened by adding the same basic oils to the skin cells from the outside, through the use of protective creams that have been developed and produced based on the EFA oils, with a special focus on the GLA.

EFA oils/fatty acids further have a positive influence on a number of lifestyles diseases and symptoms, such as PMS, high blood pressure, cardiovascular symptoms, stress, etc.

Using the enzymes in the body and the Delta 6 and 5 desaturase, the body transforms these essential fatty acids into gamma-linoleic acid, dihomogamma-linolenic acid, arachidonic acid, docosapentaenoic acid, eicosapentaen acid and docosahexaen acid.

When the body transforms these fatty acids the biological system uses vitamins and minerals. So to ensure best possible adaptation we need to consume extra vitamin A, B-complex, especially B3 niacin, B6 pyridoxine, B8 biotin, vitamin C, and vitamin E and the minerals zinc, selenium, magnesium and

calcium.

The fatty acids N3 + N6 + GLA are very responsive and to safeguard the active substances the oil should be kept refrigerated and not be exposed to light/ultraviolet radiation, oxygen or heat. The oils can be deep-frozen and should keep their freshness for at least 3 years.

Fatty Acids

All fatty acids are transformed and synthesized in the biological system, both those you can get through your food and those you should take as supplements to optimize your fatty acid balance.

Fatty acids in the prostaglandin synthesis are transformed into prostaglandin E1 - E2 - E3, with each having different functions in the biological system.

E1 has strong anti-inflammatory effects, relieves pain and ensures that the blood do not clots, etc.

E2 increases inflammation, meaning it increases pain and the risk of blood clots.

E3 has similar characteristics as E1 but is not as potent.

Clearly, it is important to eat food, which synthesizes primarily into prostaglandin E1 and E3 and avoid food that primarily synthesizes into prostaglandin E2. Because of industrial food production it is difficult to buy products which contain the correct quantity and combination of fatty acids it is necessary to consume pure fatty acids with the correct combination of omega 3 - 6 - 9 and GLA as a supplement.

Where do the natural fatty acids originate?

1. You can get fatty acids via meat, dairy produce and other meat products. These fatty acids transform and synthesise into arachidonic acid, which is the basis of E2 (PGE2), the bad prostaglandin and eicosanoids and also stimulates LDL, the bad cholesterol.

2. You can get fatty acids via vegetables, fruit, berries, nuts and seeds in varying amounts, but almost always too little. In our modern industrial age almost all foods are lacking a number of important natural ingredients, fatty acids, vitamins, minerals and micronutrients.

3. You can get fatty acids from fatty fish, for example salmon and herring. Fish, however, only contains omega 3 fatty acids and no omega 6 - 9 or GLA. It is important to remember that fish also can contain heavy metals such as mercury, dioxin, PCB and other toxic substances in unacceptable quantities.

4. You can get fatty acids with the correct balance of omega 3 - 6 - 9 and GLA through supplements from pure, cold-pressed virgin oils in the right combination and containing omega 3 - 6 - 9 and GLA. You can safely consume the amount of essential fatty acids you feel your body needs or your health advisor recommends.

5. There are very few plants containing essential fatty acids and the seeds that contain the correct amount and balance of omega 3 - 6 - 9 and GLA. The two most important species are flax that has the largest amount of omega 3/N3 oil of all foods (including fish) and evening primrose that has the best combination of omega 3 - 6 - 9 and GLA. The combination of these two seed oils pressed at very low temperatures gives the finest quality, the longest shelf life and best combination of fatty acids.

The need will be different, based on gender, age, occupation and possible different health issues and lifestyle problems, as well as inheritance and environment. It is very individual how much to take. But all good fatty acids on the market, recommend an intake of 1 - 2 tablespoonfuls per day, approximately 10 – 20 ml. daily.

The function Essential Fatty Acids

Essential fatty acids increase body energy by helping the body to absorb more oxygen. Essential fatty acids increase the oxygen uptake in the bloodstream as well as the metabolism, energy levels, resistance and endurance. This is most evident in athletes, elderly persons, overweight and middle-aged persons.

When athletes take essentially fatty acids in the balanced and correct amounts:

1. They increase their strength and endurance.
2. They recover much faster after exhaustion because recovery demands oxygen and the essential fatty acids increase the ability of the body to transport oxygen.

When elderly persons start to consume fresh essential fatty acids, they first of all notice that:

1. Their energy level increase noticeably and they feel more active.
2. They are able to increase their physical activity.
3. They can stay active later in the evening.
4. Their stamina increases.
5. They recover faster.

- Essential fatty acids may in many ways help with weight loss:

- They increase the metabolic process and the energy level. This means that we burn more calories. The calories in essential fatty acids should not be included in the total calorie count as they increase the metabolism of calories.
- Instead of being used as fuel they play a part in the creation of cell membranes and are transformed into hormone like prostaglandin. These fat substances keep us slim!!
- Essential fatty acids help the kidneys to dispose of the excess water contained in organic tissue, water that is much of the extra weight of overweight people.
- They help reduce the craving for sweets, a craving that often arises because we do not get the nutrients we need. By taking the essential fatty acids we are satisfying this need.
- Essential fatty acids elevate the mood as well as energy levels and the desire to be more active.

Brain development and function

The brain is the organ containing most fatty acids in the body and more than half the weight of the brain consists of essential fatty acids. The proportion between Omega 3 and Omega 6 in the brain is 1:1. In the development and function of the human brain the essential fatty acids are of particular therapeutic importance in 2 main areas:

1. Learning difficulties - dyslexia, hyperactivity, and lack of concentration.
2. Improved functioning and behaviour in connection with mental illnesses.

Children with dyslexia, poor motor co-ordination, poor concentration, hyperactivity and learning difficulties have shown benefits from taking oils with the correct essential fatty acid balance.

Hair, Skin and Nails

Essential fatty acids also play an important role in this aspect. They form a barrier on the skin against loss of moisture. They protect us against dehydration. Dehydration can be the cause of many problems with histamine, prostaglandin and inflammation. The barrier function of the essential fatty acids also reduces constipation and the toxic complications. Essential fatty acids make the skin soft, smooth and silky. The skin will tan quicker and burn less in the sun; in winter we need more essential fatty acids than in the summer. Essential fatty acids often help in reducing or healing eczema, acne, psoriasis and other skin related problems. Oil soluble toxins leave the body via the skin through sweat, but the oil lost by sweating must be replaced to prevent dry skin. Dry skin indicates a need for essential fatty acids. We can survive with dry skin but not with a dry liver or brain. As a consequence the brain and other internal organs have priority when it comes to absorption of the essential fatty acids supplied to the body.

When the internal organs have absorbed the fatty acids they need, the remaining fatty acids are transported to the skin.

The Essential Fatty Acids help the digestion system

The essential fatty acids can help to prevent a leaky gut.

Good oils have been known to relieve allergies. Allergic reactions against essentially fatty acids are rare, even with people with a tendency to allergies, usually it is proteins that cause allergic reactions and essentially fatty acids are protein free.

Essential fatty acids reduce the craving for and dependency of food, cigarettes, alcohol and drugs. They help the liver, kidneys, adrenal gland and pancreas as well as other glands to function correctly.

Taking essentially fatty acids also helps other inner body functions:

- Essential fatty acids contribute to sperm formation.
- They may reduce premenstrual syndrome in conjunction with some vitamins and minerals.
- They help the kidneys to remove excess water and reduce tissue infection.
- They are necessary for transporting minerals and for the protein metabolism.
- They are an essential part of the red blood corpuscle, cytogenesis and mitosis.

Cardiovascular System:

Essentially fatty acids are necessary for:

- Transportation of cholesterol
- Reduction of high triglyceride level up to 65% (Omega 3)
- The production of hormone like prostaglandin that reduces the stickiness of the blood cells and

- thereby reduces the risks of coronary and cerebral thrombosis.
- Helps to lower high blood pressure

Immune System:

Protects our genetic material from damage. Omega 3 essential fatty acids have an antioxidant effect in the oil-soluble system of the body similar to the antioxidant effect of vitamin C in the water-soluble system.

Extra energy

For athletes, elite sports people and anyone performing hard physical work it is important to create enough energy for the strenuous and muscle performances needed. Therefore, It is important to increase the fat/oil intake to increase the available quantity of energy.

To fulfil these energy needs it is necessary to consume considerable amounts of fatty acids/oils of the polyunsaturated type to prevent the creation of more LDL (bad) cholesterol in the blood. This is best achieved by taking sports therapeutic amounts of Essential Fatty Acids, pure unrefined oils from Evening Primrose seed and Flax seed, these primarily contain N3/Omega 3, N6/Omega 6 and Gamma Linolenic (GLA) oils.

Athletes, elite sports persons and anyone performing hard physical work develop large amounts of free radicals and should, therefore, consume extra amounts of antioxidants to protect the body from damage caused by the increased amount of free radicals.

As increased physical activity gives a large loss of minerals and important salts through sweating it is important to drink water and take extra minerals, both during and after the physical activities, and this should not be soft drinks containing sugar or glucose.

Athletes, elite sports persons, persons performing fitness training or hard physical work can take large amounts of EFAs, essential fatty acids N3 and N6, in quantities as high as 100 grams per day and still stay slim.

The Essential Fatty Acids known as EFAs

Use the oil in liquid form for all sports and normal fitness or exercise.

EFA can strengthen the muscles, have a stimulating effect on the whole body, increase the oxygen rate in the blood, and increase the energy levels and stamina. The body regenerates faster which means sports injuries and over-exertion (inflammation injuries) heal faster. EFAs are a part of the protein metabolism and reduce the degeneration of muscular tissue and also have an influence on the motor co-ordination.

EFA calms and reduces stress, increases concentration and enables a better and calmer sleep.

EFA improves the detoxification capacity of the kidneys and liver and increases emissions of water from the body.

EFA is necessary for testosterone production and the insulin functions necessary for muscular development. EFA increases the metabolism; energy levels and can give a slight weight reduction.

EFA reduces the cravings for fast food, sugar, coffee and other stimulants and may give a better mood and a more optimistic outlook in everyday life.

EFA regulates the production of several important enzymes that are important for our cells, increases the immune system anti-inflammatory abilities and can hinder infections.

EFA increases the metabolism and thereby increase energy levels and gives us a greater desire to exercise, creating the possibility of weight reduction.

EFA have a positive effect on our cells and the cell membranes and thereby gives a nicer and healthier looking skin with optimal moisture balance.

EFAs are easily damaged and ruined by light, oxygen and high temperature and should always be stored in the refrigerator.

The ideal EFA utilization depends of your physical exertion, including hard physical work. As an example large strong body builders can easily burn the energy from a large intake of EFA, as much as 6 - 8 tablespoonfuls per day and extra dosage when competing.

Weight Balance - Weight Reduction - Weight Stabilization

Most of us have noticed how easy it is to gain weight and how difficult it is to lose weight or maintain weight. Our biological system is fashioned to soak up energy (fats) while there is an abundance of food in nature and to use that stored energy (fats), when there is a shortage of food. It is nature! Nowadays there are no real food shortage periods, so we constantly store energy (fats) waiting for the food shortages that never come. Therefore, modern slimming diets tend to be poor. No matter what you do to lose weight, consequently creating a food shortage, you will naturally regain the weight plus some

more when you start eating normal portions again. So nature creates a surplus of food, which your body and your biological system immediately store as fat, to prepare for the next natural food shortage "that hopefully never comes". It is simply the law of nature and we cannot change that. BUT we can change our lifestyle and our way of life to generate a natural balance between the food intake (energy) and physical activity.

Remember, you become what you eat or what your biological system can absorb. Modern industrially produced foods contain many toxins and chemicals that the human body cannot transform. These are often stored as waste products and toxins in your body, mainly in the fat deposits.

What can you do? Do not count the calories but instead think about real nutrients. There are a lot of calories in our daily foods that provide no nourishment and then think about the amount of food you eat and how often you eat. As we are less active than in the past, we need to create an exercise programme including walking, running or cycling. It is necessary to create our own food and dieting plans that should contain the nutrients (we are not talking of calories) needed for our bodies to perform in the best way. The diet should be supplemented with vitamins and minerals, enzymes and fatty acids necessary to create the biological balance in the body. Create your own diet programme in alliance with an experienced nutritional advisor/dietician so it is based on your personal condition such as weight, work life, family life, hobbies or other interests. Then you should create your own exercise programme, this can be a daily walk, riding the bicycle for work, visit a fitness centre on a regular basis or do some gardening. It is necessary to create a balance in the essential fatty acids (Omega 3 - 6 - 9 + GLA). These take priority in preventing poor health, a strong antioxidant network, best possible strengthening of the immune defence, strengthening of the cardiovascular functions, strengthening of the liver functions for better purification and regeneration of the body.

For individuals who really wish to create optimal physical balance in everyday life a detailed exercise and training programme should be made that will guarantee weight, physical balance and a trimmed body, giving a new daily life and a brand new life with many good years ahead. Such a programme can be made regardless of age; it can be made for any age group. When you become engaged in your own health, well being and quality of life on this level, the training programme should consist of the energy, food and strengthening supplements that will optimize all the functions of the body, both in strength, stamina and bodybuilding. Remember good looks never hurt anybody and it strengthens one's own confidence and personal appearance. If this is the wish and ambition there is specific sports nutrition products for training.

Mother and Child, Pregnancy, Childbirth

Essential fatty acids are the vital foundation for all our cells, organs, skin and daily functions. For a child it is the foundation for development, including intelligence and learning (Lukas et al 1992).

To give a child the best start in life the mother must pay special attention to her food intake during pregnancy. Pregnancy places huge demands on a woman physically and it is very important to balance the need for nutrients with the need for nourishment of the baby during its development.

A pregnant woman shall during the pregnancy period of 9 months be able to produce a placenta of approx. 650 gram, develop mammary glands approx. 450 grams, amniotic fluid approx. 800 ml, womb approx. 900 grams and provide the foetus with approx. 1200 ml blood, and a full born foetus of approx. 3500 grams plus extra 4500 gram fat, which is the energy storage the body needs to produce the necessary breast milk.

This places large demands on the pregnant woman, and she needs to plan her life and diet in accordance and balance with this.

The greatest development of the foetus takes place in the last half of pregnancy, maybe even during the last third part of the pregnancy and the mother shall be able to provide the foetus with about 0.6 gram (600 mg) essential fatty acids per day. This means that the mother should consume 2.2-gram (2200mg) essential fatty acids per day to be able to do this. Ideally she should do this during the whole pregnancy but certainly this would apply for at least the last half of the pregnancy (FAO Food and Nutrition Paper 1994). Pregnant women should therefore take a minimum of 20-30 gram essential fatty acids, via the normal food intake or via supplements and this should continue during the breast-feeding period.

The human brain consist of approx. 50 - 55 % essential fatty acids, which is the primary basis for life and brain functioning, and also to the foetus and the coming child.

The pregnant woman should via the food she eats or via supplements eat minimum 20 - 30 gram of essential fatty acids, both during pregnancy and while breast feeding, so that both the foetus and the coming child will get the necessary amount of essential fatty acids for the continuous development of brain and organs.

A pregnant woman would normally increase her body weight by more than the weight of newborn baby.

This is because the woman builds up a stock of energy and vital substances, including essential fatty acids, so there is a stored capacity to produce breast milk for the child. It is important that all mothers breast-feed for as long as possible to secure best possible supply of vital substances for the development of the child. But also for the mother's well being after giving birth, as the stored "excess weight" should be used for the production of breast milk otherwise it will become more difficult for the woman to loose or reduce this excess weight and return to her pre-pregnancy weight. Therefore, it is important for the mother as well as the child that the correct balance is obtained and retained.

When the mother, regardless of the cause, stops breast feeding and consequently stops the normal supply of essential fatty acids to the child then it is very important for the child's further development that the child is fed the essential fatty acids in optimum amounts. This can be done either via formula milk or baby food which shall contain essential fatty acids, or through direct supplements of essential fatty acids as oil, in quantities of approximately 300-400 mg per day per kg body weight.

Supplements of essential fatty acids for babies is very important if the baby had a low birth weight or a short or no breast milk feeding period. Development of the brain and important organs are dependant on a supply of essential fatty acids.

The correct amount and ratio of fatty acids in foods or as a supplement are vital for all ages, but most important to the unborn child and during the first 5-10 years of the child's life.

How do we know what to use for frying?

Polyunsaturated fatty acids are those that become the most toxic when heated during frying and cooking. We should only use fatty acids that contain the smallest amount of polyunsaturated fatty acids. So in fact only a few products can be used.

Pure unrefined, organic virgin coconut oil

Organic Virgin Coconut Oil is pressed from the fresh white meat of organically grown coconuts. The white meat is gently mechanical pressed, so all the natural nutrients and biologically active fatty acids are preserved in the coconut oil, including vitamins, minerals and antioxidants.

Virgin Coconut Oil consists of the short and medium length fatty acids, in their saturated form roughly 92% and only about 2% polyunsaturated fats.

This gives the coconut oil a unique storage quality of up to 2 years without refrigeration if kept from direct sunlight. The oil becomes liquid at about 26°C and at less than 24°C the consistency turns creamy or firm.

Organic Virgin Coconut oil contains about 50% lauric acid, which is a strong protective agent against bacteria, viruses, etc. and it is the fatty acid in women's breast milk that protect breast-feeding children from infections, viruses and bacteria.

A number of American studies show that the short and medium length fatty acids is used as pure energy and consequently not stored as fat. Virgin Coconut Oil further increases HDL (good cholesterol) and reduces LDL (bad cholesterol) and thereby maximizes the cholesterol balance. Virgin Coconut Oil increases the metabolism. Virgin coconut oil is suitable as a fat in all slimming diets.

Organic virgin coconut oil is a pure unprocessed natural product and contains no trans fatty acids. Trans fat appears during industrial processing, for example from refining and so on.

Uses: as a replacement for butter and other oils that are unstable at high temperatures. In cooking both heated and unheated, for frying and baking, possibly slightly melted and mixed with muesli, as spread on the bread, in smoothies and in warm dishes.

Virgin Coconut Oil is the richest natural source of the short and medium length fatty acids. For health purposes it is a magnificent source to improve health and weight loss. Coconut oil contains many fatty acids, for the most part Lauric acid, Caprylic Acid, Capric Acid, Myristic Acid, Palmitic acid, Stearic Acid, Oleic Acid, etc.

Virgin Coconut Oil/coconut fat contains 92% saturated fats, 6% monounsaturated fats and 2% polyunsaturated fats, with the following approximate distribution:

- | | | |
|-----------------------------|--------|-----|
| • Caprylic acid/ fatty acid | C 8:0 | 8% |
| • Capric acid/fatty acid | C 10:0 | 7% |
| • Lauric acid/fatty acid | C 12:0 | 49% |
| • Myristic acid/fatty acid | C 14:0 | 18% |
| • Palmitic acid/fatty acid | C 16:0 | 8% |
| • Stearic acid/fatty acid | C 18:0 | 2% |
| • Oleic acid/fatty acid | C 18:1 | 6% |
| • Linoleic acid/fatty acid | C 18:2 | 2% |

Virgin Coconut Oil is nature's ingenious combination of fatty acids and is the closest we can get to breast milk, as it is almost identical to the contents of fatty acids in breast milk. 50% is lauric acid, which is the fatty acid in breast milk that gives a child the best possible protection against infection, viruses and bacteria in its first years when the immune defence and enzyme functions are not fully developed. Pure unrefined Organic Virgin Coconut Oil is not stored in the fat deposits (fatty cells) but goes directly through the liver and is transformed into pure energy in the cells.

Virgin Coconut Oil contains no enzymes and does not require enzyme functions to synthesis and consequently goes directly through the liver to stimulate growth, energy, well-being, and the mood and increase physical, cerebral and emotional balance.

Pure unrefined Organic Virgin Coconut Oil contains no sugars or carbohydrates. It does not affect insulin in the blood and is therefore suitable for cooking for diabetics.

Pure unrefined Organic Virgin Coconut Oil will be important to children when they decrease the intake of mother's milk. It is especially important when changing from breast milk, either to formula or more solid foods and will in particular be crucial throughout the growing period. Virgin Coconut Oil is thus essential for both mother and child.

Coconut oil is nature's richest source of short and medium length fatty acids. It is a wonderful for good health and weight loss and does not contain any trans fat.

Butter

Even though butter is 68% saturated fatty acids, butter fats are natural saturated fats that are produced from milk, where the highest temperature that this fat has been exposed to is the temperature of the cow which is about 37°C. Butter, for that reason, contains no trans fatty acids which primarily occurs in industrial products and, therefore, is less harmful than many other frying fats. For this reason butter is suitable for frying at low temperatures. When you fry at temperatures that make the grease on the frying pan smoke then it starts to become toxic and should not be used, regardless of which product you use as frying grease.

The table on page 4 (?????) shows a schedule with oils and fats used for cooking, it shows the content of polyunsaturated fatty acids in the most common used fats for cooking and frying. This schedule shows that only coconut oil, butter and olive oil are suitable for frying.

Best quality Olive oil

It has a very low level of polyunsaturated fatty acids (approximately 9%), which can easily be damaged by frying, is rich in monounsaturated fatty acids, about 76%, which are the most neutral fatty acids for frying and only about 15% saturated fatty acids. You can reduce the frying temperature and decrease the frying influence on the oil by using a Teflon or titanium-coated pan to fry. Shortly before the meat is done you can pour or spray olive oil over the meat. If cooking vegetables you can start by pouring a little water into the pan. When the water evaporates, you can pour some oil on. The evaporated water will keep the temperature down. You can also initially put the vegetables in boiling water and quickly take them up with a sieve and then put them in a frying pan or a wok with olive oil. So olive oil is also a choice for frying.

All other fats other than coconut oil, butter and olive oil, shown in the table (page 4), should never be used for frying or at high temperatures, since their content of polyunsaturated fatty acids is high and consequently develop similar high levels of toxins and trans fatty acids.

Remember essential fatty acids Omega 3/N3 - Omega 6/N6 and GLA must never be heated and always shall be kept in a refrigerator or deep frozen.

Oil of Life

Oil of Life consists of pure unrefined Flax seed oil (*Linum Usitatissimum*), Alpha Linolenic Acid, ALA 18:3n-3 and Evening Primrose oil (*Oenothera biennis*), Linoleic Acid, LA 18:2n-6. The oils are pressed at very low temperature and thereby have maximum content of Omega 3 to 6 and 9 fatty acids and the lowest content of free oxygen in the market. Accordingly they have the longest shelf life. The oils are mixed in the optimum percentage of approximately 2.5 to 1 Omega 3 - 6 and with approx 80 mg pure GLA (Gamma Linolenic Acid) per 15 ml oil.

This combination of fatty acids helps the body synthesize the active fatty acids GLA, EPA and DHA, which all are derived from Omega 3 and 6 oils that in the final phase creates prostaglandin E1 and prostaglandin E3.

Organic vegetable oils, which have a growth period of approximately 4 months, are nearly pollution-free and are for that reason the purest forms of Omega 3 - 6 - 9 and GLA and derivatives thereof.

It is recommended to eat about 25 ml of pure essential fatty acids per day.

It is often recommended to eat 2-4 fish oil capsules per day. This is a fairly small amount of oil considering the amount our biological system needs to create a balance in the fatty acids.

However, there is no need to use fish oil and you can avoid "fish burps" and possible contamination by heavy metals, mercury, dioxins, PCB and so on. Heavy metals can be removed by a simple refining process while PCBs (Polychlorinated biphenyl) can be removed only by a sophisticated chemical process called Molecular distillation, which is very expensive.

So pure fish oil without contamination of heavy metals, toxins and PCB are highly processed, expensive, industrial products, in which all the natural active ingredients are reduced, taken away or destroyed. When the manufacturers of fish oils state that their fish oil does not contain these toxic substances it is because the product has been refined or been subject to other forms of industrial treatment.

The fish oils that are claimed to be concentrated oils with double the amount of Omega 3 content are also industrially processed with all the vital and essential fatty acids reduced, taken away or destroyed during the industrial process and is, therefore, no longer a natural product but an industrial product. Fish oil contains approximately 23 - 25% Omega 3, Flax seed oil about 55 to 65% Omega 3 and, therefore, have more than twice as much the content of Omega 3 and remains a pure natural, purely vegetable and absolutely without any industrial processing and without any kind of additives.

The myth of the necessity for fish oil has been buried.

Fish oil is for the most part marketed in capsules, which make it almost impossible to check the quality and freshness and very few consumers would probably wish to eat pure fish oil.

Some manufacturers claim that their fish oil comes from fish caught in the cold North Seas and therefore do not contain any of the above-mentioned toxins? We should perhaps consider why we are now finding hermaphrodite polar bears.

Industrial pollution is global!

If you want to know more about essential fatty acids, you can search for more information in the following books. They can be ordered at www.amazon.com or www.amazon.co.uk.

- **The Coconut Oil Miracle** by Bruce Fife, C.N., N.D. 2004. Published by Avery
- **Coconut Cures, Preventing and Treating Common Health Problems with Coconut** by Bruce Fife, N.D. 2004. Published by Piccadilly Books
- **Virgin Coconut Oil** by Brian & Marianita Jader Shilhavy. 2004. Published by Tropical Tradition.
- **Know Your Fats: The complete Primer for Understanding the Nutrition of Fats, Oils, and Cholesterol** by Mary G.Enig, Ph.D. 2000. Published by Bethesda Press
- **The Cholesterol Myths, Exposing the Fallacy that Saturated Fats and Cholesterol cause Heart Disease** by Uffe Ravnskov, MD, PhD. 2000. Published by Newtrends Publishing.
- **Healthy Fats for Life, Preventing and Treating Common Health Problems with Essential Fatty Acids** by Lorna R. Vanderharghe and Karlene Karst. Published by Wiley.
- **Fats That Heal - Fats That Kill** by Udo Erasmus. 1987. Published by Alive Books

Or you can search the large Internet databases, such as Google - Yahoo, etc., there are great quantities of serious scientific information and verifications to be found about health, essential fatty acids, strong antioxidants, pure organic nutrients and much more.

Enjoy your reading!

Notes: