

Wasteless

Against Food Wastage

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nébih



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Dear Teacher,

You hold the teacher edition of the educational publication of a communication program aimed to prevent food waste, called Wasteless. The development of consumer behaviour begins in childhood, so the transfer of knowledge in this field should also be pursued, so the next generation purchase goods in a more conscious and sustainable way. Expanding the knowledge of children can have positive effects on the habits of parents as well.

Using the workbook and the colourfully illustrated textbook widens the horizon of students with complex knowledge. Individual chapters can be used independently, regardless of the rest of the book, but the logical structure of the material guarantees that the sections built on one another can be used easily.

This publication includes the complete material created for children and provides supplementary information to help the preparing for teaching.

For the sake of clarity, the “owl” icon will draw attention to the additional information.

We hope that the Wasteless educational material will become an effective tool for awareness raising and will provide you with a useful help in transferring knowledge.

Wasteless Team
National Food Chain Safety Office

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1. Introduction to the world of food waste

In this section, we will review the most important concepts and definitions connected to the topic that you can rely on while reading the book. Some definitions are also highlighted in the following chapters, but you can always go back to this section if you need to revise a concept.

BASIC DEFINITIONS

Before starting to examine the issue of waste, let us go over the most important concepts related to food, which can be useful at other time as well, not only in the fight against the emergence of food waste.

Foodstuffs

All products intended for or suitable for human consumption, including raw materials (such as fruits and vegetables) or even materials produced with technological processes (e.g. flour, oil, or sausage).

Meal

Products produced from various ingredients and foodstuffs by baking, cooking, or other kitchen processes, which are directly suitable for consumption. For example, while a raw chicken breast is considered to be a foodstuff, the fried chicken made from it already belongs to the category of meals.

Food chain

The series of processes from farm to the tables of consumers and the totality of the products that are produced during the processes are called food chain. The first few links of the chain deal with the production of food, such as the cultivation of plants and livestock production. Moreover, it can be regarded as even a starting point for animal health, animal protection, feed production, plant and soil protection. These are followed by the processing of raw materials, followed by the steps of transportation and warehousing and through trade units, consumers are the last link. Food production also involves activities that belong to other industries, such as the production of machinery, packaging materials, chemicals, and the building of IT systems. The food chain with these “side” processes form a highly complex network. Everyone is a part of the food chain in some form.

Even if you are not involved as a producer, manufacturer, or distributor, you are a part of the chain as a consumer anyway!

Fun fact

Foodstuffs include drinks, chewing gums, and water as well. At the same time, produces on the field waiting to be harvested, live animals and feed do not belong to the category of foodstuffs.

Actors of the food chain

The number of actors in the food chain might vary on different levels. Nearly 500,000 farms in Hungary and 12 million in the European Union produce agricultural products.

There are fewer food processing companies; around 5,000 businesses in Hungary and 300,000 in the EU are registered. The products produced in the first phase of the food chain are delivered by approximately 40,000 trade companies in Hungary and by 2,8 million in the EU to the 9,8 million Hungarian consumers and to the 500 million European consumers.

Processing of raw materials, packaging, transport, or even the food chain supervising authority's control in order to protect the health of consumers increase the added value of food. The value of our purchased products continues to increase while we prepare our meal at home (although this is rarely quantified economically).

Package size

Packaged, labelled units of foodstuffs intended for sale. Different sizes of units make it possible to choose the amount of food that you actually need. The amount of product contained in a given packaging is typically characterised by the weight (grams, kilograms) or volume (millilitres, litres) of the food.

Use-by date

The use-by date is given in the form of day/month/year on the label of the product, and the required storage temperature is also indicated. To this date, perishable food (such as milk, yoghurt, minced meat, raw fish, etc.) can still be safely consumed without causing illness. Always stick to this in order to protect your health. After this date, consumption of the product may be hazardous even if it does not seem to have deteriorated. The presence of pathogens causing diseases does not always result in visible changes of the product. The use-by date is relatively short, so plan ahead when purchasing such product, take it into account that you should consume the selected quantity before the expiration date.

Best before date

The date labelled on the product until which the food retains its properties established by the manufacturer under the correct storage conditions. Therefore, the term refers to the fact that until the end of the expiry date, the food does not lose its quality (it is "best before" that date). This type of expiry date can usually be found on durable foodstuffs that have longer shelf-life, such as pasta, canned and frozen products. The best before date can be indicated on the package by the manufacturer as day/month/year format, but the indication of month and year or the year itself is also regular, which means that the product expires at the end of the month or the end of the year.

As opposed to perishable products with use-by date, durable food can usually be consumed after the expiration date if the packaging is unopened and has been stored under the conditions provided by the manufacturer. This is an important difference, since after the expiration of best before date, it is not necessary to throw the products out; it is worth giving it a chance. However, be careful if you experience odd odours, uncharacteristic colour and consistency: food safety should always be the primary aspect.

Special storage conditions

On the packaging of food, we can often read instructions for storing or using the product beyond the storage temperature requirements – generally in the case of durable products. For example, "Store in a dry cool place, away from sunlight". These specifications should be adhered to in order to protect the quality of the food, as the manufacturer can guarantee it only under the determined conditions.

On the package of cans and juices, there is usually the instruction: “Refrigerate after opening”, since after opening them, such products may come into contact with a variety of deterioration- or disease-causing microbes, which can be slowed down only by prolonged cooling.

CONCEPTS RELATED TO FOOD WASTE

Food waste

Food waste is any food or food ingredient, which – for some reason – is not consumed by us, humans. These include such waste that are generated due to deficiencies of producing technology or transporting, but also include such food waste that deteriorates and ends in the garbage can because of our own carelessness. Giving the surplus to pets or composting it is better than just throwing it out, but it can be still considered food waste. We can reduce the amount of food by developments, inventive ideas, and the consumers with some care.

Types of food waste

Unavoidable food waste

Without exception, all households produce food waste in some form. For example, some vegetables or animal parts (peels, seeds, bones, etc.) are unsuitable for human consumption. Due to their nature, we cannot prevent their generation.

Avoidable food waste

However, there is food waste that you can also prevent from occurring. The generation of most of food waste can easily be prevented, since the expiration of the product often depends on the correct storage or on keeping the expiration date in mind. Therefore, this group of food waste can be called avoidable food waste. The generation of avoidable food waste is called food wastage.

Potentially avoidable food waste

There are also parts of food that are perfectly suitable for human consumption, but it heavily depends on individual taste or health what happens to them in certain households. Such parts are apple peel and bread crust, which cannot be chewed by a person with weaker teeth. It is a matter of personal taste whether we consume the skin of chicken or the syrup of compote. So, the resulting food waste can be categorised as potentially avoidable.

Waste hierarchy

Many people think that environmental damage can be reduced if food waste is given to animals or it is composted. Although they are completely right, since these are better solutions than throwing them out, but prevention should be the most important goal. This approach is reflected in the “waste hierarchy”, which lists the possible ways of managing waste, from the point of view of environmental utility.

The waste hierarchy consists of five consecutive steps: prevention, reuse, recycling, otherutilisation, and disposal. The first step is the most favourable, and each subsequent step is a bit worse solution than the previous one.

Important!

It is important to note that while surplus and leftover (except leftovers on plates) are food still suitable for human consumption if utilised properly, food waste is no longer edible in any form.

Prevention

This is the first step in the hierarchy, so this is the best solution to addressing the problem, as it does not generate any waste. You will find further details on the role of prevention and prevention practices in households. In households, for example, writing a shopping list can prevent you from purchasing a type and quantity of food we do not really need.

In the beginning of the food chain, namely in the production, processing, and logistics processes, the market automatically reduces the risk of overproduction for most products through price changes. If there is a large amount of something, its price will decrease, so it will be not worth dealing with it for some of the producers, so in a short time, the amount of produced goods will also decrease. At the level of companies, defining the optimal level of supplies and organising logistical processes are the most important activity that allows avoidance of surplus. Avoiding manufacturing waste is targeted by a number of technological developments. Companies, of course, have an economic interest to avoid losses, but there are more and more companies in the country that choose the ethical use of unnecessary foodstuff (e.g. donations), even if this requires extra resources sometimes.

Reuse

Reuse is typically the treatment of food surplus or excess that is perfectly suitable for human consumption. After prevention, this is the best solution, because the excess is consumed by humans. At the level of households, the consumption of not served food – that is properly stored and heated – belongs to this category. In the earlier stages of the food chain, the donation of products that remained on the shelves of shops but are still within the expiration date to people in need belongs here as well.

Recycling – creating new products and meals

Recycling is the third step, here we need to invest extra energy to avoid the actual waste generation. During recycling, surplus or excessive materials are reworked and new meals are created from them.

In households, for example, breadcrumbs can be made from dry bread, or cake from the leftover rice. You can find great ideas to this in Chapter 4. or on the internet, including the website www.maradeknelkul.hu/en.

Other utilisation

We primarily mean value salvage under other utilisation, so that we try to utilise the generated waste in a way that is the most beneficial for the environment. At this point, food is no longer suitable for human consumption. In the field of other utilisation, industry can produce biogas, biodiesel, or – under the right conditions – feed from food waste. In our own household, we can consider feeding our pets and composting primarily.

Disposal and depositing (landfill)

Step 5 includes all operations that are not considered utilisation. Waste management practices in this category are a serious burden on the environment, so we must strive to avoid them. So, we must prioritise the methods in the beginning of the hierarchy.

- 1. Prevention**
- 2. Reuse**
- 3. Recycling**
- 4. Other utilisation**
- 5. Disposal and depositing**

During the processing or production, there are also similar practices. For example, scraps remaining after the chopping of vegetables and fruits can be used to produce concentrates and juices.

Summarising questions

1. Why should food not be consumed after the use-by date?
2. What should we expect after the best before date of the product? Is it still suitable for consumption?
3. What is the difference between use-by and best before date?

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2. The reasons behind food waste generation

In the second chapter we will review the extent to which each actor of the food chain is responsible for the generation of food waste, as well as the reasons behind this.

WHERE CAN FOOD WASTE BE GENERATED?

Both developing and developed countries produce large quantities of food waste: one third (1.3 billion tonnes) of food produced is wasted worldwide. The difference lies within the cause of their generation.

In the developing world (e.g. less developed areas of Africa), most of the waste occurs in the beginning of the food chain, as in agriculture, storage, and transportation. In countries with advanced economies households are most likely to be responsible of food waste.

Below, moving along the food chain, we review the possible reasons in detail.

This is attributable to the lack of infrastructure, technology, and the lack of relevant expertise, and that there is no opportunity for investments and developments related to it. In India, for example, about 40% of fresh vegetables and fruits are wasted due to the fact that both wholesale and retail units do not have refrigerated warehouses. Even in the case of produce that are less perishable or can be stored under simpler conditions, such as rice, a third of the yield falls prey to pests. The lack of usable tools and systems makes it more difficult in developing countries to utilise food waste (composting, biogas production, etc.).

Primary production

Under the term of primary production, we mean agricultural production as well as storage processes following harvest. The amount of produce depends largely on weather conditions. If the conditions for cultivation are good in a given year, it may easily result in overproduction. In this case, it is difficult to sell a part of the produce, and in extreme cases, farmers might not even harvest the produce due to low prices. In developed economies, they repeatedly sort the crops to suit the expectations of consumers regarding impeccable quality. This also contributes to the generation of food waste. Products that are a little bit ugly with non-regular shape and size is often not taken over from the producer, which can also result in big losses.

Processing

In this phase, such issues arise that are similar to those in the primary production. Although the producing companies are striving to avoid overproduction, in many cases this cannot be ruled out. The products undergo another process of sorting, which again increases the amount of losses. A lot of foodstuffs (for example, broken biscuits) that are still suitable for human consumption are thrown out because they are damaged on the production line and the packaging machine can no longer handle it. The amount of food remaining in tubes and containers is another loss, but this can be minimised by modern technological steps. Special attention should be paid to the choice of suitable packaging, as it protects the product from dirt and damage. Otherwise, foodstuffs will start to deteriorate faster, causing more waste.

There are also such products that are still suitable for consumption, but the label on the packaging is incorrectly done, or the ratio of one component is somewhat different from the originally planned one. In many cases, manufacturers do not sell these products, because they do not want to disappoint the customers.

Trade

During distribution, the trader has to pay attention to the amount of stock available: if you place an order of a batch that is still available in sufficient quantities on the shelves and in the warehouse, there will be a surplus that can easily end up as waste. Inadequate storage conditions (such as defective refrigerator) may cause foodstuffs to deteriorate, which may ultimately result in food waste.

Trade-specific sales also pose dangers, as price reductions and “buy one get one free” opportunities encourage buyers to buy products they do not need or buy more than they can realistically consume within the expiration date.

Catering industry

Food waste can be generated in the catering industry as well. The issue can be the oversizing of portions. For example, surplus can be generated if there are too big portions served at the restaurant, and the too small portions do not satisfy the consumers.

Because of food safety risks, meals left on the plate cannot be used later. It can also contribute to the increase of the amount of waste that the number of people coming to the restaurant is not constant, so it is difficult to estimate the amount of raw materials needed to prepare meals.

Households

At the last actor in the food chain – the consumer – food waste is also generated. Some of these are necessarily generated. This includes non-consumable animal- and vegetable parts (unavoidable food waste).

However, surplus may also arise as a result of the negligence of the consumer. This includes, among other things, buying unreasonably quantities of food in the shop, not storing the products in the refrigerator properly, or cooking too much food.

How much food waste is generated?

According to the latest estimates, 28 member states of the European Union accumulate a total of 88 million tonnes of food waste each year. This quantity is divided as follows among the categories detailed above:

- Households: 53%
- Processing: 19%
- Catering industry: 12%
- Primary production: 11%
- Trade: 5%

Based on the estimates above, households in the 28 EU countries produce about 46.5 million tonnes of food waste per year. To illustrate this, we can say that this amount weights just as much as 9 pyramids of Giza would. This means approximately 92 kg per year for a European citizen. Of course, this varies widely for each nation.

Which country's citizens do you think generate the most food waste?

Let us see the situation in Hungary!

According to the latest research results, 68 kg of food waste per year is generated in Hungary. Nearly half of this would have been avoided, so this is the result of actual wastage. The so-called unavoidable food waste is also present in a similar ratio. This includes non-

consumable animal and vegetable parts that are necessarily generated in every household (such as chicken bones).

The potentially avoidable food waste takes up only a few percent. These are food parts that, although suitable for human consumption, have not been consumed because of individual taste or health reasons (for example, apple peel, breadcrumb). Leftovers were present in highest ratio in the category of avoidable food waste. After meals, bakery products are thrown out most often in a Hungarian household. Vegetables, fruits, and dairy products are also at the top of the list. It is estimated that this waste might cost up to 150 Euro for an average family of four per year. If we used this money in a smarter way, most households could afford to buy less but tastier food with better quality with some care.

On what would you spend this amount of money if you saved it with conscious planning?

What kind of food ends up most often in the garbage can because of negligence?

Summarising questions

1. How many millions of tonnes of food waste are generated in the European Union per year?
2. How many kilograms of food waste is generated annually by a European citizen?
3. Which foodstuffs are thrown out the most in Hungary?
4. List what foodstuffs end up most often in the garbage can! Why these?

In the survey of the National Food Chain Safety Office (NFCSO) conducted in 2016, NFCSO also examined the management practices of food waste. Fifty-one percent of household waste generated during a week was food waste, most of which ended in the garbage can or sewage system.

Only 37.17% of the food waste is not disposed of but utilised in other ways: 18.45% end up as feed, and the other 18.72% is composted.

In the case of avoidable food waste – that can be considered actual wastage since its generation is unnecessary – the percent of material ending up as waste was the highest (66.25%).

This is much worse than what is observed in the case of unavoidable food waste (59.88%).

Based on this, the destruction of unnecessarily purchased foodstuffs or such products that deteriorated due to incorrect storage or lack of attention is also done in a way that means the most burden on the environment.

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3. The effect of food waste on the environment and economy

Food waste appears to be problematic in many aspects, the most important of which is the unnecessary burden on the environment. Chapter 3 explains in detail the environmental damage that food waste causes to the Earth.

HOW MUCH ENVIRONMENTAL BURDEN DOES THE ENORMOUS AMOUNT OF FOOD WASTE MEAN TO THE EARTH?

Foodstuffs generally have high moisture content, so biowaste generated from them is difficult to burn – so the calorific value of such waste is usually low. Therefore, they are mostly transported to landfill sites, where they decompose. This leads to the generation of greenhouse gases, which is a very serious environmental hazard, since greenhouse gases contribute to global warming.

Worldwide, approximately 4.4 billion tonnes of harmful gas equivalent to carbon dioxide is generated as a consequence of the degradation of food waste, which is 9.49% of global carbon dioxide emission. This means that if countries were to be ranked according to their carbon dioxide emissions, and the food waste itself would be ranked as well, it would be the third behind the United States and China.

Emission of methane can also be associated with food waste, which is causing more and more serious problems due to the increasing amount of food waste.

The degradation of animal products (meat, eggs, dairy products) generate the highest emission of pollutants. Moreover, these foodstuffs represent a greater value, since their production requires more resources (for example, water and farmland). This is somewhat counterbalanced by the fact that the wastage of animal products is much smaller than that of bakery products, fruits, and vegetables. Recycling of biowaste is only available at a few places. However, even the role of working waste treatment centres is only valorisation. The environment is least burdened if wastage is prevented, so foodstuffs do not reach this stage.

The effects of food waste on ecological communities

Foodstuffs that are not consumed cover almost 1.4 billion hectares of land in landfills, which account for 30% of the total agricultural land of the Earth, or in other words, could cover Hungary's territory more than 150 times.

FOR WHAT USEFUL GOALS COULD THAT LAND BE USED?

This has a great impact on the living creatures, as landfills that require enormous areas and expanding agriculture are increasingly displacing them from their natural habitats. The continuous growth in population requires an increasing number of agricultural products. Therefore, the natural pastures are transformed, rainforests are eradicated, and there are economic plants grown in their places. Thus, untouched, protected natural areas are decreasing.

Think about it, if everyone buys only as much food as they can eat, roughly one third less of the currently used area would be taken away from nature to feed humanity. Additionally, the amount of fertilizers and pesticides used to increase the yield ratio – which are a burden on both the soil and natural water – could be decreased as well.

Food waste and “water footprint”

The water footprint shows how much water is used in the world in a given time period. This can be divided into indirect and direct water use. Direct water use means the amount used in households (for example, drinking, washing, cooking, cleaning). Indirect water use is the amount of water used in a given place to produce products (in our case, foodstuffs). Indirect water use is, for example, the amount of water a fruit processing plant uses to wash fruits or water used for the irrigation of farmland. The latter accounts for 70% of the world’s annual freshwater consumption. The water footprint of wasted food has now reached enormous proportions. For example, indirect water consumption in Germany is three times higher than direct water consumption. The water footprint of the annual amount of food waste around the world is currently equal to the one-year streamflow of the largest river in Europe, Volga.

ECONOMIC ASPECTS OF FOOD WASTE

Food that is unnecessarily disposed of is not only environmentally disadvantageous but has a harmful effect on the economy as well. The temperature change, the use of water, and the decrease of lands caused by food waste are a great cost to the society.

By preventing food waste, the number of products manufactured could be reduced by up to 15%, which would also significantly reduce the cost of businesses and households.

Food waste causes the highest cost in the end of the food chain, in households, and there are several factors behind it. On one hand, the largest quantity is generated here, and on the other hand, the added value of products is the highest in the end of the food chain.

Imagine how much we could spare if we paid a little more attention to throw out less foodstuffs that are still suitable for human consumption – the shocking data have been discussed in the previous chapter.

Do you remember?

Households account for 53% of all food waste.

INITIATIVES TO MITIGATE HARMFUL EFFECTS

In order to preserve our environment and natural values, as well as taking our expenditures into consideration, we must strive to view food as a value, even if we know that we have a very good food supply in our country fortunately. Many programs deal with the prevention of food waste. One of these programs in Hungary is the campaign called “Wasteless” launched by the National Food Chain Safety Office (NFCSO), which attempts to raise the awareness of consumers, including you, about the importance of preventing food waste.

Do you remember?

A 4-person household could save approximately 150 Euro with a little care.

There are also many initiatives in other countries in this field. Such initiatives are the British Love Food Hate Waste consumer campaign and the Every Crumb Counts campaign for a more sustainable food chain.

What ideas do you have? How do you think could people’s attention be drawn to the problem better?

Summarising questions

1. Group the following. What counts as direct and indirect water consumption? Mark the listed concepts with the correct letter.

- a. direct water consumption
- b. indirect water consumption

- tooth brushing
- irrigation of farmland
- drinking
- dishwashing
- food production
- bathing

2. Explain how the following concepts relate to food waste.

- global warming
- ecological communities
- water footprint
- cost

Wasteless

Wasteless is an awareness-raising campaign of NFCISO. Its focus is the prevention of food waste with a special attention on addressing students.

The four main aims of the program:

1. The first aim is to reduce food waste in households by changing the habits and behaviour of the population. In doing so, they draw people's attention to the severity of food waste and try to encourage them to throw out less consumable food.
2. The campaign pays great attention to primary school children, so the second aim is to raise awareness among young people of this age. A school program has been developed that helps children expand their knowledge of food waste in a way suitable for their age, often in a playful manner.
3. The third aim is the development of so-called "good practices" for food businesses; to find those methods that prove to be the best and most effective ways to prevent food waste. Such good practice might be, for example, the donation of foodstuff surplus to people in need.
4. The fourth aim of the campaign is to establish professional connections with other EU member states interested in the reduction of food waste. By exchanging own experiences and achievements gained during the campaign, future programs can be planned more effectively.

Other awareness-raising campaigns aimed to reduce food waste

There are a number of campaigns in foreign countries with similar goals all around the world, some of which are listed below.

Think.Eat.Save is a UN-sponsored campaign that promotes aspirations against famine at different levels of society by exchanging ideas and launching projects.

Love Food Hate Waste is an awareness-raising campaign in the UK. Its purpose is to promote simple, everyday practices that can be used at home to prevent food waste.

Every Crumb Counts: The campaign was launched with the involvement of many European food service providers. It aims to develop a sustainable food supply chain.

FoodDrinkEurope: The focus of the campaign is on food producers. They would like to draw their attention to food waste and propose solutions to them.

The **FoRWaRd** campaign aims to promote and support the collection and donation of foodstuffs that have not been sold. Participants can learn about “re-using” practises of food online and find educational games there as well.

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4. How can we act against food wastage?

Have you ever considered how much damage could one single unnecessarily thrown out apple cause? Imagine that! If every inhabitant of the Earth throws out only 1 apple a day, how much would it be if you added it?

Only in Hungary, approximately 1.8 million tonnes of food waste are generated annually. This amount, if it was placed on trucks, would create a line of vehicles from Budapest to Brussels (1353 km). Therefore, the importance of prevention cannot be emphasised enough. We should learn what we can do to mitigate wastage: it is not only beneficial for the Earth, but it will have a positive impact on our own household as well.

Here are some easy practices that you can do to reduce the amount of food waste.

Speak up about what and how much you want!

It must have happened to you as well that during a trip, there was something in your sandwich you did not like, or you had so much food packed that you could not eat it all. Because of these reasons, many valuable foodstuffs can end up in the garbage can. However, this could have been easily avoided. Before going on a trip, always talk to your parents about what and how much of it you want to take with you. Our taste and appetite are constantly changing. It is not certain that something you enjoyed last year you will still like it this year. If you talk about your needs in advance, you are not going to throw out that much food.

Help your parents! – Plan the menu!

In order to have all the necessary ingredients available for cooking, it is worth planning the weekly menu in advance. This way you can avoid purchasing good products that you do not really need. It is a very difficult task to cook something that meets the desires of every member in the family. Help them design the menu! So you can rest assured that less food will end up in the garbage can and you will always like the dinner.

Do not go shopping when you are hungry!

It is not enough if we help our parents in planning the menu. During the time spent in shop, you can also fight against food waste. Let us see how! Many people say that when someone is hungry, they buy such foodstuffs that they do not even need. Do not be greedy, just pick those from the shelves of the shop that you will surely consume.

Help your parents! – The bigger package of a product is not always better

Bigger packages often tempt buyers. Sometimes, because of their more favourable price, we prefer these. But in small households, they are not always consumed at once, and later we easily forget about them. In such cases, we lose more than if we had bought a smaller package. If you notice this, feel free to mention this to your parents. This way you can save money, and a considerable amount of waste can be prevented.

Just take as much food to your plate as you can eat

At a delicious Sunday lunch, we can easily be tempted: it occurs that we take more food to our plates than what we can actually eat. Do not overdo it. For meals, take fewer portions but more times to avoid throwing out food.

It is worth following this principle at restaurants as well. If you feel that half of a serving is enough, you should choose that if the restaurant provides the opportunity.

Pay attention to the expiration date!

In the first chapter, you have already heard about what exactly the difference is between the best before and use-by date. Do not be scared even if the product's best before date has

passed with a few days. Consider, for example, chocolate or canned pineapple. The consumption of these after their best before date usually does not pose a food safety risk.

It is interesting to note that in Hungary, only 38% of consumers are aware of the difference between best before and use-by date, according to NFC SO's survey from 2016.

At this point, it is important to become familiar with the FIFO principle. The abbreviation stands for "First In First Out." Compliance with this principle can help a lot in preventing food waste. Apply it: the first thing you put in the refrigerator/pantry – so the product that has nearer expiration date – should be eaten first.

Help your parents! – Many foodstuffs can be preserved by freezing

If you expect guests, it is quite difficult to estimate how much food will be consumed. Nobody likes it if a guest leaves still hungrily. If your parents prepared too much food for the guests, share this tip with them. Freezing is an excellent preservation process that can be used in the case of many types of food and meal. A freshly frozen pastry can be a heavenly delicacy after thawing. Also, this process can be applied to prepared dishes as well. However, be careful here not to put the hot food in the freezer; wait until it cools sufficiently (to room temperature). If we do not act accordingly, the temperature of the freezer rises, which can lead to deterioration of food inside. Also, make sure that food we have frozen once and then thawed we should not freeze again. It is a good idea to label the food – whether raw or cooked – you want to freeze. This is important because in the frozen state, it is harder to find out what foodstuffs are hidden in ice crystals. The day of freezing should also be indicated on the label. This way, there is less chance of forgetting about it for years.

Did you know?

You can freeze foodstuffs not only on the day of purchase, but up until the end of the consumable period, but not all kinds of food are recommended to be frozen.

Before freezing cooked meals, try to divide it into appropriate portions, so when it is thawed, there will not be surplus, which ends up in the garbage can. However, it is important to emphasise that there are some kinds of food that are not recommended to be frozen. In the case of food that was made with cream, eggs, and potatoes, do not freeze them in order to prolong their storage time.

Help your parents! – Check the temperature of the refrigerator every now and then

We already know that it is important to store food properly, but many people do not know the optimal temperature range of the refrigerator. In the absence of this knowledge, food can easily end up in the garbage can.

The correct storage temperature may range from 0 to 5°C. If we set lower temperature, food will freeze, but if there is higher temperature inside than the expected value inside, products will start deteriorating faster.

For many refrigerators, it is difficult to track this value, because we cannot set the temperature on the refrigerator, but we only see a scale, for example from 1 to 7 °C. In this case, ask your parents to buy a thermometer that is suitable for measuring the temperature inside the refrigerator to help see whether the refrigerator keeps the products and meals stored in it on the correct temperature.

Did you know?

Tasty delicacies can be prepared from leftover meals.

Important!

Eggs should be frozen if their shells are removed beforehand (as boiled eggs or liquid egg). This is important, because if it is frozen as a whole with its shell, the volume of the inner part will increase, and it breaks the egg.

Milk, cream, and certain dairy products (e.g. sour cream, yoghurt) should be handled carefully, as freezing can result in deterioration of quality (phase separation). Therefore, they should not be stored with this method.

When freezing something, we must also be aware that bacteria do not die but only become inactive. This is mainly due to the cold and the water deficient environment, which are unfavourable to them. However, if the product is thawed, the temperature will rise, and water will become available as well. Thus, the number of bacteria will increase (the more favourable the temperature is for them, the faster it increases). Therefore, it is recommended that the frozen food should be thawed in the refrigerator at night, and not on the kitchen counter. Re-freezing should be avoided, since it now contains more food bacteria than in its original raw state. After thawing (second defrosting), this can reach a level that can cause food poisoning. Infected food may also cause cross-contamination through which other pathogens can be transmitted to other, even fresh food. However, if it is necessary to freeze the product again, cook it before the operation, because this way, the harmful bacteria in it are destroyed. Low temperature slows down the multiplication of bacteria, and therefore, longer shelf-life can be provided. Nonetheless, it is important to know that cold does not completely inhibit the increase in the number of pathogens. If a perishable product is not kept in a refrigerated environment according to the storage conditions, the microorganisms within it can grow to such extent that might even cause food poisoning in a very short period of time (even 2 hours).

There are a number of programs on the internet that model the multiplication of bacteria depending on external influences (e.g. temperature). Cell proliferation is illustrated, among other things, at www.combase.cc. These models clearly show how important it is to keep track of the optimal temperature in our refrigerator.

Certain foodstuffs should not be stored in the refrigerator despite the previously stated facts. Such food is potato. Due to the low temperature, the starch content is transformed into sugar, which – when combined with aspartic acid – is converted to acrylamide by elevated temperature (e.g. baking). This compound is harmful to the human body. Moreover, banana quickly becomes overripe in the refrigerator.

Eat the less 'beautiful' vegetables and fruits too!

Not everyone is aware of the fact that a large proportion of deformed vegetables are left on the soil unharvested or are not preferred by trade chain. Even though, there is a lot of energy invested in the growing of crops, which is lost this way unfortunately.

During shopping, everyone picks the most beautiful fruit and vegetables obviously, but are they the only ones worth using in any case? Here are some examples where the slightly crooked, irregular vegetables and fruits can also be excellent ingredients.

When preparing cream soups, mashed potatoes, ice creams, and jams, they completely process the necessary ingredients, so you cannot tell the shape of the processed vegetables

and fruits prior to that. You can continue this list of food as well. So, do not judge at first, because the ugly vegetables and fruits may be as tasty as their regular counterparts.

Help your parents! – Prepare new dishes from leftover meals

There are many possibilities to utilise leftovers, depending on what we have, what kind of meal you have from which you need to prepare the new dish. Let us look at some examples.

Stew is typically a good base for making new dishes: you can make excellent goulash soup or Hungarian cabbage stew. Cooked rice also has many possible uses. It can be the base of layered meals, but it is also the perfect ingredient of fried rice balls (arancini), and if it is less salty, it can work with even desserts (milk rice, rice-pudding). Roast meat can be used in sandwiches or in tortillas with fresh vegetables. Do not throw out leftover liver either, as it may serve as a great basis for creams or pates. From boiled eggs, you can make egg pate or devilled eggs, which you can also use to spice up your meals.

10+1 Phone applications, online webpages

Nowadays, we reach for our phones to get help with everything. Not surprisingly, it can help us in our fight against food waste as well. Here are some cases when your phone can be useful.

Utilising small portions of leftover meals and raw materials

The Hungarian Food Bank Association has developed an online surface that can help you utilise unused, even small amounts of food. If you search for recipes by using your ingredients available at home as key words. Similar online surfaces are also accessible, which have user-friendly interface, so anyone can use them in the family.

You can find one of them here: <http://www.bigoven.com/recipes/leftover>

Make a shopping list differently

One of the key elements of avoiding waste is to plan shopping. The simplest thing you can do is to take a look at your refrigerator before going shopping. By doing so, you will take as much food from the shelves as you really need. Apart from the classic piece of paper, you can use your phone as well. It is an effective and quick method if you take a picture of your refrigerator before leaving to the shop, which you can always check in the aisles. So this way, you can see what you have at home and you can compare the contents of your basket to it. However, if you have a little more time to compile your shopping list items, look around on the internet. There are plenty of apps and online pages available to help you speed up the process of making the list.

If you pay more attention to these points, you can do a lot for our planet.

Summarising questions

1. What should we do before shopping? To what should we pay attention?
2. What is the FIFO principle?
3. Which foodstuffs can be consumed after the best before date if several weeks have passed?

Storing leftover meals

Type of food	Storage time in refrigerator(2-5°C)	Storage time in freezer (-18°C)	Comment
Broth	1-2 days	2-3 months	To freeze, put meat and vegetables to separate containers
Soups in general	2-3 days	4-6 months	
Cooked meat	2-3 days	2-3 months	It is worth cutting up to smaller parts for quicker cooling and easier reuse.
Roast meat	3-4 days	4 months	
Meat dishes	3-4 days	2-3 months	
Stews	2-3 days	4-6 months	Fat might get separated from the sauce, but after heating it up, we get homogenous consistency again.
Sauces and dishes with sauce and meat	1-2 days	2-3 months	
Pasta with sauce	1-2 days	1 month	It is not recommended to freeze cooked pasta
Pasta (without sauce)	2-4 days	-	
Pizza	2-3 days	3 months	-
Sandwiches	2-3 days	1 month	-
Boiled eggs	5-7 days	-	It is not recommended to freeze boiled eggs.
Devilled eggs	2-3 days	-	It is not recommended to freeze devilled eggs.
Egg dishes	3-4 days	1 month	-
Salads with ham, chicken, tuna	3-4 days	-	Freezing is not recommended
Layered dishes	1-2 days	1 month	-
Cakes and pies	1-3 days	4-6 months	This period might shorten depending on the type of the cake: in the case of foam cakes, 1-2 days
Waffles and donuts	4-5 days	1 month	-

Explanation about cakes:

When storing cakes, it is important to note that the average 1-3 days of chilled storage decreases for 1-2 days in the case of creamy and foam cakes. For these reasons, these products should not be frozen due to their milk and cream content. Sponge cakes, other confectionery and bakery products can be placed in the freezer for even several months without deterioration of quality.

Storage of leftovers

You need to be familiar with some basic rules if you want to store leftover food for the next few days. We give you some help now regarding this.

If you would like to consume certain meals later than you can safely store, it is worth freezing them. Divide the prepared meal into appropriate portions and place them in sealed containers. Then place it in the refrigerator as soon as possible. It must be done by it cools to room temperature, at latest.

Leave space between food so the air can reach each and every item in the refrigerator.

Do not overcrowd the refrigerator for optimum operation.

It is recommended to label the boxes so the family members know exactly which meals should be eaten sooner.

The summary table shows the recommended storage time for different food types both in refrigerator and freezer.

Before eating it, it is important to heat up the leftover food. Experienced people may often know that the meal has started to deteriorate based on its smell, taste, colour, and consistency.

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5. Conscious shopping can also help to preserve your health

Based on the previous chapters, it can be stated that food waste management is of utmost importance in several aspects. However, we should not forget that the protection of our health is a priority over all other factors. Strengthening our conscious consumer behaviour also plays an important role in the preservation of food safety. Thus, in addition to the practices against food waste that were described previously, the most important food safety rules from the purchase of food products until their consumption are detailed in the following chapter.

WHEN SHOPPING, PLAN AHEAD AND PAY ATTENTION TO THE APPROPRIATE ENVIRONMENTAL CONDITIONS

Never buy a foodstuff if its packaging is damaged or defective. The most important task of packaging is to protect food from external physical, chemical, and biological contaminations. Even in the case of minor damage, food in the packaging may be contaminated or its shelf-life has decreased, so it poses food safety risks. Do not forget to quickly check the shopping basket or trolley before using it. If you notice contamination, pick another trolley and tell someone who works there that the cleaning of trolleys is required. Even if the tool looks clear, food that is ready for consumption (vegetables, fruit, bakery products) should not be placed in the basket without packaging. Cleanliness is equally significant in the case of shopping bags brought from home. It is important to think carefully about with what you start shopping, because the proper temperature of foodstuffs is also very decisive for microbiological reasons. Always start with foodstuffs that do not require cooling, and then these should be followed by chilled food, and place the frozen products into your basket only at the very end of shopping. It is a good idea if you prepare to buy chilled foodstuffs at home already and take a cooler bag with you.

Tools used during shopping (e.g. shopping trolleys) might be contaminated with microorganisms. It might come from the previous buyers, especially because of improper use (for example, placing a child in the trolley), and its direct contact with raw meat, vegetables, fruits, and other meals. According to a survey from 2012, an average of 3.43×10^5 bacterial cells are on a shopping trolley, the vast majority of which is *Escherichia coli*. From food safety aspect, O157:H7 serotype of *Escherichia coli* has the greatest significance, which can cause, among other things, bloody diarrhoea. In Hungary, tens of thousands of people suffer from food-mediated pathogens every year; a significant part of these cases could be avoided with a little care.

ALWAYS GO HOME FIRST AFTER SHOPPING

After shopping, especially in the case of frozen products, you must take foodstuffs home straight away. Separate raw foodstuffs from those that are ready for consumption both during shopping and transportation. Always keep foodstuffs properly packaged. It is a particularly important rule that thawed food must never be frozen again.

In the case of freezing already thawed food, the damaged cells of pathogens can regain their infectivity and even adapt to stress caused by the cooling, so they might cause an illness after rethawing. It is worth mentioning that certain bacteria (e.g. *Bacilli*, *Clostridia*) are able to produce resistant endospores that are more resistant than vegetative cells to ecological factors, such as temperature. The high resistance of spores can be attributed to their specific structure and their chemical components.

WASH YOUR HANDS THOROUGHLY AFTER GETTING HOME

It is important to know that there are microbes in the human and animal body and in our environment as well that are not visible to the naked eye. They are rapidly multiplying on foodstuffs, then they can cause health damage in the body depending on their infectivity. Therefore, be sure to wash your wrist, the skin between your fingers and around your thumb, and finally the nails thoroughly.

Washing your hand simply with water is not enough, the use of warm water and soap is also important. Do not forget that wiping your hands dry is just as important as washing hands.

The discovery of Ignaz Semmelweis on the importance of hand disinfection (1858 – Puerperal Fever, Medical Weekly) is just as valid today as in his own age. Out of the skin areas that come into contact with the environment, the hand is considered to be the most contaminated, so it is not surprising that 80% of infectious diseases are spreading through direct contact. Within a few hours, up to 1000 bacteria can settle on our palms, also contaminating the surfaces we touch. While some bacteria can last for twenty minutes, other can survive for hours or weeks preserving their infectivity.

BE FORETHOUGHTFUL ALSO WHEN STORING FOODSTUFFS

After getting home and washing your hands, the first thing to do should always be putting the food away. First, put the frozen foodstuffs to the freezer, then those belonging to the refrigerator, and eventually those that do not need cooling. Also, keep in mind that raw meat, vegetables, and eggs should be stored separately from all other ingredients, especially from meals.

If you store foodstuffs smartly and forethoughtfully in the refrigerator, you can accomplish a lot not only regarding the reduction of food waste, but also the prevention of food deterioration.

Most often, foodborne illnesses are caused by *Salmonella*, *E. coli*, *Listeria*, *Campylobacter* and various parasites, the multiplication of which can be prevented by providing adequate temperature conditions. If the temperature of the refrigerator is kept under +5°C and the freezer's under -18°C, in addition to checking the temperature of the refrigerator regularly, the growth of the aforementioned pathogenic microorganisms is significantly prevented.

It is important that the refrigerator is regularly cleaned and disinfected and that our food is properly packaged.

If a foodstuff becomes suspicious based on its appearance or smell, dispose of it immediately. One of the best indicators of the deterioration of chilled food is mould, which can grow even at low temperatures.

Keep in mind that the storage conditions stated on the label of foodstuffs and the expiration date must always be taken into account.

CONSIDER PREPARING YOUR MEALS AS A CRITICAL POINT

In addition to washing your hands thoroughly, do not forget to completely clean the dishes, utensils, and surfaces that come into contact with foodstuffs. To cut raw meat, use a separate

cutting board to reduce the chance of contamination of other foodstuffs with pathogens. It does not matter how strange it sounds, when using genuine wood cutting board, the tannic acid of the wood contributes to the disinfection of the board. However, special attention should be paid to the cleaning of wood cutting boards. It is important that you consume your meal thoroughly cooked and roasted. Food can only be considered safe from the aspect of food safety if its core temperature reaches 75 °C for at least two minutes during cooking, roasting, or any other heat treatment. If you do not eat the food immediately after preparation, cool it as soon as possible and place it in the refrigerator within 2 hours. This also prevents the growth of pathogenic bacteria and of those that cause deterioration, since their ideal growth temperature is between +5 and +60 °C. Based on the previous description, you already know how you can contribute to the prevention of foodborne illnesses. With this knowledge, you can protect not only your own, but your environment's health.

IF IT DOES GO WRONG...

Symptoms of mild diarrhoea that passes quickly are over in one or two days, so no medication is needed, but keeping hydrated is an important part in this case as well. If symptoms continue and worsen (vomiting, fever, bloody diarrhoea), call a doctor immediately. Visiting a GP is also recommended with milder symptoms, as the illness might be part of a foodborne outbreak.

Summarising questions

1. Why is it important to separate raw foodstuffs and food already suitable for consumption?
2. What might be the symptoms of a foodborne illness?
3. At what temperature and how long should the food be cooked to be safe from the aspect of food safety?

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6. Alternative solutions to reduce food waste

In the first chapter, it was already discussed that our most important task is the pursuit of prevention while talking about food waste. However, there might be cases when we do not have this option. What can we do then? In this chapter, we are trying to answer this question.

DONATION

Due to organisational shortcomings, food products suitable for human consumption and are impeccable regarding food safety aspects often remain in stock in the food industry and trade. It might also happen that they accidentally make a mistake on the label during manufacturing, but this issue does not affect the safety or quality of the product.

What should we do with these products?

While many people waste food, there are some who do not even have a few bites to eat a day. Donations can help them, but even in the case of donated foodstuffs, the most important criterion is for them to be safe.

Various shops, factories, and processing plants have the opportunity to offer foodstuffs that remained on their shelves to organisations specialising in food distribution. Such organisation is the Hungarian Food Bank Association. This organisation considers the collection of foodstuffs suitable for human consumption, which cannot be sold for some reasons (e.g. damaged packaging) or might expire before they could be sold as their main task. However, it is important to know that these products cannot differ from their perfect counterparts in terms of safety. The Food Bank Association collects these products and gives them to families in need, older people, and the homeless through charitable organisations. This way the products end up in the best possible place, and we can also reduce the amount of food waste. While individuals cannot give products to the Food Bank directly, there are many organisations you can directly contact. Thus, still consumable, unopened, but unnecessary foodstuffs will not be thrown out to the garbage can but can be offered for charitable purposes.

The National Food Chain Safety Office (NFCSO) is responsible for the official supervision of the food chain. As a part of this, food businesses are monitored on a professional basis, and if it is revealed that such foodstuffs are manufactured or distributed that are under the standard of food safety, the operation of the unit can be suspended temporarily, and withdraw the affected products from the market. NFCSO will also act if the product tracking documentation (e.g. the origin of raw materials used for production) is not provided or if there is a deficiency regarding the label of the product. As a result, many foodstuffs become waste. This might seem to be contradictory to the objectives of the campaign Wasteless, but it is important to highlight that foodstuffs with uncontrolled source are considered to be a great risk regarding food safety. Food safety aspects should always be kept in mind when implementing initiatives to reduce food waste to avoid causing more harm than good.

Guide for Composting

COMPOSTABLE WASTES		
NAME	METHOD OF PRETREATMENT	EXCIPIENTS
Vegetable and fruit waste, fallen fruit	chopping	lime and fillers (soil, clay flour, wood chips)
Egg shell	chopping	not necessary
Coffee and tea ground	not necessary	algae lime
Wilted flowers, dried leaves of houseplants, flower soil	fragmentation	not necessary
Clippings, shredded twigs, leaves, grass clippings	drying, then fragmentation	rock dust
Herbivorous small animals' excrement	not necessary	covering material (straw, foliage of trees)
Straw, wood chips, sawdust	not necessary	not necessary
Wood ash (only clean wood or charcoal ash)	not necessary	not necessary
Cut hair, nail	not necessary	not necessary

WASTES NOT RECOMMENDED FOR COMPOSTING
Leftovers, meat, bone
Vegetative propagules of herbs
Grass clippings, foliage, leaf litter by busy roads
Non-degradable materials: plastic, metal, glass, ceramic
Oil and fat residues
Diseased plant parts
Mineral coal or briquettes ash
Coloured paper

COMPOSTING

Many foodstuffs (e.g. egg shell, corncob, vegetable peel) are not really suitable for human consumption, so they are expected to end up as waste. Composting might be an ideal solution in this case.

What is composting?

Composting is a biological procedure, which relies on biological processes, during which micro- and macro-organisms decompose the biowaste which was collected separately, resulting in humus-forming matter and inorganic mineral salts. The end-product of the process is the compost. The compost is essentially artificial humus, so a material that contains nutrients needed for plants. It is a crumbly dark brown material with earthy texture that has high organic matter content. It can be used in agriculture, horticulture, and in our home for potting soil or in our kitchen garden. Its important role is that we can also reduce the use of fertilizer with it.

What do you need for it?

First of all, you need to be determined and environmentally conscious. In addition, appropriate composting site and compostable materials are required. Let us look at some examples of what can and cannot be used for composting from food waste. The more materials we mix, the more likely it is that the quality of the compost will be good.

Did you know?

Many kinds of waste generated in households can be used for composting.

BIOFUEL PRODUCTION

As mentioned before, there are food waste that cannot be composted. However, they can still be used in other ways. Such food waste is used cooking oil, which remains after frying. This can be utilised in the production of biodiesel after proper preparation. The bio prefix indicated that during the production of this fuel, agricultural products were used. In addition to biodiesel, bioethanol can also be produced from food waste.

ANIMAL FEED

Feeding is a good way to utilise foodstuffs that can no longer be consumed by humans but are suitable for animals. Humanity has been using this method for centuries, but we need to be careful about what we can use as feed in order to keep our animals healthy.

Let us look at the foodstuffs we can give to our pets and what we need to avoid while feeding them.

Did you know?

Among the by-products of the food industry, many materials are suitable for feeding animals.

Summarising questions

1. What is the task of the Food Bank?
2. Which foodstuffs can be given to animals? What should we pay attention to?
3. Why is biofuel useful?

What should we feed our animals?

DOGS

YES

cooked / baked potatoes
egg
bread, pasta
meats
offal (heart, lung, kidney, liver, spleen, rumen)
vegetable, animal fats
small amounts of cooked leguminous plants (e.g. peas, beans, lentils)
(fried) fish without fishbone, fish head
fermented dairy products (yoghurt, kefir)
apple

NO

chocolate
milk
leafy vegetables
macadamia nut
raw meat and bone of pork and wild animals
fruits except: apples
xylitol and xylitol sweetened product
candy
raw potatoes
raw zucchini

CATS

YES

fish without fishbone
cooked/fried meat
small amounts of chicken liver
cheese
boiled egg
cooked carrot
zucchini
banana
blueberry
apple

NO

sweets
caffeine
grape
onion
garlic
avocado
cow's milk
raw pork and venison
alcohol
xylitol

Composting

It has been mentioned that certain parts of food cannot be used for composting. This can be attributed to different causes for each type of food.

Although leftover, meat, and bones are able to decompose (with unpleasant smell), but their presence attract rodents and stray animals as well. Furthermore, infectious insects, such as flies, might also appear around the compost.

In general, the peel of fruits are excellent ingredients for compost. Yet, the peel of citrus fruits is an exception, because it is treated with various mould inhibiting agents (i.e. post-harvest pesticides), which has a detrimental effect on the activities of soil-based organisms. If you want to compost them anyway, wash these fruits thoroughly before they get to the pile. The litter of carnivorous pets should never be composted, given that there might be many pathogens in their intestines which can endanger the health of humans if it returns to the food chain.

Be careful not to empty the contents of the dust bag, because dust can bind heavy metals that endanger our health, as this contamination can reach us through the food chain.

When composting, pay attention to the proper ratio of carbon (C) and nitrogen (N) (C:N=30:1). Too much carbon decelerates the processes, and high nitrogen level leads to the development of ammonia gas. This ratio can be most easily estimated by the fact that if the material that is about to be composted is older and woodier, its carbon level is higher; and if it is fresher, juicier, it contains more nitrogen.

Although eggshell is excellent for composting, special attention should be paid to its dosing and preparation: they should be used in small quantities at a time and should be broken into small pieces for more efficient degradation.

With the cooperation of families, communities, or even school classes, community composting can be an option after selecting the right place. This requires a designated person who coordinates the process, but when the composting is over, everyone can use their share for their own purposes.

Feeding pets

Feeding our pets requires extra attention, since they depend on us. Contrary to many misconceptions, not all foodstuffs we eat are right for them. Let us start the blacklist with chocolate. There is an alkaloid called theobromine (a nitrogen-rich organic compound extractable from plants), which is toxic to cats and dogs. This compound is similar to caffeine, which should also be avoided when feeding our pets. Place these foods in a safe place where they cannot access it.

Cats

In the case of cats, it is less likely that they pilfer it, they do not consider chocolate forgotten on the table a food, since they do not have the ability to taste sweetness.

There is a similar misunderstanding regarding the relationship between cat and milk: unlike the misbelief, cats should not drink milk. It is worth accepting this rule, because the majority of cats – like humans – are lactose intolerant, so they cannot digest this component of cow's milk. If you still want to give your cat milk, try the products that are made for cats, since they contain only a small amount of lactose.

Onion is also poisonous for cats due to its active substance called N-propyl disulphide. The component's effect is that red blood cells fall apart, which can lead to anaemia.

In order to preserve the health of our furry pets, it is necessary to avoid the glycoalkaloid with steroid skeleton called solanine, which can be found mainly in tomatoes, potatoes, peppers, and aubergine (solanaceous plants). Only feed your animals with these if the vegetable is fully ripe or cooked. Avoid giving them raw (e.g. as a part of leftover) to your kitten.

Dogs

Do not forget that there are foodstuffs that are not recommended to use as feed.

Dogs should not be given raw potato either, because digestive problems might appear, but after cooking, it can be a good nutrition for our pets as well.

Raw pork and venison, as well as their bones, are also among the foods that should be avoided, since they might be the source of viruses and parasites that can cause serious illnesses.

It is important to note that heat-treated meat is a better choice than raw meat because of many reasons. This way, proteins are more digestible and can be utilised more easily by the body. The raw meat and bone left around in the garden can be the home of different bacteria, which can also be prevented by heat treatment.

Few people know that not all kinds of bones are suitable for feeding our dog. Choosing a bone that is not good for the dog can impose serious health risk. The shape and strength of the bone and the way it can break might differ depending on the species or from where in the body it is. With the sharp edges of splintering bones can not only damage the intestinal wall of the dog, but it can even perforate it, causing ileus. So, it might happen that although not many dogs have issues with eating bones, some of them will have to be taken to the vet. Consuming corncob might have similar consequences for our pet.

Similarly to cats, dogs should avoid the consumption of milk, chocolate, and spicy foods as well. Thus, there is less chance for our dog to be a picky eater and the likelihood of heart and kidney disfunction can be reduced.

Xylitol, known as a sweetener, is absorbed within half an hour in the body of dogs, and the insulin level suddenly rises, causing the blood glucose levels to fall. As a result, dogs might experience vertigo, but there might be vomiting or loss of consciousness. Thus, it is extremely important to keep the xylitol-containing products away from our pets, so they cannot reach it.

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Summary

In the previous chapters, you could learn about many interesting facts about food waste and read about examples what you can do to reduce food waste. Finally, let us revise what we learned in each chapter.

In the **first chapter**, we discussed the concepts of food chain, use-by date, and best before date. Following this, food wastage and the three types of food waste were detailed, highlighting the most important category, avoidable food waste, since you can prevent their generation as well with a little care.

In the **second chapter**, you could get familiar with the reasons, amounts, and actors behind food waste generation from the beginning until the end of the food chain. In this book, the main focus was on the households, since the highest amount is generated in our homes.

In the columns of the **third chapter**, the environmental and economical effects of food waste were detailed, including greenhouse gases and the endangerment of natural resources. Awareness-raising campaigns aimed to reduce harmful effects were introduced, so you could learn about the campaign Wasteless as well.

In the **fourth chapter**, we gave tips and advice that you can use to stand up against food waste, and you can even help your parents avoiding the unnecessary accumulation of food. By the end of the chapter, you could learn that even planning together and going through some questions can prevent a part of waste.

In the **fifth chapter**, we also presented a few simple rules regarding food safety, which can help you and your family avoid foodborne illnesses during both shopping and food preparation at home.

With ideas in the **sixth chapter**, we tried to inspire you in case when you cannot prevent the generation of food waste. Such ideas were donation, composting, and using food waste as feed. This food waste can be utilised in some way.

Hopefully, you found this new knowledge interesting and you can use it in your everyday life, protecting nature, your environment, and your purse as well.

Answer key

1. Introduction to the world of food waste

1. After the expiration of use-by date, the consumption of the foodstuff imposes health risks even if it does not seem to be expired.
2. The quality of foodstuff has probably decreased, but it does not mean deterioration in most cases. The product can still be consumed.
3. Products with use-by date cannot be eaten after its expiration date, because they are not safe. After the expiration of best before date, the product can still be consumed if it is stored correctly.

2. The Reasons Behind Food Waste Generation

1. 88 million
2. 92 kg
3. leftover
4. own answer

3. The effect of food waste on the environment and economy

1.
 - a. Direct water consumption: tooth brushing, drinking, dishwashing, bathing
 - b. Indirect water consumption: irrigation of farmland, food production
2.
 - a. Greenhouse gases – that are generated in a great extent during the degrading of food waste – contribute to the development of **global warming**.
 - b. Living beings are displaced from their natural habitat because of agricultural activities that require more and more area and waste generated because of food wastage. Due to this, the composition of ecological communities and their relationships change.
 - c. An enormous amount of water is required for food production, which can be expressed by the concepts of indirect water consumption and water footprint. With food waste, we not only waste food, but also the water resources of the Earth.
 - d. Environmental burden caused by the food waste is a serious cost for the whole of society, but we could save a lot even in our households by preventing food waste.

4. What can we do against food waste?

1. Before going shopping, it is recommended to talk it over what foodstuffs and in what quantity are needed by who in the family. Moreover, the contents of the refrigerator/pantry should be checked to see what is missing. It is useful to plan what food will be prepared in the upcoming days by the family. Based on this, it is easy to compile a shopping list appropriate from many aspects. It is also important to avoid going shopping when you are hungry and buying products in big packaging.
2. FIFO principle means “First In First Out”, which means always consume those products first that you put in the refrigerator/pantry sooner, so those that has nearer expiration date.
3. Every unopened foodstuff that has best before date and has been stored accordingly to the storage conditions (e.g. store in a dry place, away from sunlight) marked on the label.

5. Conscious shopping can also help to preserve your health

1. This way, cross-contamination between different foodstuffs can be avoided.
2. Diarrhoea, vomiting, fever.
3. At at least 75 °C for 2 minutes.

6. Alternative solutions to reduce food waste

1. They collect safe foodstuffs that are suitable for human consumption but could not enter the market for some reason (e.g. package with wrong colours). These products cannot differ from their perfect counterparts.

2. Foodstuffs suitable for dogs: cooked/baked potato, meat, offal (heart, lungs, kidneys, liver, spleen, rumen), chunks, tendons, skin, minced meat with bone, fried/raw blood (except pork), bone, fried fish without fishbone, fish head, spleen of bigger fish, fermented dairy products (yoghurt, kefir), eggs, heat-treated (cooking, baking) cereal grains and products made of them (e.g. bread, pasta), vegetable and animal fat, small amounts of cooked leguminous plants (e.g. peas, beans, lentils), apple.

Foodstuffs suitable for cats: fish without fishbone, cooked/fried meat, small amounts of chicken liver, whole grains, cheese, boiled egg, cooked carrot, cooked broccoli, cooked green beans, squash (e.g. zucchini), sweet potato, banana, blueberry, cantaloupe, apple.

3. To produce biofuel, food waste that is not suitable for compost can be used. Such waste is agricultural by-products and used cooking oil. Therefore, production of biofuel is an appropriate method to avoid leaving food waste in landfills or waste incinerator without utilisation.

CROSSWORD

1. composting
2. bakery
3. use by
4. vegetables
5. freezing
6. food bank
7. water footprint
8. avoidable
9. household
10. shopping list

Solution: PREVENTION

One third of the food produced worldwide gets lost or wasted.

Quality over quantity!

<http://maradeknelkul.hu/en/>