UNIT-2 Basics of Nutrition-I

Learning Outcomes

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

- ✓ Discuss what Macro-Nutrients are.
- ✓ Discuss why do we need carbohydrates, proteins and fats in our diet.
- ✓ Understand how traffic light colours fit into a Healthy Diet.

Unit 2

Basics of Nutrition-I

What is Nutrition?

Macro-Nutrients

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

There are three macronutrients:

- Carbohydrates.
- Proteins.
- Fats.

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

- Carbohydrates provide 4 calories per gram.
- Proteins provide 4 calories per gram.
- Fats 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 carbohydrates present in the food we eat and turns it into glucose. Like fats, carbohydrates consist of carbon, hydrogen, and oxygen atoms.

Composition of Carbohydrates

Carbohydrates are composed of 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, and the muscles (including the heart) to function properly.
- Carbohydrates can be stored in the muscles and liver and then, they can be used for energy.
- Carbohydrates are important in intestinal health and waste elimination.
- Carbohydrates are mainly found in starchy foods (such as, grain and potatoes), fruits, milk, and yogurt. Other foods like vegetables, beans, nuts, seeds, and cottage cheese contain carbohydrates, but in smaller 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 can 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 also 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 are found naturally in fruits and milk and other dairy products. Simple carbohydrates are also often found in refined, processed foods. Examples of foods which 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, and beta carotene and selenium in the prevention of diseases, such as, coronary heart disease and cancer. Fruits and vegetables - 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 the preferred scientific term for dietary fibre. Consequently, this has led to a 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, 12 g of NSP is roughly equivalent to 20 g of dietary fibre. For example, breakfast cereal may contain 17 g of dietary fibre and 13 g of NSP/100 g. 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 this helps to prevent constipation.

Current dietary guidelines recommend that average intake of NSP for the people should be 18 g of NSP a day; this is roughly equivalent to 30 g 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, and barley, whereas insoluble NSP is found in wheat, rice, and some vegetables.

How NSP Intake can be increased in your 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 cannot form the proteins it needs. We cannot 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 (this is 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 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. 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 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 cannot manufacture them and cannot 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 sunflower, 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 of omega-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 the 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% of daily calories. Anything lower than 20%, 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 0 g 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, 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 they 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 overweight, 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
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, which is also called ascorbic acid or E300, is one of the most widely used antioxidants.

Preservatives

These help to make food keep 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 (which contains sweeteners) to children aged under 4 years old, 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 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, which also contain a 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 which 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, ambers, and greens. So when choosing between similar products, one should try to go for more greens and ambers, and fewer reds, this is 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.

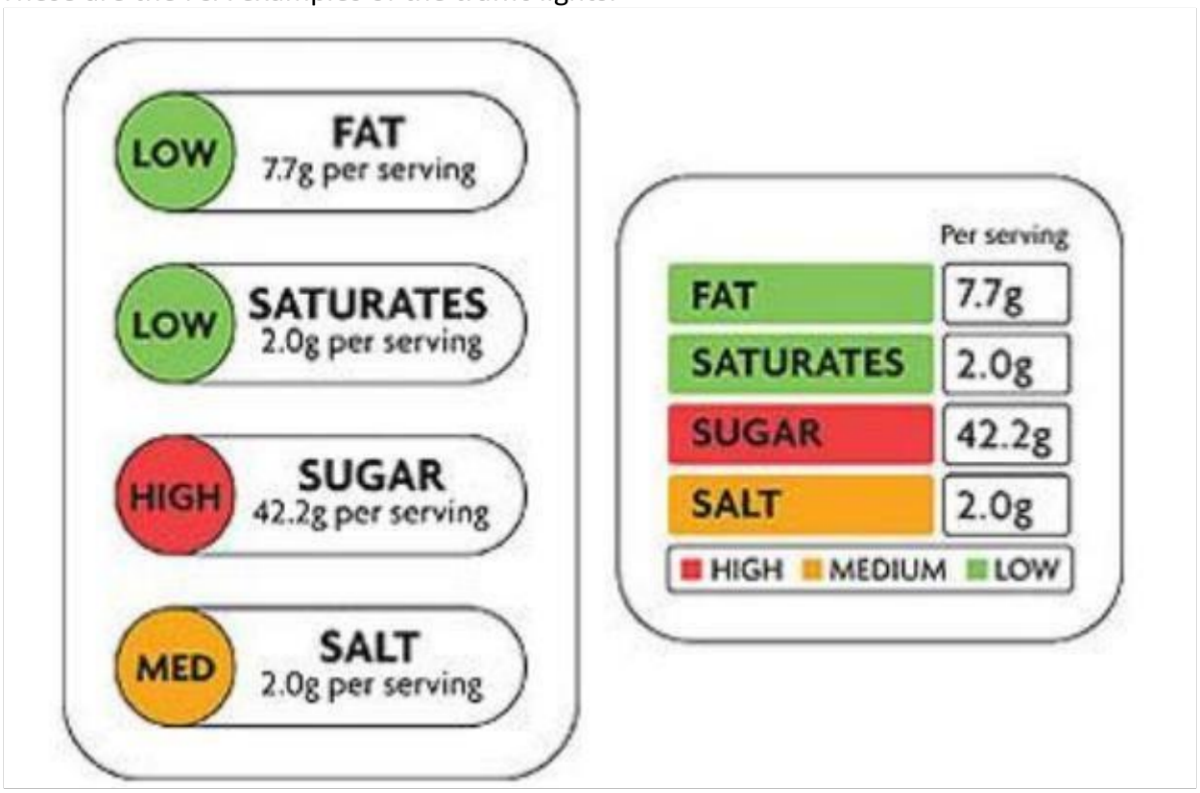
We should also try to remember that although some products may contain a lot of sugars, they can be healthier choices if they contain lots of fruit. One can tell this by checking the ingredients list; the higher up the ingredients list the more fruit there is.

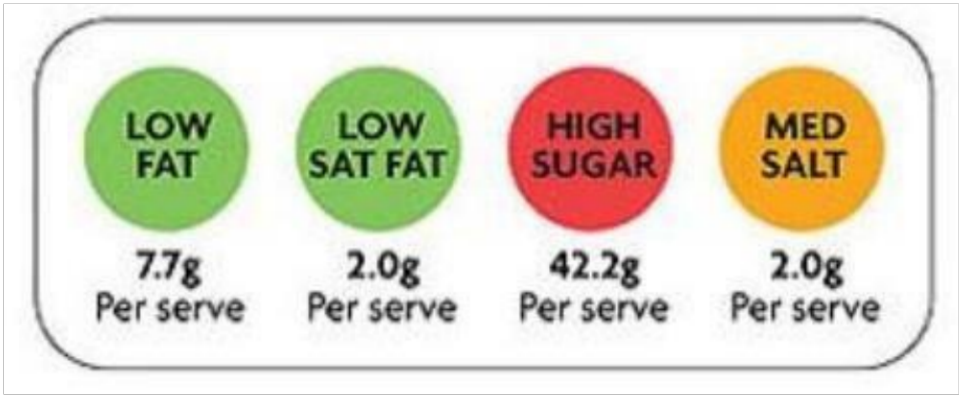
What do the Different Traffic Lights Look Like?

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.

Ingredient List

Ingredient 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 certain amounts per serving, but this should be in addition to the 100 g or 100 ml breakdown.

The Key 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 other 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 do and they 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, fruits, and vegetables.

Salt

Lots of food labels tell us how much salt is in 100 g of food. Sometimes they only give a figure for sodium, but sometimes they will 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 us how much saturated fat is in the food.

High is more than 5 g sat fat per 100 g
Low is 1.5 g sat fat per 100 g or less

If the amount of saturated fat per 100 g is in between these figures, then, that is a medium level.

We should try to choose foods that are low in saturated fat as often as we can, or we should aim for medium amounts, at the most. If foods are high in saturated fat, we should not be eating these too often.

Further Reading:

- ✓ ***Introduction to Nutrition and Metabolism (5th Edition), By David A. Bender 2017***
- ✓ ***William's Basic Nutrition and Diet Therapy, (2018), By Staci Nix***
- ✓ ***Nutrition Counselling and Education Skill Development 3 ED, (2019), By Kathleen D. Bauer***

