UNIT-2 Dietary Nutrition

Learning Outcomes
By the end of this unit the learner will be able to:

Unit 2

Dietary Nutrition

Macro-nutrients

Macro-nutrients are the nutrients we consume in large amounts: these are protein, fats and carbohydrates. Macronutrients are nutrients that provide calories or energy. Nutrients are substances needed for growth, metabolism, and for other body functions. Since —macro means large, macronutrients are nutrients needed in large amounts. There are three macronutrients:

Carbohydrate

- Protein
- Fat

While each of these macronutrients provides calories, the amount of calories that each one provides varies.

- Carbohydrates provide 4 calories per gram.
- Protein provides 4 calories per gram.
- Fat provide 9 calories per gram.

This means that if we look at the Nutrition Facts label of a product and it said 12 grams of carbohydrate, 0 grams of fat, and 0 grams of protein per serving, we would know that this food has about 48 calories per serving (12 grams carbohydrate multiplied by 4 calories for each gram of carbohydrate = 48 calories).

Carbohydrates

Carbohydrates are the body‘s preferred source of energy. They consist of sugar and starches. Protein and fats can be used for energy, but if carbohydrates are present the body will use these first. The body breaks down all the carbohydrate present in the food we eat and turns it into glucose. Like fats carbohydrates consist of carbon, hydrogen and oxygen atoms.

Composition Of Carbohydrates

Monosaccharides, Disaccharides, and Polysaccharides.Monosaccharides are single sugars such as glucose and fructose. Glucose is the type of carbohydrates often found in energy drinks, while fructose is fruit sugar. Disaccharides are double sugars such as sucrose and lactose. Sucrose is found in table sugar, while lactose is found in milk. Both monosaccharides and disaccharides are soluble in water. Polysaccharides are complex structures found in starches and fibres. Polysaccharides can either be stored in the liver and muscle and later used for energy or broken down and used for digestion.

Why Do We Need Carbohydrates To Survive?

45% -65% of calories in our diet should come from carbohydrate. We need this amount of carbohydrates because:

- Carbohydrates are the body's main source of fuel.
- Carbohydrates are easily used by the body for energy.
- All of the tissues and cells in our body can use glucose for energy.
- Carbohydrates are needed for the central nervous system, the kidneys, the brain, the muscles (including the heart) to function properly.
- Carbohydrates can be stored in the muscles and liver and later used for energy.
- Carbohydrates are important in intestinal health and waste elimination.
- Carbohydrates are mainly found in starchy foods (like grain and potatoes), fruits, milk, and yogurt. Other foods like vegetables, beans, nuts, seeds and cottage cheese contain carbohydrates, but in lesser amounts.

Fibre refers to certain types of carbohydrates that our body cannot digest. These carbohydrates pass through the intestinal tract intact and help to move waste out of the body. Diets that are low in fibre have been shown to cause problems such as constipation and hemorrhoids and to increase the risk for certain types of cancers such as colon cancer. Diets high in fibre; however, have been shown to decrease risks for heart disease,obesity, and they help lower cholesterol.Foods high in fibre include fruits, vegetables, and whole grain products.

Types Of Carbs:

Simple Carbs

Simple carbohydrates digest quickly to be used by the body for energy. Simple carbs arefound naturally in fruits and milk and other dairy products. Simple carbohydrates are alsooften found in refined, processed foods. Examples of foods that contain simple carbs include table sugar,corn syrup, soda, cakes, cookies, and candy.

Refined Carbs

Refined carbs are found in processed foods that have been stripped of essential vitamins and nutrients, holding no nutritional value. Diets high in refined carbs have been found to contribute to increased risk of type-II diabetes, certain types of cancers, obesity, cardiovascular disease, and depression. Examples of refined carbohydrate foods include: white pasta, white rice, and sugary breakfast cereals.

Complex Carbs

Complex carbohydrates in their natural form are considered good-quality carbs and are important for a healthy diet. Complex carbs take longer to digest than simple carbs, and are usually high in fibre, nutrient-rich, and provide many benefits including: improved digestion, stabilized blood sugar levels, and longer levels of satiety. Good sources of complex carbs include: beans, whole-grain breads, rice, potatoes, and pasta. Complex carbs such as those found in whole grains are absorbed slowly by the

body. This slow absorption keeps blood sugar levels from spiking, thereby keeping energy levels stable. Whole grains are also rich in B vitamins, which have been shown to boost energy.**Good sources of whole grains** include whole-wheat bread, oatmeal, and brown rice and pastas.

Whole grains are typically full of fibre as well, which also slows digestion, and fibre-rich foods provide a steady stream of energy throughout the day. In addition to whole grains, excellent sources of fibre include berries, various greens, cauliflower, beans, and broccoli. As well as providing the body with slow-burn energy, they are an important source of many vitamins, minerals and fibre. Complex carbohydrates are a diverse group of substances which can be classified as starch and non-starch polysaccharides (NSP).

High Carbohydrate Vegetables	Low Carbohydrate Vegetables
Yams	Bean sprouts
Parsnip	Cucumber
Turnips	Leafy greens (spinach, lettuce)
Beets	Tomatoes
Peas	Bell Peppers/chillies/ hot peppers
Carrots	Mushrooms
Swedes	Radishes
	Celery
	Onions/leeks/ spring onions/garlic
	Green beans
	Herbs (parsley, chives etc)
	Brussels sprouts
	Cabbage/ Cauliflower/ Broccoli

Functions of Starchy Foods

Starchy foods are filling without being fattening. In the past people were led to believe that bread, potatoes and cereals were fattening. However, served on their own they are not. It is only when these foods are served or cooked with fatty sauces that they are high in calories. A slice of bread provides about 340 kJ (80 kcal) but when spread with butter it provides about 630 KJ (150 kcal). Complex carbohydrates should provide about half the dietary energy. Bread, potatoes, rice or pasta should form the main part of every meal. Instead of meat with potatoes and a small amount of vegetables people should be encouraged to think in terms of potatoes, rice or pasta with a large serving of vegetables and a small amount of meat, fish, cheese or pulses. The starchy part of the meal should be planned first and then the meat, fish or cheese.

As a rough guide, the recommended intake of complex carbohydrates can be achieved by consuming four servings a day from the following list of foods:

- Breakfast cereals
- Cereals including rice, pasta, oats, barley, barley, wheat, plain popcorn and corn meal.

- Bread of any kind including wholemeal, brown, white, soft grain, high fibre, white bread, pitta, chapatti, naan, muffins, bagels and current bread.
- Potatoes, sweet potatoes, green bananas, yams and plantain.

As part of the advice to choose a diet rich in complex carbohydrates, individuals should also be advised to consume plenty of fruits and vegetables. Recent research has focused on the importance of the anti-oxidant nutrients, vitamin C and E, beta carotene and selenium in the prevention of diseases such as coronary heart disease and cancer. Fruits and vegetable particularly the green and orange varieties- are rich in the anti-oxidant nutrients, and current guidelines advise the consumption of five or more servings of fruit and vegetables daily, including one serving of pulses or nuts.

Non-Starch Polysaccharides

NSP is now preferred scientific term for dietary fibre. Consequently, this has led to great deal of disagreement as to the amount of fibre in various foods. NSP can, however, be measured with reasonable accuracy, and it is the major component of dietary fibre. Practically it means that foods that are rich in NSP are also high in dietary fibre. NSP is not quantitatively the same as dietary fibre.

For example, 12g of NSP is roughly equivalent to 20g of dietary fibre. For example, break fast cereal may contain17g of dietary fibre and 13g of NSP/ 100g. The function of NSP is to slow down and regulate the digestive process. NSP reduces the rate of glucose absorption. In the large intestine, NSP adds bulk to the faeces and thus helps to prevent constipation.

Current dietary guidelines recommend that average intake of NSP for the people should be 18g of NSP a day; this is roughly equivalent to 30g of dietary fibre. Wholegrain breads, cereals, pulses are the richest sources of NSP, with fruits and vegetables supplying more modest amounts.The richest sources of soluble NSP include pulses, oats,barley whereas insoluble NSP is found in wheat,rice and some vegetables.

How NSP Intake can Be Increased In The Diet

NSP intake can be increased in the diet by:

- choosing wholegrain breakfast cereal
- choosing whole meal bread.
- eating more potatoes, particularly with the skin
- using whole meal flour for baking or half whole meal and half white flour
- eating plenty of fruit and vegetables
- eating pulses such as dried beans and lentils three times a week

It is important to eat diet with rich NSP, but at the same time consumption of starchy carbohydrates should also be increased. Foods which are rich in NSP are normally rich in starch too, but foods rich in starch are not necessarily good sources of NSP. White bread for example contains less NSP but just as much as starch.

Proteins

Proteins are made up from building blocks called amino acids, which are necessary to build and repair all the tissues of the body. Protein is an important component of our muscles, including our heart muscle and brain. Perhaps this is why the word protein comes from the Greek word =protos' which means first. Many of our body's hormones, enzymes, parts of blood and antibodies are also proteins.

Protein is different from carbohydrates and fats because although all three macronutrients contain carbon, hydrogen and oxygen atoms, protein is the only one that contains nitrogen atoms.It is the nitrogen in protein that is the reason that high protein diets have been criticised as being unhealthy.

The protein part of the food that we eat, our body breaks it down into the small components of protein which are known as building blocks of protein. These building blocks are called amino acids. Overall there about 22 amino acids, which are the building blocks of our body proteins.The body can manufacture some of these amino acids but there are eight essential ones that must be obtained from the diet. These are best obtained by eating a variety of protein rich foods. If one or more of the eight amino acids is missing; our body can not form the proteins it needs. We can not substitute one of these building blocks for another.The other amino acids are called non-essential,because body can make them itself by combining essential amino acids. The eight amino acids are: isoleucine, leucine,phenylalanine, threonine, tryptophan, methionine, valine and lysine.

Why Do We Need Protein To Survive?

10% - 20% of calories in our diet should come from protein. We need protein for:
Growth (especially important for children, teens, and pregnant women)

- Tissue repair
- Immune function
- Making essential hormones and enzymes
- Energy when carbohydrate is not available
- Preserving lean muscle mass

Protein is found in meats, poultry, fish, meat substitutes, cheese, milk, nuts, legumes,and in smaller quantities in starchy foods and vegetables.

When we eat these types of foods, our body breaks down the protein that they contain into amino acids (the building blocks of proteins). Some amino acids are essential which means that we need to get them from our diet, and others are nonessential which means that our body can make them.

Protein that comes from animal sources contains all of the essential amino acids that we need.Plant sources of protein, on the other hand, do not contain all of the essential amino acids.

Animal Sources Of Protein

Animal sources of protein are the most concentrated sources of protein. These include: beef, lamb, poultry, fowl, fish and eggs. Red meat has been singled out as a major source of heart disease and cancer. The dangers of red meat are most likely due to the way the animals are raised. The same is true for the poultry. The best sources of all meat and poultry however are organic, free range and pasture

fed. The completeness of protein that we eat depends on how many of the essential amino acids are there in the food. Many nutrition experts consider eggs to be the most complete protein food, against which all others are compared. Eggs contain all eight essential amino acids. Eggs being complete protein foods contain B-vitamins, lecithin and other nutrients also.

Dairy Source Of Protein

Other most concentrated sources of protein are dairy products, such as cheese, milk and yogurt. Dairy sources can include cattle, goats or sheep. The situation for dairy is the same as for the meat:the healthiest sources of dairy are the organic ones.

Vegetable Sources Of Protein

These sources of protein include grains, beans, legumes, nuts and seeds. Vegetable sources of protein are not the complete sources of protein because they lack one or more of the essential amino acids. People who do not eat any animal foods at all, they should include variety of vegetable foods and egg in their diet in order to get the essential amino acids from the food. This isn‘t difficult to do. For example, legumes are deficient in methionine,while grains are deficient in lysine. While the grains contain methionine and legumes contain lysine.We can include both these in our diet by combining both these foods.

Looking At protein Intake In The Diet

Many people eat too much of the concentrated protein sources (meat, chicken, fish, eggs and dairy). As these foods are concentrated the serving size that can be roughly the size of the palm of the hand for one meal for most people. However, we have different needs for different amounts of protein, depending on a variety of factors, such as how old we are, how much energy we expend and what climate we are living in. Protein food is a warming food. People living in colder climate may need more of this food.

When Is Protein In The Diet A Problem

Protein is a macronutrient and therefore it is essential for health. However eating too much protein can be problematic. It is best for our body to have some protein at every meal. If we eat too much of protein in our diet. Once our body has digested the protein we have eaten and it has taken the nutrients and amino acids that it needs from this food, the rest of the food becomes waste and our body needs to process and eliminate this waste. Excess protein is also difficult to digest, especially for those who have digestive problem. Improperly digested protein can sit in the intestines where it can putrefy and feed putrefactive (unfriendly) bacteria. Since meat has no digestive fibre, eating lots of meat can add to this problem since it will stay in the intestines longer if there is no fibre to keep it moving through.

Fats

Although fats have received a bad reputation for causing weight gain, some fat is essential for survival. About 25% - 35% of calories in our diet should come from fat. We need this amount of fat for:

- Normal growth and development
- Energy (fat is the most concentrated source of energy)
- Absorbing certain vitamins (like vitamins A, D, E, K, and carotenoids)
- Providing cushioning for the organs
- Maintaining cell membranes
- Providing taste, consistency, and stability to foods

Fat is found in meat, poultry, nuts, milk products, butters and margarines, oils, lard, fish, grain products and salad dressings. There are three main types of fat, saturated fat, unsaturated fat, and Trans fat. Saturated fat (found in foods like meat, butter, lard, and cream) and trans fat (found in baked goods, snack foods, fried foods, and margarines) have been shown to increase the risk for heart disease. Replacing saturated and trans fat in the diet with unsaturated fat (found in foods like olive oil, avocados, nuts, and canola oil) has been shown to decrease the risk of developing heart disease.

As well as being the most essential source of energy fats in the supply essential fatty acids and the fat soluble vitamins A, D, E and K. The body needs fatty acids: linoleic acid and linolenic acid but it can not manufacture them and can not survive without them. These substances are important components of nerve cells, cellular membranes and hormones like substances called prostaglandins.These are also important in the transport, breakdown and excretion of cholesterol. The fact is that there are healthy, necessary fats as well as the unhealthy fats, the consumption of which contributes towards degenerative disease.

Fatty Acids

Most of the fat in the diet is in the form of triglycerides which are composed of one molecule of glycerol and three molecules of fatty acids. The characteristics of dietary fat are determined largely by the nature of the fatty acids. **Fatty acids** may be saturated, monounsaturated or polyunsaturated depending on the number of double bonds in the molecule. Eating low fat food doesn‘t mean we should give up fat entirely, but we do need to educate ourselves about which fats should ideally be avoided and which ones are more heart-healthy. Let‘s be clear: we need fat in our diet. As the most concentrated source of calories (nine calories per gram of fat compared with four calories per gram for protein and carbohydrates), it helps supply energy. Fat provides linoleic acid, an essential fatty acid for growth, healthy skin and metabolism. It also helps absorb fat-soluble vitamins (A,D,E and K). Fat adds flavour and is satisfying, making us feel fuller, keeping hunger at bay. Although all fats have the same amount of calories, some are more harmful than others: **saturated fats and trans fats** in particular.

Saturated Fats

These fats are derived from animal products such as meat, dairy and eggs. But they are also found in some plant-based sources such as coconut, palm and palm kernel oils.These fats are solid at room temperature. Saturated fats clog our arteries and directly raise total and LDL (bad) cholesterol levels. We should avoid them as much as possible.

Trans Fats

Unlike other members of the fat family (saturated, polyunsaturated and monounsaturated fats), trans fats, or trans-fatty acids,are largely artificial fats. A small amount of trans fats occur naturally in meat and dairy products.

Hydrogenation:

Trans fats are made by a chemical process called partial hydrogenation. Liquid vegetable oil (an otherwise healthy monounsaturated fat) is packed with hydrogen atoms and converted into a solid fat. This is seen an ideal fat for the food industry to work with because of its high melting point, its creamy, smooth texture and its reusability in deep-fat frying.

Shelf Life And Texture:

Partially hydrogenated fats, or trans fats, extend the shelf life of food. They also add a certain pleasing mouth-feel to all manner of processed foods. Think of buttery crackers and popcorn, crispy French fries, crunchy fish sticks, creamy frosting and melt-in-your mouth pies and pastries. All these foods owe those qualities to trans fats.

Worse Than Butter:

Hydrogenated fats were seen as a healthier alternative to saturated fats: using stick margarine was deemed better than using butter, yet numerous studies now conclude that trans fats are actually worse. True, saturated fats raise total and bad (LDL) cholesterol levels. Trans fats do the same, but they also strip levels of good (HDL) cholesterol, the kind that helps unclog arteries. Trans fats also increase triglyceride levels in the blood, adding to our risk of cardiovascular disease. Basically, the more solid the fat, the more it clogs our arteries. Many margarines and spreads are now available with low or zero levels of trans fats, but they are less suitable for cooking and baking.

Unsaturated Fats

Monounsaturated fats and polyunsaturated fats are two types of unsaturated fatty acids. They are derived from vegetables and plants.

- Monounsaturated fats are liquid at room temperature but begin to solidify at cold temperatures. This type of fat is preferable to other types of fat and can be found in olives, olive oil, nuts, peanut oil, canola oil and avocados. Some studies have shown that these kinds of fats can actually lower LDL (bad) cholesterol and maintain HDL (good) cholesterol.

- Polyunsaturated fats are also liquid at room temperature. These are found in safflower, sesame, corn, cottonseed and soybean oils. This type of fat has also been shown to reduce levels of LDL cholesterol, but too much can also lower the HDL cholesterol.

Omega-3 Fatty Acids

These include an—essential‖fatty acid, which means it's critical for our health but cannot be manufactured by our bodies. Good sources of omega-3 fatty acids include cold-water fish, flax seed, soy,

and walnuts. These fatty acids may reduce the risk of coronary heart disease and also boost our immune systems.

Good, Bad and worst Fats

The Good: Unsaturated Fats

As oxymoronic as it sounds, there are actually good fats—the unsaturated kind that help fight the very diseases that consuming excess fat was said to cause. These unsaturated fats are divided into monounsaturated fats and polyunsaturated fats, and both types are thought to have beneficial effects on cholesterol levels. Monounsaturated fats help lower LDL (bad) cholesterol while also boosting HDL (good) cholesterol.

Polyunsaturated fats are also thought to help lower total and bad cholesterol. But monounsaturated fats tend to be favoured over polyunsaturated fats because some research suggests that polyunsaturated fats are less stable, and can reduce levels of good cholesterol as well as bad. Polyunsaturated fats are often a good source of omega-3 fatty acids, found mostly in cold-water fish, nuts, oils and seeds, and also in dark leafy greens, flaxseed oils and some vegetable oils. One kind ofomega-3 fatty acid is an "essential fatty acid," which cannot be manufactured by our bodies, so eating these foods is the only way to get them. Omega-3 fatty acids are thought to lower blood pressure, combat LDL (bad) cholesterol, fight inflammation and protect the brain and nervous system.

Most cooking oils are made up primarily of unsaturated fats. When it comes to choosing cooking oils, each type of cooking oil varies in its ratio of monounsaturated to polyunsaturated fats. Two oils stand out for their high levels of monounsaturated fats: canola oil and olive oil. Other than non-stick cooking spray, these two oils should be in use.

At the end of the day, a good fat is still a fat in terms of calories. Any labels on cooking oil that describe the oil as "light," are referring to the taste or colour, not the fat or calorie content.All oils are 100 percent fat and are worth around 120 calories per tablespoon.

The Bad: Saturated Fats

Then there are the bad fats—those artery-clogging saturated fats from meat and dairy products. These fats are solid at room temperature. Saturated fats not only clog our arteries, they also directly raise total and LDL (bad) cholesterol levels. We should avoid them as much as possible.

The Worst: Trans Fats

Finally, these are what are now described as the really bad fats: trans fats, also known as hydrogenated fats. Trans fats are created during a hydrogenation process, where liquid vegetable oils are converted into solid fats. Trans fats are thought to be worse for us than saturated fats because they not only raise total and LDL (bad) cholesterol; they also lower HDL (good) cholesterol.

What Kind of Fats should we eat?

The bottom line is that the body needs dietary fat. Fat is a source of energy, it allows the proper function of cells and the nervous system, and fat is required for the proper absorption of certain vitamins. Fat also helps us maintain healthy hair and skin, and insulates us from the cold. Nonetheless, we should limit our fat intake to no more than 30 percent of daily calories. Anything lower than 20 percent, however, is unhealthy. Most of that fat should be unsaturated. We should use liquid oils over solid fats in cooking and should choose low-fat dairy products, and the leanest cuts of meat and poultry. We should eat fish (including fatty fish such as salmon) at least twice a week, and keep processed food and fast foods to an absolute minimum.

Finally, back to trans fats: even if a food label proudly says 0g trans fats, it doesn't transform that food into a healthy food. It means that the hydrogenated fat has been replaced by another kind of fat, often a saturated tropical fat, which may or may not be more beneficial.

What Are Omega-3 Fatty Acids?

Omega-3 fatty acids are polyunsaturated fats found naturally in oily fish, nuts, seeds, and leafy green vegetables. Omega-3 fatty acids are thought to protect against heart disease, inflammation, and certain types of cancer, diabetes, Alzheimer‘s disease, and macular degeneration (a leading cause of vision loss). Omega-3 fatty acids are critical for proper brain development and neurological function in developing babies, too.

Are They Essential?

Omega-3 fatty acids are often classed as "essential fatty acids," meaning that they are necessary for our health and that our bodies are unable to produce them. In fact, the body is unable to manufacture one kind of omega-3 fatty acid known as alpha linolenic acid (LNA or ALA), but it can make the other types, eicosapentaeonic acid (EPA) and docoshexaeonic acid (DHA), by converting LNA, though only a small percentage of LNA is able to be converted. That‘s why it‘s important for us to include foods containing omega-3 fatty acids in our diet, even if we‘re trying to eat low fat.

Fortified Foods And A Caveat:

Certain foods are fortified with omega-3 fatty acids, including eggs, bread, yogurt and pasta.These fortified foods tend to contain the less potent LNA, so are not as helpful to the body as food sources containing EPA and DHA.

Best Foods For Omega-3 Fatty Acids:

Sources Of EPA And DHA:

Fatty fish such as salmon, herring, and tuna; seaweed and algae

Sources of LNA:

- Walnuts
- Canola Oil

- Hempseed Oil
- Flaxseeds and oil
- Soybeans/tofu
- Grass-fed Beef

Margarines, Spreads And Oils

Using margarine or cooking oil rich in polyunsaturates or monounsaturates will help to reduce the intake of saturated fat but not that of total fat. For individuals of normal weight a polyunsaturated margarine is a healthy choice but for individuals who are over weight it is better to choose a low or very low fat spread because it will help to reduce their energy intake.Butter need not be avoided but can be added occasionally to those foods where the taste of butter is considered to be particularly important.

Food	Fat % by Weight	Fat % energy
Milk, Cream, Yogurt		
Whole Milk	4	55
Semi-Skimmed Milk	1.5	29
Skimmed Milk	0.1	3
Double Cream	48	96
Whipping Cream	39	94
Single Cream	19	86
Whole Milk Yogurt (Plain)	3	34
Whole Milk Fruit Yogurt	3	26
Low Fat Yogurt (Plain)	0.8	13
Low Fat Yogurt (Plain)	0.7	7
Greek Yogurt	9	70
Cheese		
Blue Cheese	30	78
Cottage Cheese	4	37
Cottage Cheese (low fat)	1.5	17
Cream Cheese	48	18
Cheddar Cheese	34	74
Butter, Spreads and Oils		
Butter	82	100
Margarine	82	100
Polyunsaturated Margarine	82	100
Low fat Spread	40	92

Very low fat spread	25	82
Meat and meat Products		
Bacon grilled	34	76
Beef burger	17	58
Chicken (no skin)roast	5	30
Chicken (with skin roast)	14	58
Lamb chop	8	48
Mince	15	59
Turkey (no skin roast)	3	19
Fish		
Kipper (backed)	11	49
Tuna (canned in oil)	9	43
White fish fried (Bread crumbs)	10	45
Chips and crisps		
Chips (chip shop)	12	45
French fries	16	51
Oven chips	4	22
Crisps	48	63
Crisps (low fat)	22	41
Biscuit, cakes and Chocolate		
Digestive biscuits		
Chocolate Plain	24	44
Sandwich biscuits	26	46
Tea biscuits	17	33
Croissants	20	60
Doughnuts	20	50
Fruit cake	13	33
Sponge cake	26	51
Chocolate	30	51

Low Fat Foods

There are several low and reduced fat alternatives, including milk, yogurt, cheese, spreads, beef burgers, salads dressings, chips and crisps.‘ Low fat‘ or =reduced fat‘ generally means that the product contains less fat than ordinary equivalent but not necessarily that the food is low in fat. Skimmed and semi skimmed milks and low fat yogurts are genuinely low in fat but low fat spreads are not. Low fat spreads

contain 40 times as much fat as low fat yogurt. However, if any low fat product is used to replace a full fat variety on a weight loss basis, fat intake will fall. Some practical suggestions that can help to reduce the fat intake:

- Choosing skimmed or semi-skimmed milk instead of whole.
- Choosing chicken, fish and lean meat rather than fatty meat; trimming all fat from meat
- Using low fat cheeses, yogurts, salad dressings and mayonnaise instead of full fat varieties
- Using as little oil in cooking as possible
- Using oils rich in polyunsaturated, such as sunflower or Soya or those rich in monounsaturates, such as olive oil rather than lard or dripping
- Eating foods such as pastries, pies, biscuits, cakes and crisps only occasionally.

Cholesterol

Some fat in the diet is in the form of cholesterol. Dietary cholesterol, however, has an insignificant effect on serum cholesterol. The majority of people do not need to worry about cholesterol in the diet. Saturated fat is much more important. Cholesterol is found in eggs, liver and shellfish.

Understanding Food Labels

Food labels can be very confusing with all their different terms and symbols**.** Food labels give us information so that we can choose between foods, but sometimes they can be confusing. For example, how much lactose is in a 'reduced lactose' product? If something is 'light' or 'lite', what does this actually mean?

Understanding E Numbers

If a food additive has an E number this shows it has passed safety tests and been approved for use throughout the European Union. This approval is monitored, reviewed and amended in the light of new scientific data. Most food additives must be included either by name or by an E number in the ingredient list. The ingredient list also tells us what job an additive does, such as adding colour or acting as a preservative. The types of additives that we are most likely to see on food labels are explained below.

Antioxidants And Preservatives

Antioxidants

Any food made using fats or oils - from meat pies to mayonnaise - is likely to contain antioxidants. These make foods last longer by helping to stop the fats, oils and certain vitamins from combining with oxygen in the air - this is what makes food taste 'off' - become rancid and lose colour. Vitamin C, also called ascorbic acid or E300, is one of the most widely used antioxidants.

Preservatives

These help stop food 'go off' and mean that food can be kept safe for longer. Most food that has a long shelf-life is likely to include preservatives, unless another method of preserving has been used ' such as freezing, canning or drying. For example, to stop mould or bacteria growing, dried fruit is often treated

with sulphur dioxide (E220); and bacon, ham, corned beef and other 'cured' meats are often treated with nitrite and nitrate (E249 to E252) during the curing process. More traditional preservatives such as sugar, salt and vinegar are also still used to preserve some foods.

Colours

These are sometimes used to replace the natural colour lost during food processing or storage, or to make products a consistent colour. Colours commonly found include caramel (E150a), which is used in products such as gravy and soft drinks; and curcumin (E100), a yellow colour extracted from turmeric roots. Some people think that adding colour makes food look more attractive, while other people think added colours are unnecessary and misleading.

The Food Standards Agency carries out work on colours:

- to make sure that their presence in food does not compromise food safety
- to help our input to discussions within the European Union about the use of colourings in food

Certain combinations of the following artificial food colours: sunset yellow (E110), quinoline yellow (E104), carmoisine (E122), allura red (E129), tartrazine (E102) and ponceau 4R (E124) have been linked to a negative effect on children's behaviour.These colours are used in soft drinks, sweets and ice cream. If a child shows signs of hyperactivity or Attention Deficit Hyperactivity Disorder (ADHD),these additives should be avoided.

Emulsifiers, Stabilisers, Gelling Agents and Thickeners

Emulsifiers such as Lecithins (E322), help mix ingredients together that would normally separate, such as oil and water. Stabilisers, such as locust bean gum (E410) made from carob beans, help stop these ingredients from separating again. Emulsifiers and stabilisers also give foods a consistent texture. They are used in foods such as low-fat spreads and other sweet and savoury foods.The most common gelling agent is pectin (E440), which is used to make jam. Gelling agents are used to change the consistency of food. Thickeners help give body to food in the same way as adding flour thickens a sauce.

Flavour Enhancers and Flavourings

Flavour enhancers are used to bring out the flavour in a wide range of savoury and sweet foods without adding a flavour of their own. For example monosodium glutamate (E621), known as MSG, is added to processed foods, especially soups, sauces and sausages.

Flavour enhancers are also used in a wide range of other foods including savoury snacks, ready meals and condiments. Flavourings, in contrast, are added to a wide range of foods, usually in very small amounts, to give a particular taste or smell. Flavourings don't have E numbers because they are controlled by different laws to other food additives. Ingredients lists will say if flavourings have been used, but individual flavourings might not be named.

Sweeteners

Lower in calories and safer for teeth, sweeteners are often used instead of sugar in products such as fizzy drinks, yoghurt and chewing gum. 'Intense sweeteners', such as aspartame (E951), saccharin (E954) and acesulfame-K (E950) are many times sweeter than sugar and so only very small amounts are used. Bulk sweeteners, such as sorbitol (E420), have about the same sweetness as sugar and so they are used in similar amounts to sugar. When giving concentrated soft drinks (that contain sweeteners) to children aged under 4, it's important to dilute them. This is to avoid children having large amounts of sweetener.

Traffic Light Labelling

A growing number of supermarkets and food manufacturers are using traffic light colours on the labels of some products to help people make the choice.

What Do The Traffic Light Colours Mean?

For eating a healthy diet, one of the key things to be done is, trying to cut down on fat (especially saturated fat), salt and added sugars. Food products with traffic light labels on the front of the pack show us at-a-glance if the food that we are thinking about buying has high, medium or low amounts of fat, saturated fat, sugars and salt, helping to get a better balance.

In addition to traffic light colours also contain the number of grams of fat, saturated fat, sugars and salt in what the manufacturer or retailer suggests as a 'serving' of the food.

So, if we see a red light on the front of the pack, we know the food is high in something we should be trying to cut down on. It's fine to have the food occasionally, or as a treat, but try to keep an eye on how often we choose these foods, or try eating them in smaller amounts. If we see amber, we know the food isn't high or low in the nutrient, so this is an OK choice most of the time, but one might want to go for green for that nutrient some of the time. Green means the food is low in that nutrient. The more green lights, the healthier the choice.

Many of the foods with traffic light colours that we see in the shops will have a mixture of red, amber and greens. So, when choosing between similar products, one should try to go for more greens and ambers, and fewer reds, this is for making a healthier choice.

The traffic light colours make it easier for us to compare products at-a-glance. The label also tells us how much of each nutrient is in a portion, so if two labels have similar colours we can compare these figures, and choose the one that is lower to make a healthier choice.

How Do Traffic Light Colours Fit Into a Healthy Diet?

If we want to choose a healthy diet, we should:

- base our meals on starchy foods such as wholegrain bread, pasta and rice eat lots of fruit and vegetables, which means trying to go for at least five portions of a variety every day have some protein-rich foods such as meat, fish, pulses, milk and dairy foods.
- keep foods (and drinks) high in fat, especially saturated fat, sugars or salt to a minimum

Traffic light colours can help us get the balance right by helping us to choose between products and keep a check on the amount of foods high in fat, sugars and salt that we are eating. We can use the signpost labelling to help put us in control, so we should look out for the colours on the front of food packs.

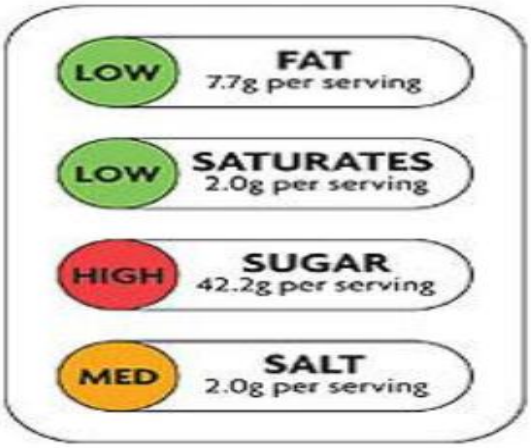
Making the healthy choice isn't always easy – sometimes there seems to be so much to remember. But with traffic light colours we just need to go for as many greens as we can and avoid choosing too many reds- to make healthier choice.

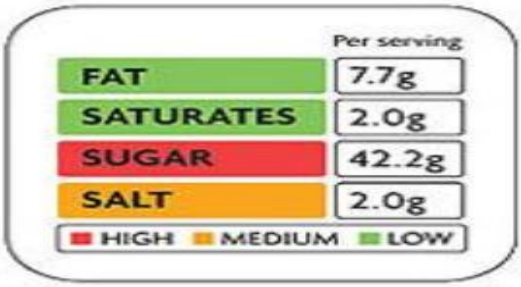
We should also try to remember that although some products may contain a lot of sugars, they can be healthier choices if they contain lots of fruit. One can tell this by checking the ingredients list; the higher up the ingredients list the more fruit there is.

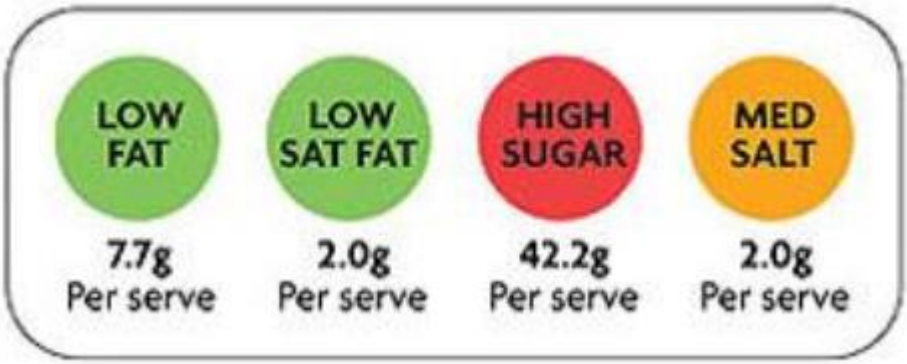
What Do the Different Traffic Lights Look Like?

Although the traffic light label designs may look different, one can still compare these foods because the companies are all using the Food Standards Agency guidelines.

These are the FSA examples of the traffic lights.







The traffic light colours on the front of food packs are a quick and easy guide, but one can check the back of packs for more information. On the back of some food packs, we will find the nutrition panel, Guideline Daily Amounts information and the ingredients list.

Nutrition Panel

This is often seen on the back of food packs. It gives the nutritional breakdown of the food: the amount of energy, protein, carbohydrates, sugars, fat, dietary fibre and sodium. This information can be used to make healthier choices.

Ingredients List

Ingredients lists always start with the biggest ingredient first and are listed in descending order of weight at the time they were used to make the food. We can see a panel on food labels giving the nutritional breakdown of the food.

Nutritional Information

Manufacturers are required by law to give this information if the label also makes a nutritional claim such as low fat or high fibre. Sometimes manufacturers give this information voluntarily. When nutritional information is given on a label, it must show the amount of each of the following in 100 g or 100 ml of the food:

- energy (in kJ and kcal)
- protein (in g)
- carbohydrate (in g)
- fat (in g)

Plus the amount of any nutrient for which a claim has been made.Sometimes we can also see amounts per serving, but this should be in addition to the 100 g or 100 ml breakdown.

These Terms Used on Food Labels

Energy

This is the amount of energy that the food gives when eaten.It is measured either in calories (kcal) or joules (kJ).

Protein

The body needs protein to grow and repair itself. Most adults in the UK get more than enough protein for their needs. Protein-rich foods include meat, fish, milk and dairy foods, eggs, beans, lentils and nuts.

Carbohydrates

There are two types of carbohydrates that the body turns into energy: simple and complex.Simple carbohydrates are often listed on food labels as 'Carbohydrates (of which sugars)'. This includes added sugars and the natural sugars found in fruit and milk.

Complex carbohydrates are also called starchy foods. Starchy foods include bread, cereals, rice, pasta and potatoes. We should get most of our energy from complex carbohydrates (or starchy foods) rather than those containing sugar. Sometimes we only see a total figure for carbohydrates on food labels. This includes the carbohydrates from starchy foods and from simple carbohydrates.

Fats

Many food labels give figures for the product's fat content. Some food labels also break the figures down into these different types of fat: saturates, monounsaturates and polyunsaturates. Saturated fat can raise blood cholesterol levels, which increases the chance of developing heart disease. Monounsaturates and polyunsaturates are both types of unsaturated fat. These don't raise blood cholesterol in the same way as saturated fats and provide us with the essential fatty acids that the body needs. Most people know that we should be cutting down on fat. But it's even more important to try to replace the saturated fat we eat with unsaturated fat.

Dietary Fibre

Fibre helps prevent constipation, piles and bowel problems.Good sources of fibre include some breakfast cereals, kidney beans, mixed unsalted nuts, wholemeal bread, baked beans,fruit and vegetables.

Salt

Lots of food labels tell us how much salt is in 100g of the food. Sometimes they only give a figure for sodium, or sometimes they might give both. Sodium x 2.5 = salt

If we know how much sodium is in a food, we can work out roughly the amount of salt it contains by multiplying the sodium level by 2.5. Eating too much salt can raise our blood pressure, which triples our risk of developing heart disease.

Checking The label For Saturated Fat

One should look out for the figure for =saturates' or =sat fat' on the label because this tells how much saturated fat is in the food.

High is more than 5g sat fat per 100g

Low is 1.5g sat fat per 100g

If the amount of sat fat per 100g is in between these figures,then that is a medium level.Some foods have =traffic light' labels on the front of the pack. These show if a food is high, medium or low in fat, sat fat, sugars and salt.

Red = High
Amber = Medium
Green = Low

We should try to choose foods that are low in sat fat as often as we can, or should go for medium. If foods are high in sat fat, we should not be eating too often.

Micronutrients

Micronutrients are vital for health but we need them in very small amounts: milligrams or micrograms rather than grams. These micronutrients are **vitamins and minerals.**

What Vitamins and Minerals Do?

Vitamins and minerals are nutrients that act as coenzymes or cofactors in important metabolic activities that occur in our body. As a coenzyme, a vitamin helps an enzyme to work. Enzymes are special proteins that change the rate of chemical reactions in our body. Enzymes are their own energy source which means they do not need any out side sources of energy to work and they don't need to change their forms while they are working.

Enzymes are very specific. Each enzyme works on only one substance. For example, the digestive enzyme lipase only works on metabolising fat: it will not help with metabolising carbohydrates or protein. Some enzymes need to have specific vitamin present to do their work.

Vitamins

Vitamins are necessary to run many of the body processes properly. Vitamin deficiency may result in different diseases. A well known vitamin deficiency disease is scurvy, which is caused by the deficiency of vitamin C.

The Fat Soluble Vitamins

Fat Soluble Vitamins are A, D, E and K. ''Fat soluble' means that they are found in the fat component of vegetable and animal sources of foods. Fat soluble vitamins can be stored in our body tissues and therefore it is possible to take in toxic excessive amounts of these vitamins as supplements, but generally through food.

Vitamin A

Functions

- maintains integrity of epithelial membranes
- maintains resistance to infections
- necessary for formation of rhodopsin and prevention of night blindness

Deficiency

Mild deficiency may result in:

- retarded growth
- increased susceptibility to infection
- abnormal function of gastro intestinal, genitourinary, and respiratory tracts due to altered epithelial membranes
- dry, shrivelled, thickened skin.
- night blindness

Severe Deficiency May Result In:

- Xerophthalmia, a characteristic eye disease, and other local infections

Characteristics

- fat-soluble
- not destroyed by ordinary cooking temperatures
- destroyed by high temperatures when oxygen is present
- marked capacity for storage in liver
- carotene is a precursor to vitamin

Good Sources

Retinol: milk fats, butter, cheese, cream, whole milk, egg yolk, liver, fatty fish.

Carotene: green leafy vegetables, carrots, fruits, yellow and red.

Food	Quantity	mcg RAE
Egg	1 medium	118
Milk (non-fat)	1 cup	149
Nectarine	1 medium	50
Watermelon	1 piece	27

Recommended Daily Allowances

(DRV 700 microgram for men ,600 for women)

Vitamin D

Functions

Regulates absorption of calcium and phosphorus from the intestinal tract

Mild

- interferes with utilization of calcium and phosphorus in bone and teeth formation
- irritability
- weakness

Severe

- rickets in young children
- childhood deficiency disease marked especially by soft deformed bones
- osteomalacia in adults

Characteristics

- soluble in fats and organic solvents
- relatively stable under refrigeration
- stored in liver
- precursor: UV-activated 7-dehydro-cholesterol

Good Sources

- Natural
- butter
- egg yolks
- oily fish
- salmon, tuna fish, herring, sardines, mackerel, bluefish, catfish
- oysters
- liver
- exposure to sunlight
- formed in the skin

Food	Quantity	mcg	IUs
Cheese, cheddar	1 oz	0.075	3
Egg	1 large	0.675	27
Milk, non-fat	1cup	2.5	100
Red Salmon (canned)	1/2 cup	23.5	940
Cat Fish (cooked)	3 oz	14.25	570
Multivitamins (most brands)	1 tablet	10	400

Vitamin E

Functions

- Prevents damage to cell membrane
- Active in maintaining
    - involuntary nervous system
    - vascular system
    - involuntary muscles

Deficiency

- Red blood cell resistance to rupture is decreased

Characteristics

- fat soluble

- stable to heat in absence of oxygen

Good Sources

Natural

- whole grains
- green, leafy vegetables
- vegetable oils, margarine
- nuts, seeds
- brown rice
- olives
- asparagus

Food	Quantity	mg
Brussels sprouts, boiled	1/2 cup	0.7
Spinach, boiled	1 cup	0.675
Almonds	1 oz	7.5

Recommended Daily Allowances (RDA)

- Males (11 yrs. and older)
  - 15 mg
  - 8-10 mg
- Females (11 yrs. and older)
  - 15 mg
  - 8 mg
- Pregnant females
  - 15 mg
  - 10 mg
- Lactating females
  - 15 mg
  - 11 mg
- Children
  - 10-15 mg
- Infants
  - 5 mg
- Varied values reflect different references

Vitamin K

Functions

- coenzyme in synthesis of fatty acids and glycogen
- important in blood clotting
- aids in bone formation

Deficiency

- haemorrhagic problems
- 30 percent higher risk of hip fractures

Characteristics

- fat soluble

Good Sources

- green leafy vegetables
- broccoli
- peas
- soybeans
- potatoes

Adequate Intakes (AI)

- Males (Adult)
  - 120 mcg
- Females (Adult)
  - 90 mcg

Water Soluble Vitamins

The Water Soluble Vitamins are divided into vitamin C and the B complex group of vitamins. The B complex includes B1 (thiamine, B2 (riboflavin), B3 (niacin), B5 (pantothenic acid), B6 (pyridoxine), B12 (cyanocobalamine), folic acid and biotin. The water soluble vitamins are not stored by the body and therefore excess of these vitamins is generally washed from our body through our urine.

Vitamin C

Functions

- formation of intracellular cement substances in a variety of tissues
  - skin, dentin, cartilage, and bone matrix
  - important in healing of wounds and fractures of bones

- increases resistance to infections
- facilitates absorption of iron

Deficiency

Mild

- lowered resistance to infections
- joint tenderness
- susceptibility to dental caries, pyorrhoea, and bleeding gums

Severe

- hemorrhage
- anaemia
- scurvy

Characteristics

- soluble in water
- easily destroyed by oxidation
    - heat hastens process
- lost in cooking
    - particularly if water in which food was cooked is discarded
- loss is greater if cooked in iron or copper utensils
- quick-frozen foods lose little
- stored in the body to limited extent

Good Sources

Natural

- Most fresh fruits and vegetables
- Fruits
    - citrus fruit, strawberries, cantaloupe
- Vegetables
    - tomatoes, peppers, broccoli, potatoes, kale, cabbage, cauliflower, brussels sprouts

Food	Quantity	mg
Orange	1 medium	70
Green pepper	1/2 cup	56
Broccoli, raw	1 cup	82
Tomato juice	8 oz	44

Recommended Daily Allowances (RDA)

- Males (11 yrs. and older)
  - 90 mg
  - 50-60 mg
- Females (11 yrs. and older)
  - 75 mg
  - 50-60 mg
- Pregnant females
  - 80 mg
- Lactating females
  - 100 mg
- Children
  - 45 mg
- Infants
  - 35 mg

B1 (thiamine)

Overview:

Vitamin B-1, otherwise known as thiamine, is necessary for most every cellular reaction in the body as a participant in an enzyme system known as thiamine pyrophosphate. It is vital to normal functioning of the nervous system and metabolism. It can be found in meat, whole grains, fish, and nuts.

How This Vitamin Works in the Body:

- Maintains health of mucous membranes
- Keeps normal workings of nervous system, heart, and muscles
- Helps treat herpes zoster and beriberi
- Supports normal growth and development
- Restores deficiencies caused by alcoholism, cirrhosis, overactive thyroid, infection, breastfeeding,
- absorption diseases, pregnancy, prolonged diarrhoea, and burns
- Reduction of depression, fatigue, and motion sickness
- Potential improvement in appetite and mental alertness

Symptoms Of Deficiency:

Symptoms include fatigue, depression, decreased mental functioning, muscle cramps, nausea, heart enlargement, and eventually beriberi. Alcoholics are at increased risk of a deficiency.

The Following May Benefit From this Vitamin:

Alcohol or other substance abusers by accelerating metabolism Those with poor nutritional dietary intake

- Age greater than 55 years old
- Women who are breastfeeding or pregnant
- Recent surgery patients
- Those with liver disease, overactive thyroid, or prolonged diarrhoea

Good Sources:

- Baked Potato
- Beef kidney/liver
- Brewer's yeast
- Flour; rye and whole grain
- Garbanzo beans (chickpeas), dried
- Ham
- Kidney beans, dried
- Navy beans, dried
- Orange juice
- Oranges
- Oysters
- Peanuts
- Peas
- Raisins
- Rice, brown and raw
- Wheat germ
- Whole-grain products

Recommended Daily Intakes

- Men: 1.2 mg
- Women: 1.1 mg
- Pregnancy: 1.4 mg
- Lactation: 1.5 mg

B2 (riboflavin)

Overview:

Vitamin B-2, otherwise known as riboflavin, is readily absorbed from foods, such as meat, dairy products, and fortified grains. This vitamin is essential to energy generation, nerve development, blood cell development, and the regulation of certain hormones.

How This Vitamin Works in the Body:

- Releasing food energy
- Normal growth and development
- Keeps healthy mucous membranes linings together with vitamin A

- Keeps healthy brain and nervous system, skin, hair, and blood cells
- Essential for iron, pyridoxine, and niacin functions
- could increase growth of body during development stages
- Potential treatment for cheilitis

The Following May Benefit From this Supplement:

- People with needed nutritional supplements
- Pregnant or breastfeeding women
- Substance abusers
- People with excess stress or who have undergone recent surgery
- Hyperthyroidism sufferers
- Participants in vigorous physical activity

Good Sources

- Bananas
- Beef liver
- Dairy products
- Eggs
- Enriched breads
- Fortified cereals
- Ham
- Mixed vegetables
- Pork
- Tuna
- Wheat germ

Recommended Daily Intakes

- Men: 1.3 mg
- Women: 1.1 mg
- Pregnancy: 1.4 mg
- Lactation: 1.6 mg

B3 (niacin)

Overview:

Vitamin B-3, otherwise known as niacin, acts like other B vitamins to create enzymes that are essential to metabolic cell activity, synthesize hormones, repair genetic material, and maintain normal functioning of the nervous system. Great sources of this vitamin may be found in meat, fish, and whole grains.

How This Vitamin Works in Your Body:

- May treat pellagra

- Decreases cholesterol and triglycerides in blood
- Large doses dilate blood vessels
- Handles ear ringing and dizziness
- Essential for genetic material repair
- Potential reduction in heart attacks, depression, and migraine headaches
- Poor digestion could be improved

The Following May Benefit From this Supplement:

- Anyone with poor dietary intake
- Pregnant or breastfeeding women
- Substance abusers
- severe burn or injury patients
- Infants with congenital metabolic disorders

Good Sources:

- Beef liver
- Brewer's yeast
- Chicken, white meat
- Dried beans/peas
- Fortified cereals
- Halibut
- Peanut butter
- Peanuts
- Pork/ham
- Potatoes
- Salmon
- Soybeans
- Swordfish
- Tuna
- Turkey

Recommended Daily Intakes

- Men: 16 mg
- Women: 14 mg
- Pregnancy: 18 mg
- Lactation: 17 mg

B5 (pantothenic acid)

Overview:

Vitamin B-5, otherwise known as pantothenic acid, is a coenzyme involved in energy metabolism of carbohydrates, protein, and fat. Great sources of this vitamin include eggs, nuts, and whole-wheat products.

How This Vitamin Works in Your Body:

- Helps normal growth and development
- Helps release food energy
- could hasten healing of wounds in animals
- May relieve stress
- May lessen fatigue

The Following May Benefit Most From this Supplement:

- Those with increased nutritional needs
- Pregnant or breastfeeding women
- Substance abusers
- Those under prolonged stress
- Those having undergone recent surgery
- People with vigorous physical activity levels

Good Sources:

- Avocados
- Bananas
- Blue cheese
- Broccoli
- Chicken
- Collard greens
- Eggs
- Lentils
- Liver
- Lobster
- Meats, all kinds
- Milk
- Oranges
- Peanut butter
- Peanuts
- Peas
- Soybeans
- Sunflower seeds

- Wheat germ
- Whole-grain products

Recommended Daily Intakes

- Men: 5 mg
- Women: 5 mg
- Pregnancy: 5 mg
- Lactation: 5 mg

B6 (pyridoxine)

Overview:

Vitamin B-6, otherwise known as pyridoxine, performs as a coenzyme to carry out metabolic processes that affect the body's use of protein, carbohydrates, and fat. It helps to convert tryptophan to niacin, and may be found in meat, fish, eggs, milk, and whole grain foods.

How This Vitamin Works in Your Body:

- Promotes healthy cardiovascular, nervous, and immune systems
- Supports healthy skin, hair, and normal red-blood-cell formation
- Assists in production of food energy
- Possible anaemia treatment
- Treatment of cycloserine and isoniazid poisoning
- Keeps normal homocysteine levels
- Functions as a tranquilizer
- Important for Healthy nerve and muscle functioning
- Blood cholesterol may decrease
- Inflammation of arthritis and carpal-tunnel syndrome may be reduced
- Reduction of PMS symptoms
- May reduce asthma symptoms
- Increases levels of serotonin to ease sleep

The Following People May Benefit From Taking this Supplement:

- Those with increased nutritional needs
- Pregnant or breastfeeding women
- Substance abusers
- Long periods of excess stress
- Estrogen and oral contraceptive users
- Hyperthyroidism sufferers
- those with high homocysteine levels

Good Sources:

- Avocados
- Bananas
- Beef liver
- Chicken
- Fortified cereals
- Ground beef
- Ham
- Hazelnuts (filberts)
- Lentils
- Potatoes
- Salmon
- Shrimp
- Soybeans
- Sunflower seeds
- Tuna
- Wheat germ

Recommended Daily Intakes

- Men: 1.3 mg
- Men (Over 50): 1.7 mg
- Women: 1.3 mg
- Women (Over 50): 1.5 mg
- Pregnancy: 1.9 mg
- Lactation: 2.0 mg

B9 (Folic Acid)

Overview:

Vitamin B-9, otherwise known as folic acid, serves as a coenzyme during the creation of DNA. This vitamin is also very important to the growth and reproduction of all body cells, including red blood cells. Great food sources of vitamin B-9 include liver and dark green leafy vegetables.

How This Vitamin Works in the Body:

- Formation of red blood cells
- Creation of genetic material
- Promotes a healthy pregnancy by regulating the nervous system development of the foetus
- Helps treat anaemic patients resulting from folic acid deficiency
- Functions to metabolize proteins
- Cervical dysphasia may be reduced

The Following People May Benefit From the Consumption of This Vitamin:

- Those with increased nutritional needs
- Pregnant or breastfeeding women or those planning to become pregnant
- Oral contraceptive users
- Substance abusers
- Those who have undergone partial removal of the gastrointestinal tract

Good Sources:

- Asparagus
- Avocados
- Bananas
- Beans
- Beets
- Brewer's yeast
- Brussels sprouts
- Cabbage
- Calf liver
- Cantaloupe
- Citrus fruits/juices
- Endive
- Fortified grain products
- Garbanzo beans (chickpeas)
- Green, leafy
- vegetables
- Lentils
- Sprouts
- Wheat germ

Recommended Daily Intakes

- Men: 400 mg
- Women: 400 mg
- Pregnancy: 600 mg
- Lactation: 500 mg

B12 (Cyanocobalamin)

Overview:

Vitamin B-12, otherwise known as cyanocobalamin, performs as a coenzyme for the creation of DNA material. It also promotes growth and cell development and is important to fat, carbohydrate, and

protein metabolism. Although vitamin B-12 is not found in plant foods, good sources of this supplement include meats, fish, eggs, and dairy products.

How This Vitamin Works in The Body:

- Growth and development of nerve, skin, hair, and blood cells
- Produces genetic material
- Metabolizes amino and fatty acids
- Works to release food energy
- Helps treat Alzheimer's disease
- May help sufferers of nervous disorders
- Could improve immune system
- May see increase in energy and memory

The Following May Benefit From The Consumption Of This Vitamin:

- Vegans
- Those with increased nutritional needs
- Substance abusers
- Those with chronic illnesses or recently undergone surgery, especially removal of portions of
- gastrointestinal tract
- Burn and recently injured patients
- Those with malignancies of the pancreas or bowels

Good Sources:

- Beef
- Beef liver
- Blue cheese
- Clams
- Dairy products
- Eggs
- Flounder
- Herring
- Liverwurst
- Mackerel
- Milk
- Oysters
- Sardines
- Snapper
- Swiss cheese

Recommended Daily Intakes

- Men: 2.4 mcg
- Women: 2.4 mcg
- Pregnancy: 2.6 mcg
- Lactation: 2.8 mcg

Minerals

Calcium

Functions

- bones and teeth formation
- nerves and muscles function
- blood clotting
- activation of enzymes that convert food to energy

Deficiency

- muscle cramps
- Children
  - rickets (soft, deformed bones)
  - poor growth in children
- Adults
  - osteoporosis

Good Sources

Natural

- milk and dairy products
- dark-green, leafy vegetables
- spinach, collard greens, mustard greens, turnip greens
- broccoli
- soybean products
- tofu
- garbanzo beans
- bean sprouts
- nuts
- almonds, chestnuts, filberts
- sunflower and sesame seeds
- fish (with tiny bone particles)
- (canned salmon, sardines, or jack mackerel)
- oysters

- kelp
- figs

Food	Quantity	mg
Sardines, Atlantic	3 oz	325
Milk, fat free	1 cup	301
Cheese	1 oz	204
Yogurt	8 oz	452
Book Choy, cooked	1 cup	330

Adequate Intakes (AI)

- Males and Females
  - Adults
    1000 mg
  - 11-24 years
    1200 mg
  - 25 years. and older
    800 mg
- Pregnant/Lactating females
  - 1200 mg
- Children (1-10 yrs)
  - 800 mg
- Infants
  - 7 months to 1 year
    600 mg
  - birth-6 months
    400 mg

Chloride

Functions

- nerve and muscle function
- water balance (with sodium)

Deficiency

- impaired electrolyte balance

Good Sources

- Salt

Adequate Intakes (AI)

- Males and Females (Adults)
  - 2.3 g

Chlorium

Functions

- Glucose metabolism

Deficiency

- Adult-onset diabetes

Good Sources

Natural

- Meats
  - beef, chicken, pork, lamb, liver, oyster, shrimp
- Vegetables
  - black pepper, green pepper, potato, spinach, parsnips, fresh chilli, carrots
- Fruit
  - apple, banana, orange, blueberries
- cheese
- egg
- whole grains
- beans
- beer

Food	Quantity	mcg
Beef, round	3.5 oz	57
Whole wheat bread	1 slice	12
Green pepper	3.5 oz	19
Cheese, Swiss	3.5 oz	11

Adequate Intakes (AI)

- Males (Adult)
    - 35 mcg
- Female (Adult)
    - 25 mcg

Selenium

Functions

- To protect immune system
- To prevent free radical formation

Good Sources

- Brazil nuts
- Seafood
- Meat
- grains

Copper

Functions

- helps in formation of red blood cells
- helps keep bones, blood vessels, nerves and immune system healthy
- enzyme function
- energy production

Deficiency

- anaemia
- Menkes' syndrome

Good Sources

Natural

- meat
- poultry
- liver
- seafood, fish, oysters
- green vegetables
- whole grains
- legumes, peas
- nuts

- raisins, papaya, apple
- mushrooms, carrots, turnips
- vegetable oils
- butter
- gelatine
- black pepper, thyme, paprika, bay leaves, ginger root

Food	Quantity	mcg
Raisins, seedless	2/3 cup	310
Pistachios, dry roasted	1 oz	340
Mushrooms	1/2 cup	390
Oyster, cooked	1 medium	670
Pork loin	3.5 oz	400

Recommended Daily Allowances (RDA)

- Males and Females
  - 900 mcg

Fluoride

Functions

- bone and teeth growth

Deficiency

- tooth decay
- possibly osteoporosis
- Good Sources

Natural Sources

- fish, seafood
- milk
- tea

Artificial sources

- fluoridated drinking water

Recommended Daily Allowances (RDA)

- Males (adults)
  - 4 mg
- Females (adults)
  - 3 mg
- Pregnant females
  - 1.6 mg
- Lactating females
  - 1.7-1.8 mg
- Children
  - 0.8-1.2 mg
- Infants
  - 0.4-0.5 mg

Iodine

Functions

- thyroid hormone formation
- regulates oxidation in cells

Deficiency

- hypothyroidism
  - disturbance in thyroid function
- goitre
  - enlargement of thyroid gland
- cretinism
  - stunting and mental retardation
  - in infants / new born

Good Sources

Natural

- seafood
  - salt-water fish
  - seaweed
- dairy
  - milk
  - cheese
  - butter
- whole-grain cereal

Food	Quantity	mcg
Cheese, cheddar	1 oz	12
Salt, iodized	1 tsp	400

Recommended Daily Allowances (RDA)

- Males and Females (11 yrs. and older)
  - 150 mcg
- Pregnant females
  - 175 mcg
- Lactating females
  - 200 mcg
- Children
  - 7-10 yrs.
    120 mcg
  - 4-6 yrs.
    90 mcg
  - 1-3 yrs.
    70 mcg
- Infants
  - 7 mths - 1 yrs.
    50 mcg
  - birth - 6 mths
    40 mcg

Iron

Functions

- oxygen transport in red blood cells production of haemoglobin and myoglobin enzyme function

Deficiency

- fatigue, weakness headaches shortness of breath
- iron deficiency anaemia

Good Sources

Natural

- red meat, liver, kidney shellfish

- egg yolks beans
- green leafy vegetables apricots
- whole grains

Food	Quantity	mg
Bread, whole wheat	1 slice	1.0
Eggs, scrambled	3 medium	2.2
Beef, lean sirloin steak, broiled	3 oz	2.6
Liver, fried	3 oz	5.3
Oatmeal, instant	1 packet	6.7

Recommended Daily Allowances (RDA)

- Males
  - Adult
    8 mg
  - 19 years and older
    12 mg
  - 11-18 years
    10 mg

- Females
  - Adult
    18 mg
  - 11-50 yrs.
    15 mg
  - 50+ yrs.
    10 mg
- Pregnant females
  - 30 mg
- Lactating females
  - 15 mg
  - 18 mg
- Children (1-10 yrs)
  - 10 mg
- Infants
  - 7 mths-1 yr
    10 mg

- birth-6 mths
  6 mg

Magnesium

Functions

- essential to bone growth and production of cells and genetic material
- cofactor in enzymatic release of energy
- regulates neuromuscular sensitivity
- including regulation of normal heart rhythm

Deficiency

- muscle cramps and weakness
- twitching
- confusion
- irregular heartbeat
- insomnia
- deficiency most often seen in
- Alcoholics
- people taking diuretics
- those dehydrated from prolonged diarrhoea

Good Sources

Natural

- green, leafy vegetables (raw)
- nuts
- beans
- soybeans and soy products
- whole grains
- fish, crab, oysters, scallops
- kelp
- potato, sweet potato, beets
- avocado
- figs, apricots, dates, prunes, raisins, banana, blackberry, coconut
- also found in plant and animal tissues but seldom occurs in high concentration

Food	Quantity	mg
Peanut butter	1 tbsp	28
Cashews	12	50
Potato, baked	1 medium	55
Spinach, cooked	1/2 cup	79
Kelp	1 oz	217
Buckwheat	1 oz	65

Recommended Daily Allowances (RDA)

- Males
  - 19 yrs. and older
    420 mg
  - 15-18 yrs.
    350 mg
  - 11-14 yrs
    400 mg
    270 mg
- Females
  - 19 yrs. and older
    320 mg
  - 15-18 yrs.
    280 mg
  - 11-14 yrs
    300 mg
  - 280 mg
- Pregnant females
  - 320 mg
- Lactating females with infant
  - 7 mths - 1 yr
    340 mg
  - 1-6 mths
    355 mg
- Children
  - 7-19 yr.
    170 mg
  - 4-6 yrs.

120 mg
- 1-3 yrs
80 mg

- Infants
  - 7 mths - 1 yr
60 mg
  - birth - 6 mths
40 mg

Manganese

Functions

- enzymatic function

Deficiency

- not known in humans

Good Sources

- green, leafy vegetables
- nuts
- beans
- whole grains
- fruit
- Tea

Adequate Intakes (AI)

- Males (adults)
  - 2.3 mg
- Females (adults)
  - 1.8 mg

Phosphorus

Functions

- formation of bones and teeth
- helps form membranes and genetic material
- activation of enzymes that convert food to energy
- maintenance of body's proper acid/base balance
- nerve/muscle function

Deficiency

- deficiency is rare
- muscular weakness
- pain in bones
- loss of appetite

Good Sources

Natural

- milk and dairy products
- egg yolks
- meat, poultry, and fish
- whole grains
- beans, peas, soybeans
- nuts, seeds
- green and root vegetables
- fruits
- nearly all foods

Food	Quantity	mg
Scallops	6 medium	200
Milk, non-fat	1 cup	250
Trout, broiled	3 oz	260
Cottage cheese, low fat	1 cup	340
Sunflower seeds, hulled	1 oz	240

Recommended Daily Allowances (RDA)

- Males and Females
  - Adults
    700 mg
  - 25-51 yrs.
    800 mg
  - 11-24 yrs.
    1,200 mg
- Pregnant/Lactating females
  - 1,200 g
- Children (1-10 yrs)
  - 800 mg
- Infants

- 7 mths-1 yr
  500 mg
- birth-6 mths
  300 mg

Potassium

Functions

- regulation of fluid balance
  o cells and blood
- nerve impulse transmission
- muscle contraction
- function of heart and kidneys

Deficiency

- muscle weakness
- irregular heart beat
- kidney damage
- deficiency most often seen in people
  o taking diuretics
  o dehydrated from prolonged diarrhoea

Good Sources

Natural

- bananas
- citrus fruits
- fresh vegetables
- potatoes
- legumes
- whole grains
- milk and dairy products
- meats, fish
- nuts, seeds

Food	Quantity	mg
Banana	1 medium	422
Milk, non-fat	1 cup	406
Potato, with skin	1 medium	610
Spinach, cooked	1/2 cup	419
Sunflower seeds	1 oz	262

Adequate Intakes (AI)

- Males and Females (19-51+ yrs.)
  4,700 mg (4.7 g)
  2,000 mg
- Children
  - 10-18 yrs.
    2,000 mg
  - 6-9 yrs.
    1,600 mg
  - 2-5 yrs.
  - 1 yr
    1,400 mg
    1,000 mg
- Infants
  - 7 mths-1 yr
    700 mg
  - birth-6 mths
    500 mg

Sodium

Functions

- nerve and muscle function
- fluid balance

Deficiency

- muscle cramps
- weakness
- headache
- deficiency rare in developed countries
- acute deficiency caused by extremely heavy perspiration

Good Sources

- table salt
- milk and dairy products
- also found in many processed foods
- drinking water (some locations)

Adequate Intakes (AI)

- Males and Females (19-51+ yrs.)
  1,500 mg (1.5 g)
  500 mg

- Children
  - 10-18 yrs.
    500 mg
  - 6-9 yrs.
    400
  - 2-5 yrs.
  - 1 yr
    225 mg

- Infants
  - 7 mths-1 yr
    200 mg
  - birth-6 mths
    120 mg

Zinc

Functions

- required to produce enzymes necessary for
- o digestion
- o cell division, growth, and repair (healing)
- helps immune system function properly
- plays role in acuity of taste and smell

Deficiency

- wounds slow to heal
- loss of taste/appetite
- stunted growth and sexual development in children

Good Sources

Natural

- beef, chicken
- liver
- seafood
- o fish, shellfish
- milk and dairy products
- eggs
- whole grains
- legumes, peas
- nuts

Food	Quantity	mg
Yogurt, low-fat	8 oz	1.5
Lentils, boiled	1 cup	2.5
Turkey, dark meat, roasted	3.5 oz	4.4
Peanuts	1 oz	0.9
Beef, ground round steak	3.5 oz	5,6

Recommended Daily Allowances (RDA)

- Males (11 yrs. and older)
  - 11 mg
  - 15 mg
- Females (11 yrs. and older)
  - 8 mg
  - 12 mg
- Pregnant females
  - 30 mg
- Lactating females
  - 15 mg
- Children
  - 10 mg
- Infants
  - 5 mg

Dietary Supplements

There are three categories of vitamin and mineral supplements:

1. **Multivitamin And Multiminerals**
   These usually contain around 100% of the Reference Nutrient Intake (RNI) for each vitamin.

2. **Combination Of Particular Vtamins And Minerals**
   marketed for specific groups of people such as school children, menopausal women and athletes.

3. **Single Vitamin And Single Minerals**
   often containing very large amounts. When levels of vitamins and minerals exceed 10 times the RNI, they are usually known as 'mega doses. Many supplements are labelled in terms of Recommended Daily Amount (RDA) which is quantitively similar to the RNI.

The majority of the people living in the UK who eat a balanced diet do not need to take vitamin and mineral supplements. But there are groups of population who are at risk of deficiency and might benefit from vitamin and mineral supplements. These include:

- Pregnant and breast feeding women
- Infants
- Children and young people
- The elderly
- Athletes
- Vegetarians particularly vegans
- Members of Asian community
- Long term travellers
- People on low income

The best choice of dietary supplement for any of these groups of people is one which contains a wide variety of vitamins and minerals and which does not contain more than the Reference Nutrient Intake (RNI) of each nutrient.

Vitamin A

Vitamin A is involved in the growth and differentiation of epithelial tissue. Low intakes of both vitamin A and beta-carotene have been associated with an increased risk of cancer at various sites including the stomach, breast and respiratory tract. Toxic effects of vitamin A are well known in both children and adults. Poisoning may occur after a single dose of 30mg of vitamin A. If taken over several months doses of 7.5- 15 mg can cause toxicity. Large doses of vitamin A are teratogenic so vitamin A supplements should be avoided by women who are pregnant or who are likely to become so.Beta-carotene is generally non- toxic. Excessive intake of supplements or of carrot juice can cause an orange colouration of the skin.

Vitamin B6

Mega doses of vitamin B6 have been recommended for a variety of disorders including carpal tunnel syndrome, pregnancy sickness and asthma. Vitamin B6 has an adverse effect on the peripheral nervous system, and even in doses as low as 50 mg it may cause peripheral sensory neuropathy.

Niacin

Nicotinic acid is licensed in the UK as a lipid-lowering drug, but it should not be recommended as a dietary supplement for this purpose. In doses exceeding 500mg a day, nicotinic acid has been associated with liver damage.

Folic Acid

Low levels of folic acid are associated with birth defects, e.g. spina bifida in infants. All women who are pregnant or intend to become pregnant should be recommended to take folic acid supplement.Doses of folic acid before conception and during pregnancy

High risk: 5mg
Low risk : 0.4 mg daily

Vitamin C

A beneficial effect of mega doses of vitamin C has been claimed for an extraordinary number of conditions including the common cold, wounds and cancer. Whilst vitamin C appears to reduce the severity of cold symptoms, this does not justify 'mega dose' intakes. High doses of vitamin C are relatively harmless, but may cause diarrhoea.

Vitamin D

Vitamin D plays an essential role in the regulation of plasma calcium and in bone mineralization and is claimed to be useful in the prevention and treatment of osteoporosis. Intakes of vitamin D exceeding 500 microgram are toxic and may lead to the development of hypocalcaemia with its associated symptoms of muscle weakness, bone pain and headaches. Vitamin D in doses exceeding 10 micro gram/ day should be avoided by mothers who are breast feeding because of the risk of hypocalcaemia in infants. Vitamin D supplements are important for those who are house bound.

Vitamin E

The primary role of vitamin E is an antioxidant helping to protect the tissues from free radical damage. But large doses of vitamin D have been advocated in cardiovascular disease. There appears to be little risk of toxicity with even quite large doses of vitamin E.

Calcium

A calcium or calcium and vitamin D supplement may be recommended to post menopausal women. A calcium supplement should provide 0.5- 1g of elemental calcium per day.

Magnesium

Magnesium supplements have been promoted for a number of conditions including premenstrual syndrome, post menopausal, osteoporosis and migrane. But actually magnesium does not appear to be very useful as a dietary supplement.

Selenium

Like vitamins A, C, E and beta-carotene, selenium has been advocated for the prevention of cancer.

Zinc

Zinc supplements have been advocated for the treatment and prevention of colds and skin disorders such as acne, eczema and psoriasis, but evidence for a beneficial effect in these conditions is inclusive. Patients with impaired wound healing may have low zinc levels, and for such people a supplement may be helpful. High doses of zinc (>300mg a day) may decrease levels of HDL cholesterol; high levels of HDL are though to be protective against heart disease.

Health Supplements

Fish liver Oils And Fish Oils

Fish liver oils have traditionally been used because they are a rich source of vitamin A and D but they are also rich in polyunsaturated fatty acids, particularly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Excessive intakes of fish liver oil can lead to vitamin A and D toxicity. Cod liver oil is also rich in energy: 10 ml provides about 336 KJ (80 kcal).

Gamma linolenic Acid

Gamma linolenic acid is a polyunsaturated fatty acid of the n-6 series. It is synthesised in the body from dietary linoleic acid. Evening primrose oil, borage seed oil, black current seed oil is sold as sources of supplementary gamma-linolenic acid.

In the UK, it is prescribe able for the symptomatic relief of eczema and breast pain. Claims for a beneficial effect in other conditions, such as premenstrual tension, multiple sclerosis and asthma

Garlic

Garlic has long been used medically for centuries and is widely promoted for colds and coughs. There is growing evidence that garlic has beneficial effects in lowering serum cholesterol and in reducing platelet aggregation. Garlic may also be protective against the development of certain type of cancers. It also has an anti bacterial and anti fungal activity.

Special Nutrients

Water

Water constitutes about 70% of the total body weight and it is the medium in which almost all metabolic processes take place. A constant supply of water is therefore essential and an average adult living in a temperate climate requires about 2500ml of water a day. Water is constituent of all drinks and most foods, especially fruits and vegetables, but it is also found in solid foods such as bread, meat and fish. Most of the water requirement is supplied by drinks.

What kind Of Water is Best?

Tap water is generally safe to drink in the UK; it is monitored for safety and must meet certain standards. It is treated to keep the population safe from harmful bacteria or germs. While this is a good thing that chemicals used to kill these germs are not harmful for health. Chlorine is the most well known of these chemicals. If chlorine is consumed on regular basis, it can deplete the body of certain vitamins and can also harm the beneficial flora that we have in our intestines.

Filtered water

Most of the chlorine and other chemicals from water can be removed by using filter jug, which has a built in filter. These filters in these systems also need to be replaced from time to time. Boiling water is also a useful practice for killing harmful germs but it does not necessarily destroy the entire harmful chemical. Infect boiling water can even concentrate these chemicals.

Well water

Well water can be a good source for drinking water because it has beneficial minerals in it. But this water should be tested that is if it free from germs and pollutants.

Hard water

Some areas of the country have hard water. Hard water is water that naturally has a lot of minerals in it. People in those areas may install a water softener in their house.

Distilled water

Distilled water is water which has been heated until it is steam and then steam is collected and condensed. Distilled water is essentially pure water. While drinking distilled water may seem like a good idea, it isn't. Because distilled water is devoid of any minerals, it tends to attract and pull minerals from the body.Cooking foods in distilled water pulls the minerals out of the foods and makes them less nutritious.

Spring water

Spring water is the water that comes from natural springs in the earth. Most natural water contains minerals, so in one sense these waters are all mineral waters.

Fibre

Fibre is not a nutrient, but it is very important to have enough of it in the diet. The fibre found in plants comes in two forms: insoluble and soluble. Insoluble fibre is what we call 'roughage', though it does have the ability to absorb some water and therefore it gives stools more bulk and makes them softer. Insoluble fibre is a bit like a broom that sweeps through the large intestine, keeping it clean and free from a build up of toxins. In this way, insoluble fibre also decreases the time that stool remains in the large intestine and keeps things moving. Soluble fibre is more dissolvable and helps in maintaining more stable blood sugar levels.

Foods That Contain Fibre

Both soluble and insoluble fibres are found naturally in whole foods. Foods especially high in these types of fibre are wholegrain, legumes, vegetables and fruits. Meat though nutritionally beneficial for other reasons, has no fibre. Fat also has no fibre. Refined foods have had their fibre removed during processing and we know that a diet of refined foods not only nutrient-depleted but is also devoid of fibre. People who eat a diet mostly consisting of refined foods often experience constipation and are at more risk of developing digestive diseases, heart disease and diabetes. In whole foods Nature has given us both kinds of fibre and in right amounts.