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Quality of milk and milk products – case study

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The local farmer raise and kept animals for the production of animal origin food stuff. He has also approved mini dairy plant to produce local dairy products like cheese and yoghurts. Mastitis appeared in his dairy cows in the summer period, and he had to use antibiotics to cure them. During treatment, dairy cows had to be milked regularly. However the milk during the treatement ould not be used for human consumption.

After the end of the treatment the farmer milked the cattle and start to make yoghurt from it. The farmer used thermophilic yoghurt cultures containing strains typical of the yoghurt culture Lactobacillus delbrueckii subsp. bulgaricus and Streptococcus thermophilus .

The farmer proceeded to make the yoghurt in the same way as he had done many times before. He followed the culture manufacturer's recommendations, but the fermentation process under good practice did not take place even after 5 hours of milk fermentation at the temperature of 45 °C and the milk with the starter culture did not convert lactose into lactic acid and the expected decrease of the pH level during the fermentation process was not observed.

(a) What could affect the process of youghurt procudction ?

(b) Where can be found the criterias for the raw milk quality and safety ?

Solution:

The presence of antibiotics in milk is a significant problem affecting the technological safety of dairy products.

The most of the problems caused by the presence of antibiotic residues are due to the fact that they inhibit the development of lactic acid bacterias (naturally presented in raw milk and added in the form of the starter culture in the production). The residues delay the acid production by these bacteria. Lowering the pH during the fermentation proceses is very important, for example, in the cheese-making process because it increases the activity of enzymes and the speed of coagulation, which is important especially in hard and long-matured cheeses. In addition, insufficient pH lowering can cause early fermentation, supported by clostridia or by yeasts, and defects in the sensory characteristics of yogurt and cheese.

In the naturally contaminated milk, the antibiotics can be present in milk in different forms. “Total residues” of drug in the edible products of the treated animals include not only the parent drug but also many other products of drug metabolism (free metabolites of the parent drug, conjugates to small molecules and macromolecules, covalently bound metabolites, and drug fragments).

Milk and its derivatives may have antibiotic residues, but their evolution varies among products. Residues of antibiotics cause delays in the time needed to produce dairy products due to their inhibitory effects on LAB. However, only small changes in the characteristics of the final product have been described.

However, there are many factors that could affect the concentration of residual drugs during the manufacture of yoghurt (e.g., the heat treatment of the milk, the fermentation temperature and time, the binding of residues to milk proteins etc.).

The fermentation process of the yoghurt production could be affected by the not complied of the withdrawal period for the antibiotics which were applied in the treatment of the mastitis.

The criteria for raw milk can be found in Regulation (EC) No 853/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for food of animal origin.

Raw milk must come from animals:

- that do not show any symptoms of infectious diseases communicable to humans through milk and colostrum;

- that are in a good general state of health, present no sign of disease that might result in the contamination of milk and colostrum and, in particular, are not suffering from any infection of the genital tract with discharge, enteritis with diarrhoea and fever, or a recognisable inflammation of the udder;

- that do not have any udder wound likely to affect the milk and colostrum;

- to which no unauthorised substances or products have been administered and that have not undergone illegal treatment within the meaning of Directive 96/23/EC;

- in respect of which, where authorised products or substances have been administered, the withdrawal periods prescribed for these products or substances have been observed.

Food business operators must initiate procedures to ensure that raw milk is not placed on the market if either:

- it contains antibiotic residues in a quantity that, in respect of any one of the substances referred to in Annexes I and III to Regulation (EEC) No 2377/90 (21), exceeds the levels authorised under that Regulation; or

- the combined total of residues of antibiotic substances exceeds any maximum permitted value.

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Quality of milk and milk products 2 – case study

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Handling Staphylococcus aureus, udder infections in herd health and production management programme. Staphylococcus aureus mastitis in lactating cows represent a big problem on the farm, because can be controlled, but commonly not eradicated. Please recommend the farmer what is the cause of Staphylococcus aureus mastitis problem and how can it be prevented?

(a) What are the most important sources of Staphylococcus aureus infection for other cows?

(b) After identification of the Staphylococcus aureus mastitis problem on the farm, recommend to the farmer, some schedule for application of Staphylococcus aureus mastitis control.

Solution:

Staphylococcus aureus mastitis of lactating cows is a big problem, because the most important source of infection for other cows is the infected cow.

Staphylococcus aureus is also prevalent on the udder skin, in bedding material, in forages, in flies, etc. The rate of new infections depends on the number of existing infections and hygiene on the farm. The transmission of Staphylococcus aureus mastitis occurs mainly in the milking parlour from one milking cluster to another, or from the hands of the milkers. Therefore, Staphylococcus aureus mastitis belong to so-called contagious mastitis. That is why, hygiene at milking, milking practices and also milking machine maintenance are paramount issues in this context.

The following plan for application of Staphylococcus aureus mastitis control should be recommended: function of milking machine (regular control of milking machine through a year); evaluation of milking procedure (milking technique); washing and drying the udder before milking; taking the first squirts of milk to the special cups and testing the milk quality; teat dipping after milking; drying of therapy for all cows; regular treatment of clinical cases of mastitis; culling of chronically infected cows; separation of infected and treated cows, etc.

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Quality of the raw cow´s milk and hazards and risks on the farm

Please advise the farmer what the quality of raw milk should be, what are the requirements for raw milk.

(a) Define the terms "hazard and risks".

(b) Give some example of microbiological, chemical and physical hazards and risks.

Solution:

Quality of raw milk means the organoleptic quality (colour, consistency, taste and odour), nutritional value (content of milk constituents: fat, protein, lactose, minerals, vitamins), physico-chemical properties (e.g. acidity, freezing point, density), somatic cell count, plate count at 30 °C, residues of inhibiting agents, etc.

Hazards and risks refer to the different diseases and disorders that we want to handle. Hazards ar agents or noxae which may be microbiological, chemical and physical or managerial in nature. They may cause a certain risk which is deemed unacceptable to animals, professionals, consumers or products. Risk refers to the probability of occurrence of a certain hazard and to impact this occurrence may have.

Examples of microbiological hazards and risks are zoonosis threatening public health: e.g. Salmonella spp., Mycobacterium tuberculosis, Brucella abortus bang, Listeria monocytogenes, Campylobacter spp., E. coli O157H7. Mastitis and other bacterial or viral and parasitological diseases (e. Cryptosporidium parvum) belong to this group.

Examples for chemical hazards and risks are residues of antimicrobial drugs, contamination of milk by cleaning detergents used for milking machine cleaning, mycotoxins, hormones, pesticides, but also oil leaking on grass or corn from tractors used for manufacturing of silage.

Examples for physical hazards and risks are poorly maintained equipment and their parts in the housing facilities (stables) of cows, which led to trauma in the animals. Also to this part we can include a poorly maintained slatted floor with too many unequal or broken slats, iron pins in the feed rack which can threatening a cattle health and welfare.

Among managerial hazards and risks, we can involve for instance poor identification of the animals, poor feed harvesting, personal health status, poor record keeping.

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Quality of canned fish product– case study

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The customer bought canned fish product (Herring fillets in vegetable oil). Soon after consumption, he began to feel ill (nausea, vomiting) and developed localized symptoms in the mouth, throat and skin (itching, sneezing, reddening of the skin).

a) What could be the likely cause of this sudden health issue?

b) Could it be related to the type of fish? (a) Define the terms "hazard and risks".

(c) The described symptoms are typical for food allergy.

Solution:

In general, fish is one of the seven most common food allergens. Some fish species (including herrings) are naturally high in free amino acids, which serve as precursors to biogenic amines. Among them, histamine is the most important. It is formed by enzymatic decarboxylation of L-histidine, which is catalyzed by histidine-decarboxylase produced by common enteric bacteria.

An allergic reaction usually occurs a few seconds or minutes after eating. Histamine causes dilatation of small blood vessels, reddening and swelling of the surrounding skin. It also affects the nerves in the skin causing itchines and increases the amount of mucus produced in the nasal lining. In sensitive individuals, an allergic reaction can lead to anaphylactic shock or even death.

Due to serious risks to human health, the maximum acceptable limits of histamine have been established for certain fish families with a high amount of histidine in the muscles (Commission Regulation No 2073/2005 as amended by Commission Regulation No 1441/2007). In fishery products from fish species with high amount of histidine, the histamine content must not exceed the maximum value of 200 mg.kg-1. The amount of histamine is controlled by the HPLC method.

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Olive oil case: food fraud – case study

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Official sampling of "extra virgin olive oil" revealed the presence of refined olive oil. This case was evaluated as food fraud.

a) Do you know what food fraud means?

b) What four criteria must a case meet to be considered food fraud?

Solution:

Food fraud is a non-compliance concerning any suspected intentional action by food businesses or individuals, for the purpose of deceiving purchasers and gaining undue advantage therefrom, in violation of the rules referred to in food and food safety.

Fraud in the context of food means that the description of the origin of food, its composition and how it has been obtained and/or prepared, shall be truthful.

Four operative criteria refer to food fraud: 1) violation of EU rules (breach of marketing standards for olive oil); 2) intention (intentionally mislabelled as "extra virgin olive oil"); 3) economic gain (differences in the price of "extra virgin olive oil" and "olive oil"); 4) deception of the customer (olive oil sold as "extra virgin olive oil").

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Confectionery food safety and production 1 – case studies

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1. E-shop Nekupto.cz informed about the recall of the product Mickey white chocolate due to the content of an unauthorized component. An internal inspection found that Mickey White Chocolate contains 6 % of hydrogenated canola oil.

a) What fats can be used in the production of chocolate? Are there any limits for the maximal content of these fats?

b) What properties of the product may be negatively affected if these requirements are not met?

c) What regulation deals with the requirements for chocolate and for which physico-chemical parameters of chocolates are the limits specified in it?

Solution:

a) Cocoa butter is ideally the only vegetable fat in chocolate. But there are six fats, the so-called equivalents of cocoa butter, that are the exception. These include **palm oil, illipe, sal, shea butter, mango kernel oil and kokum gorgi**. The share of these equivalents in the product must **not exceed 5 %** and it must not be at the expense of the mandatory content of total cocoa solids or cocoa butter.

b) Cocoa butter is hard and brittle at room temperature. Its melting point ranges from 32 to 38 °C. It is close to the body temperature, which is why chocolate melts easily in your mouth. Chocolate containing a higher proportion of cocoa butter equivalents/non-permitted fats may have an altered taste/aroma, may exhibit an atypical texture, lack a shell-like fracture and crunch when bitten, and melt poorly in the mouth. There is a possible negative effect on the stability of the product and the formation of fat florescence.

c) Directive e No. 2000/36/EC of the European Parliament and of the Council relating to cocoa and chocolate products intended for human consuption.

2. Mrs. Nováková bought a larger quantity of vinegar than usual with the aim to use it for the food preservation. At home, she found that the vinegar was slightly turbid.

a) Is the turbidity of the vinegar considered a defect?

b) In what phase of vinegar production does the content of turbidity causing substances decrease and which substances are they?

c) In what method of vinegar production does the mother of vinegar form?

Solution:

a) Slight turbidity of vinegar is allowed.

b) Vinegar treatment:

clarification – reduction of the content of substances causing turbidity (proteins, pectins, melanoid substances, metal complexes etc.)

filtration – separation of mucus and tannins

c) The Orleans Process (surface culture)

starting material (wine) is inoculated with vinegar bacteria (aging in barrels)

uses side aperture for air circulation

wine is added at the bottom of the barrel (preventing the alteration of the "mother of vinegar")

"mother of vinegar" - biofilm formed by the transforming microorganisms

especially wine vinegars (France, Italy)

very slow process (months to years) → high quality vinegar

3. A student of a three-year confectionary course wanted to try making jelly sweets at home. The resulting jelly consistency was too soft and the jelly was quite sticky.

a) Name possible causes of the above-mentioned defects.

b) What gelling agents can be used to make jelly candy?

c) Briefly describe the production of jelly confectionery.

Solution:

a) The consistency is determined by the type of the hydrocolloid and the water content. A soft consistency is caused by a higher water content, the use of an inappropriate temperature, or the use of more sweeteners, when sugar inversion can occur. Jelly stickiness may be caused by a high concentration of reducing sugars or invert sugar (improper pH).

b) Agar, pectin, starch, gelatin.

c) sugar solution → boiling sucrose and starch syrup (ratio 2:1 to 1:1), (113-121 °C) → slowly pouring sugar solution into gelatin (max. 60 °C), flavoring (citric acid) → pouring into molds → cooling

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Confectionery food safety and production 2 – case studies

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1. After carrying out laboratory analyses, the control organization found that the limit for the use of preservatives in Sinapík baby mustard was exceeded.

a) What additives can be added to mustard for the purpose of preservation? Where are the legislative requirements for these substances stated?

b) Name what glucosinolates are found in mustard.

c) Which substance in mustard are responsible for the pungent taste?

Solution:

a) Preservatives:

- benzoic acid
- sulphur dioxide

Regulation (EC) No. 1333/2008 of the European Parliament and of the Council of 16 December 2008 on food additives

b) glucosinolates

- Sinalbin (*Brassica (Sinapis) alba)* → *p-hydroxy benzyl-isothiocynate; p-hydroxy benzylamine*
- Sinigrin (*Brassica juncea, Brassica nigra*) → allyl isothiocyanate

c) allyl isothiocyanate

- *brown mustard* → volatile oil of mustard with pungent, irritating odour and an acrid taste
- *white mustard* → little odour and sensation of heat on the tongue

2. A patient with high blood pressure received a doctor's recommendation to reduce his daily salt consumption.

a) What diseases are associated with excessive salt consumption? What is the maximum consumption recommended by WHO?

b) Name 3 basic ways of obtaining salt.

c) What is halite? Name at least 5 types of salt.

Solution:

a) WHO recommendations:

- adults: less than 5 g of salt per day
- children: 2 to 15 years – salt should be iodized or "fortified" with iodine
- Excessive salt consumption: 9–12 grams per day

Exceeding the recommended daily amount of salt:

– high blood pressure → increased risk of cardiovascular diseases (coronary heart disease)

– higher risk of stroke incidents

– increased risk of stomach cancer

– the risk of kidney stones

b) Basic methods of obtaining salt:

- Rock salt mining
- Extracting salt from salt brines
- Evaporating salt water from oceans, seas, and salt lakes

c) Types of salt - Table salt, Kosher salt, Sea salt, Rock salt, Fleur de sel, Flake salt, Himalayan salt, Hawaiian salt, Celtic sea salt (Grey salt), Smoked salt, Pickling salt, Curing salt, Truffle salt, Persian blue diamond salt, etc.

3. The official food inspection authority found that Aceto Balsamico di Modena (PGI) was labeled as more expensive Aceto Balsamico Tradizionale di Modena (PDO).

a) What is the difference between these vinegars?

b) What does the designation PGI and PDO mean?

c) What other types of vinegar do you know?

Solution:

a) Aceto Balsamico Tradizionale di Modena (Aceto Balsamico Tradizionale di Reggio Emilia)

- cooking of grape must (increases sugar concentration) → alcoholic fermentation (osmophilic yeasts) → „sweet wine" → mother of vinegar is added → acetification → aging by a dynamic system (i.e., passage through different barrels containing vinegar from different vintages or different ages)

Aceto Balsamico di Modena

- obtained from grape must (min. 20 % of the volume) → the addition of at least 10 % of wine vinegar + max. 2 % of caramel (colour stability) → aged for at least 2 months (not necessarily in barrels)
- a cheaper version of Aceto Balsamico Tradizionale

b) *Traditional Balsamic Vinegar of Modena* PDO (Protected Designation of Origin)

Balsamic Vinegar of Modena PGI (Protected Geographical Indication)

c) Balsamic vinegar, cane vinegar, champagne vinegar, cider vinegar, coconut vinegar, distilled vinegar, malt vinegar, rice wine vinegar, sherry vinegar, spirit vinegar, wine vinegar, etc.

4. Mrs. Sweet bought her favorite hard candies (Bon Pari). After unwrapping it at home, she discovered that the hard candies showed milky turbidity and were grainy (crystallized).

a) What could have caused the milky turbidity and graininess?

b) Name some other defects of candies.

c) Briefly describe the production of confectionery with non-crystallized sucrose.

Solution:

a) Sugar crystallization – important for forming of texture

Crystallization is affected by – temperature, agitation, viscosity, sweetener type or presence of other ingredients

cooling without agitation – very large, coarse crystals (hard candies)

rapidly cooled with agitation – very fine crystals (fondant)

b) Stickiness, Graining, Flavour loss

Stickiness can be caused by sugars, that are inverted due to the addition of acids used as flavouring agents, Improper packaging material or humidity exposure.

Flavour loss - flavours can be poorly incorporated because of the structural nature of the matrix

c) Hard candies (Non-Crystalline Candies)

mixing (sucrose + water + glucose syrup) → dissolving → cooking (evaporating) → colouring and flavouring → forming →(cutting) → cooling → packing

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Confectionery food safety and production 3 – case studies

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1. Fondant candies were bought in a specialized luxury confectionery shop. After tasting them, however, it was noticeable that they are too hard and gritty.

a) What factors during the production process could affect the quality of fondant?

b) Describe the process of fondant production.

c) What other fondant defects do you know?

Solution:

a) Factors affecting fondant quality:

- temperature, speed of agitation, retardation of crystallization, sucrose to glucose ratio, moisture content

b) The production process:

- preparation of sugar syrup (sucrose + glucose syrup (4:1) boiled down to about 88 % of solids)
- mixture is boiled to required temperature (about 117 °C)
- boiled mixture is cooled with a high degree of agitation

c) Defects:

- too hard or too soft, sticky, gritty or grainy texture, white surface discoloration

2. Miss Alice wanted to buy her friend´s favourite caramel for her birthday, however she bought some other type as she was unsure.

a) What types of caramel do we distinguish and how do they differ from each other?

b) Describe the process of caramel production.

c) Name the defects of caramel.

Solution:

a) Difference between Caramel and Toffee:

- ❖ Toffee:
  - higher boiling temperature than caramel
  - lower amount of dairy ingredients and fat than caramel

b) The production process:

- Mixing and emulsification → cooking and browning → cooling → forming

c) Defects:

- cold flow, graining, stickiness, hardness, oil separation, sugar and protein graining

3. Kate wanted to please a friend who likes marzipan, so she bought her a cake thinking it was covered with marzipan, with a marzipan decoration on top of it. However, after tasting it, she discovered that the decorations on the cake really were made from marzipan, but the cake itself was covered with fondant.

a) What is the difference between fondant and marzipan?

b) Briefly describe the process of basic marzipan mass production.

c) Name the defects of marzipan.

Solution:

a) Fondant - semi-solid to solid consistency of sugar mass with a fine crystalline structure

Marzipan - mixture of ground blanched almonds and sugar.

b) The production process of basic marzipan mass:

- crushing of peeled almonds and mixing with sugar
- rolling - refining (larger almond particles)
- roasting - evaporation of water

c) Defects:

- Hardening, dehydration, rancidity

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Plant base product, food safety and production 1 – case studies

support of practical exercises

structured tutorials for students

1.) After purchasing product labeled as „white tea“ from the market network, you find out that it does not contain the undeveloped silver leaf buds of the tea plant characteristic for white tea.

a) Explain how white tea differs from other types of tea from Camellia sinensis.
b) Describe white tea production technology and compare it with green tea production technology.
c) What parameters of teas are determined by czech legislation (Decree No. 330/1997 Coll.)?

Solution:

a) White tea should contain a high proportion of undeveloped leaf buds (referred to as "silver tips") of the tea plant with a typical silver color, however there is no legislative limit for their content. White tea has a typical lighter straw-coloured infusion.

b) White tea production technology: undeveloped leaves → wilting → drying

Green tea production technology: wilting → heat treatment → rolling → drying.

Heat treatment prior to rolling in green tea production is inevitable to inactivate enzymes.

c) Sensory requirements for tea quality:

- appearance, color, smell and taste (before and after brewing)

Physical and chemical requirements for the quality of black tea:

- total ash: no more than 8.0% by weight
- water extract: at least 25% by weight
- weight loss by drying at 103 °C: maximum 10% of weight.

2.) During inspection in the market, you find that one batch of virgin olive oil has higher turbidity.

a) Explain the term "virgin oil". Is possible turbidity considered a significant defect?

b) Describe the individual technological steps used to remove unwanted substances from oils. Which technological operations can be used for cold pressed oils?

c) Name individual olive oil types available in the market and explain the differences between them.

Solution:

a) Virgin oil = oil obtained only by mechanical processes of extraction or pressing without thermal heating, which do not lead to changes in the nature of the oil. Possible turbidity or sediments may occur due to cooling of the oil during storage in stores and will dissolve again at room temperature, so they are not considered a defect.

b) Refining = refinement of oils, removal of undesirable substances contributing to a specific color/smell/taste or turbidity.

Hydration (degumming) = removal of mucilaginous and proteinaceous substances from the oil, which can cause a bitter taste. It is the process of hydrating phosphatides present in an oil by injecting hot water followed by centrifugation. There are only three reasons to degum oil: to produce lecithin (phosphatides), to provide degummed oil for long-term storage or transport, and to prepare for physical refining.

Neutralization (deacidification) = removal of free fatty acids using sodium hydroxide/carbonate, which forms an alkaline salt (soap) with the free fatty acids.

Bleaching = removal of pigments, achieving a light color of the oil, based on adsorption with bleaching clay or a mixture with activated carbon.

Deodorization = removal of undesirable taste and odor substances using steam distillation under reduced pressure.

For purification of cold-pressed oils only water washing, settling, filtering and centrifugation may be used.

c) Extra virgin olive oil = from 1st cold pressing, the highest quality and most expensive, free fatty acid content up to 0.8%.

Virgin olive oil = cold pressed, limit for free fatty acids 2%.

Olive oil = a mixture of refined and virgin olive oil.

Olive oil from pomace = contains oil obtained by extraction of pomace.

3.) During the inter-operational inspection at the flour mill, 2 suspicious samples were taken by a new employee: a flour sample with a greenish-gray color and a flour sample with uneven granulation containing both a finely ground fraction and a coarsely ground fraction. Due to concerns about violation of quality requirements, the employee consults the color and granulation of the sample with you.

a) Is the greenish-gray color of the flour a sign of poor quality? Justify your answer.
b) Is a high proportion of fractions with significantly different granulation a sign of unsatisfactory quality? Justify your answer.
c) Briefly describe the main steps of the milling process and list the equipment used.

Solution:

a) Not in the case of rye dark (bread) flour - the typical pigment is chlorophyll, unlike wheat flour, which is typically brownish, reddish or dark red, or can be white with a yellowish tint.
b) Yes, in Decree No. 18/2020 Coll. limits for granulation (described as minimal percentage of particles that pass through specified sieves) for individual types of wheat flour are given. However, one exception is graham flour, this decree does not include a granulation limit, the content of different fractions is its characteristic feature.
c) For detailed description see presentation Cereals and milling technology.

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Plant base product, food safety and production 2 – case studies

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1.) In the course of an inspection purchase in a retail store, you as an inspector of State food inspection authority come across a bun in the bakery section that you suspect does not meet the requirements for fresh bakery products, even though it is not labeled in the required manner according to the legislation.

a) How does the legislation define the term "fresh bakery product"?

b) What other alternatives, other than fresh bakery products, are specified by the legislation?

c) Briefly describe the individual methods of dough making from the technological view.

Solution:

a) According to Decree No. 18/2020 Coll. on the requirements for milled cereal products, pasta, bakery products, confectionery products and doughs, fresh bakery product is unpackaged common bakery product, the entire technological process of production from dough preparation to baking and placing on the market has not been interrupted by freezing or other technological treatment leading to prolongation of shelf life and which is also offered for sale no longer than 24 hours after baking.

b) durable bakery goods, deep-frozen bakery products, "thawed" products (unpackaged bakery products that have been frozen after being completely baked and are offered to the final consumer in a thawed state. Where the product is directly offered for sale to the final consumer, the name of the product together with the information that it has been thawed has to be stated in proximity.) Furthermore, "frozen semi-finished" products (unpackaged bakery products that have been finished from a frozen bakery semi-finished product. Where the product is directly offered for sale to the final consumer, the name of the product together with the

information that it is from a frozen semi-finished product has to be stated in proximity.)

c) Direct – direct mixing of all ingredients, use of yeast, indirect – the ingredients are combined and the dough is prepared in more than a single phase, use of preferments (poolish, sourdough starter, etc.).

2.) As a technologist in a bakery, you will be tasked to design the formulation of a new wholegrain product that would have sensory properties attractive for consumers and at the same time comply with the recommendations of nutrition specialists.

a) Where could you find legislative requirements for bakery products? Is there a specific requirement or limit for wholegrain bakery products?

b) Characterize wholegrain flour compared to classic plain flour.

c) Explain the difference between whole grain and multigrain bread according to czech legislation.

Solution:

a) Decree No. 18/2020 Coll. on the requirements for milled cereal products, pasta, bakery products, confectionery products and doughs, wholegrain bakery products/bread must contain at least 80% wholegrain flour or an equivalent amount of milled grain products so that all grain components are included, based on the total weight of used milled cereal products.

b) Wholegrain flour contains all parts of the grain. It is milled grain product obtained by crushing the whole grain of cereals or pseudo-cereals or by grinding its individual components and containing all components of the grain, i.e. endosperm, bran and germ, in the same proportion as the original grain. It has shorter shelf-life due to the content of the germ (contains fat prone to rancidity), a higher proportion of fiber, vitamins, minerals, pigments, but a lower proportion of gluten, which affects the texture of bakery products. High degree of grinding. A typical brownish, reddish or dark red shade – affects the color of the bakery goods.

c) multigrain bread or multigrain bakery products is a bakery product whose dough contains, in addition to milled grain products from wheat and rye, other ingredients such as milled grain products from grains of other botanical species, pseudocereals, legumes or oilseeds in a total amount of at least 5%, based on the total weight of used milled cereal products.

3.) Mr. Miller works as a chief technologist in a mill. He solves the problem with a large supply of food wheat, which, however, will probably not reach the required milling and baking quality. During its sensory evaluation, a sweet taste was noted.

a) What defect does the sweet taste indicate? For what reason could the sweet taste occur? How would it affect the properties of bakery products?

b) Which other basic component of grains affects the quality of food wheat and how do we classify wheat based on this component?

c) What measure does the mill use to ensure standard flour production without prominent deviations from its quality between the batches?

Solution:

a) The quality of harvested wheat grain is influenced by many factors. The most important are the variety, agricultural technology and especially the climatic conditions. Rainy, humid and warm weather before harvest induces the germination (growth) of grains in ears. Germination begins with the grains absorbing the water needed to start enzyme activity. At the beginning of germination, there is an increase in the activity and synthesis of new hydrolytic enzymes, especially α-amylase and also β-amylase, as well as protease, that break down starch, proteins and components of cell walls. This excessive activity of hydrolytic enzymes and the breakdown of major and minor components of the grain can result in impaired quality of bakery products. When baking, they cause the dough to be sticky, affect the volume of bakery products and their shelf life. Starch is usually broken down by enzymes from the class of hydrolases - amylases. Its activity is quite low in mature, intact grains. However, if the grain germinates, its activity increases (poorly stored or overgrown grain). Such grain with disturbed starch is not suitable for processing. This is because such starch is quickly hydrolyzed in the dough during fermentation, which results in the formation of low-molecular sugars too quickly and the dough's

stickiness. During baking, this amylase, which has optimum activity at higher temperatures, strongly disrupts the structure of the dough, as the disrupted starch does not have the capacity to maintain a sufficient amount of water in the crumb. The baked goods then have a low-quality, gooey or crumbly texture depending on the degree of damage.

b) content of gluten-forming proteins (gliadin and glutenin). Hard varieties - higher protein content (firm, flexible and resistant gluten), soft varieties – inflexible, unstable gluten.

c) Grain gristing = Systematic combining of two or more lots or kinds of grains to obtain a uniform mixture of a desired specification. For detailed description see presentation Cereals and milling technology.

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Plant base product, food safety and production – case studies

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1.) Your division director will assign you the task of revising the flour specifications that are produced within your company. In the "Product identification" section, in the "Other designations" column, you will read the abbreviation T 400.

a) What does this abbreviation stand for and what does it say?

b) Describe what characteristics of bakery products can be affected by this number.

c) What legislative regulation states the requirements for flour and what categories of flour does it distinguish?

Solution:

a) For detailed description see presentation Cereals and milling technology.

b) color, texture, volume, glycemic indes and satiety, ...

c) Decree No. 18/2020 Coll. For detailed description see presentation Cereals and milling technology.

2.) After consuming gluten-free cookies, a consumer diagnosed with celiac disease experienced digestive problems, on the basis of what he submitted a request for an inspection to Czech Agriculture and Food Inspection Authority via a web form.

a) When can a product be labeled as gluten-free or as a product with a low gluten content?

b) What technological function in the dough do gluten-forming proteins perform?

c) List at least 10 examples of naturally gluten-free flours from different categories.

Solution:

a) People with celiac disease may have a different tolerance limit for trace amounts of gluten. Therefore, the European Commission issued Regulation No. 828/2014 providing information on the absence or reduced content of gluten in food. According to Commission Regulation (EU) No. 828/2014, the term "gluten-free" can be used for foods that do not contain more than 20 mg/kg of gluten when delivered to the final consumer.

Foods that are partially made from wheat, barley, rye, oats, or their hybrids and have been processed to reduce gluten make "very low gluten" claims. They may contain no more than 100 mg/kg of gluten.

Decree No. 18/2020 Coll. on requirements for milled grain products, pasta, bakery products and confectionery products and dough does not address gluten content.

b) Gluten enables the formation of a three-dimensional protein network - the porous structure of the dough and the achievement of a high volume. Gluten-forming proteins give the dough elasticity. The product will keep its shape even without a mold.

c) 1. flours from naturally gluten-free cereals (rice, corn)

2. flours from pseudocereals (quinoa, amaranth, buckwheat)

3. flours from legumes (soybean, peas, beans, chickpeas, lentils)

4. flours from oilseed cake (flax, hemp, butternut squash, milk thistle)

5. flours from nuts (almond, coconut)

3.) The state food inspection authority took a sample of roasted coffee beans from the retail chain and after chemical analysis it was found that the maximum limit of ochratoxin A was exceeded, which according to Commission Regulation (EC) No. 1881/2006 is 5.0 µg/kg.

a) What is ochratoxin A? Explain how ochratoxin A is produced.

b) Failure to follow the procedure at which stage of coffee production can cause the presence of ochratoxin A?

c) Name some adverse effects of ochratoxin A on the consumer´s health.

Solutions:

a) Ochratoxin A (OTA) is a mycotoxin. Aspergillus species such as Aspergillus carbonarius, A. niger, A. ochraceus and A. westerdijkiae are the most widely OTA producers in tropical and semi-tropical coffee plantations.

b) Consequence of inadequate drying or rehydration during any of the phases of storage or transportation.

c) OTA displays a vast toxicity, including neurotoxic, teratogenic, immunotoxic, carcinogenic, hepatotoxic, embryotoxic and especially nephrotoxic activity.

d) For detailed description see presentation Hygiene requirements for food of plant origin – coffee and related products.

4.) The state food inspection authority found that several coffee samples taken from the retail chain contain higher amounts of acrylamide. With high consumption of coffee beverages per day, coffee is important contributor to the exposure to acrylamide following potato and cereal products.

a) What are potential risks of this substance and how is it formed in coffee beans?

b) Name at least 3 other potentially dangerous compounds that may be present in coffee.

c) What procedures can be used in coffee processing to reduce the content of these substances?

Solutions:

a) Acrylamide: formed by the degradation of free asparagine in the presence of sugars.

b) Acrylamide is classified as a probable human carcinogen.

c) Furan and furfural derivatives, ochratoxin

d) No clear provisions how to decrease these processing contaminants, further research is needed. Current provisions have only limited effect:

e) Sorting out immature beans (contain higher amounts of asparagine)

f) Dark roast coffees have lower levels of acrylamide, but in this case some other thermal processing contaminants are known to have higher levels. Acrylamide decreases during storage of roasted coffee, but this should not be seen as a strategy as there is also a change in flavor.

g) Vacuum roasting of coffee to a medium roast degree has been shown to decrease acrylamide formation 50% compared with conventional roasting without affecting sensory properties.

h) Moderate consumption is not considered harmful. For detailed description see presentation Hygiene requirements for food of plant origin – coffee and related products.

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Starch, food safety and production 1 – case studies

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structured tutorials for students

1. The company produces a pudding dessert consisting of milk, sugar, cornstarch, flavouring and colouring. However, consumers have complained that there is liquid on the surface of the product when opened. Please advise the manufacturer what is the cause of this problem and how can it be prevented?

(a) What are the processes involved in heating native starches? Describe them.

(b) Why are starches modified? What legislation applies to native and modified starches?

Solution:

The cause is starch retrogradation. The problem could be avoided by using modified starches instead of native starches.

Starch grains are insoluble in cold water - suspension formation. By gradually heating the suspension, the starch begins to absorb water - swelling. When the gelatinisation temperature is reached (depending on the type of starch, temperatures from 50°C to 70°C), existing bonds are broken and water molecules penetrate and interact with the loose binding sites. The hydrated chains move away from each other, revealing additional binding sites and binding additional water. The grain increases in volume. This process is called starch lubrication. The grain continues to take up water, the amylose molecules are released into the environment, the amylopectin structure forms a skeleton and starch grease is formed (=multiply enlarged starch grains, very viscous). Cooling the sebum increases the viscosity - a starch gel is formed. The opposite of gelatinisation (=greasing) is starch retrogradation, where the bonds between amylose and amylopectin are restored and water is excreted.

Modified starches may have different properties than native starches. It depends on the modification. Some can dissolve in cold water, some are resistant to retrogradation. Regulation 1333/2008.

2. Inspection found elevated levels of aflatoxins in peanuts. What is this group of substances and how did they appear in peanuts?

a) What other mycotoxins do you know, what effects do they have on the body, where are they found?

b) How are mycotoxins detected and where can you find the limits?

Solution:

The cause is mold, mycotoxins are its products.

Aflatoxin (peanuts, corn, nuts-genotoxic, carcinogenic), Ochratoxins (cereals-immunotoxic, teratogenic, carcinogenic), Patulin (fruits-carcinogenic, teratogenic, mutagenic), Fusarium mycotoxins (corn, cereals-estrogenic, immunotoxic, GIT inflammation), ergot (cereals-neurotoxic)

Methods: most commonly chromatographic methods, ELISA, etc.

Limits are specified in Regulation 1881/2006

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Starch, food safety and production 2 – case studies

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1. A customer bought sliced bread in a shop. When he unwrapped it at home, he found mold on it.

a) Why did the mould form?
b) Can this product be considered safe to eat?

Solution:

Causes: packaging of a piece that is not sufficiently cold, improper storage of baked goods

Sliced bread is more prone to mold - crust protects the bread, cleanliness of slicer?

Not safe. Mould can produce mycotoxins that are toxic to humans (e.g. Aflatoxins, Ochratoxin, Fusarium mycotoxins, ergot). Mycotoxins are often thermostable.

Ergot - Claviceps purpurea, ergotism

-symptoms-states similar to the effects of LSD-hallucinations, convulsions, abortions, manic-depressive states, vasoconstriction, necrosis of acral body parts (=St. Anthony's Fire)

Legislation relating to mycotoxins: Regulation 1881/2006

How mycotoxins are determined: ELISA, HPLC, GC

2. The bakery wants to include packaged gluten-free bread in its range. Please advise how the bakery should label these products and what parameters the products must meet to be called gluten-free.

Solution:

Regulation 1169/2011:

(a) the name of the food

(b) the list of ingredients

(c) any substance or excipient listed in Annex II or derived from a substance or product listed in Annex II causing allergy or intolerance which has been used in the manufacture or preparation of the food and is still present in the final product, albeit in an altered form

(d) the quantity of certain ingredients or groups of ingredients

(e) the net quantity of the food

(f) the date of minimum durability or use-by date

(g) the name or business name and address of the food business operator

the country of origin

(h) the nutritional information

Regulation 828/2014 - Gluten-free products must not contain more than 20 mg/kg of gluten.

3. A customer bought sourdough bread from a small bakery. However, the bread had deep cracks on the surface and was small in volume. What could be the causes of this technological defect?

Solution:

Defects during baking: insufficient steaming during baking or, on the contrary, too long a steaming phase or premature vapour withdrawal (should be 1-3 minutes) (there may also be dough defects, e.g. over-acidified dough, too soggy wrapper, low humidity in the oven, baking technology)

Baking stages:

Phase 1 - 1-3 minutes

Steam is injected into the oven, lubricating the starch on the surface of the bread, which protects the bread from cracking.

Stage 2

After the steam is removed, 10-20 minutes, temperature 250-230 °C. Increase in bread volume.

Stage 3

Temperature 230-200 °C, 15-30 minutes. Crust colouring occurs

Stage 4

190-170 °C, 15-30 minutes. The entire volume of the bread is baked through.

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Milk Hygiene – Case Study

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1. In the dairy, an elevated titratable acidity of the milk was detected during the intake of raw cow's milk.
   A) What can be the cause of increased titratable acidity?
   B) What is the legislated value of titratable acidity of raw cow's milk.

2. On receipt of raw cow's milk, a positive sample was found for inhibitory residues in the 3rd chamber of the tanker.
   a) By what test is this check performed?
   b) What test is needed to confirm the result?
   c) What is the next step in confirming RIL?

3. A pasteurization temperature of 82°C was found in the production of highly pasteurized milk.
   A) Is the temperature sufficient to label the product highly pasteurised?
   B) If the temperature is not sufficient what corrective measure should be implemented.

4. During the filling of the cream yoghurt, the fat content of the product was found to be 9.5%.
   A) What is the minimum fat content of cream yoghurt according to Decree 343/2016
   B) Can the manufactured products be placed on the market?

5. During the control of stress tests (thermostatic tests), the presence of yeast was detected in the final products. These products have already been placed on the market.
   A) What action needs to be taken to ensure consumer health protection.

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Legislation on the labelling of food products

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Frozen creams

The company Najlepšia s.r.o., operating on the market in the Czech Republic, where it has various production facilities, has branches - distribution warehouses also in the Slovak Republic. In one of the production facilities in the Czech Republic, chocolate frozen cream will be produced for sale to the final consumer in retail outlets in the Czech Republic and Slovakia. The packaging of the product will therefore be bilingual. However, when drawing up the labelling for this frozen cream, different conditions or requirements of the commodity regulations for the conditions of use of the designation 'chocolate' were found.

Tasks to solve:

- to determine whether legislation on the production of frozen creams is harmonised at EU level;
- establish whether the production of frozen creams in Sr is addressed by commodity legislation, if so, indicate the specific regulation currently in force and the source.
- what will be the course of action if there is no harmonised legislation at EU level in the field of frozen creams ? In view of the different labelling requirements of the commodity regulations, will the designation "chocolate" also be allowed to be used for the Slovak Republic ?

Meat products:

Krkovička s.r.o. produces and distributes various categories of meat products. Within the category of Soft Meat Products (MMV) they also produce a product called Spišské párky - Traditional Speciality Guaranteed.

Tasks to solve:

- find out what the raw material composition of the product is supposed to be and in which regulation this is stated;
- to find out what the prescribed physical and organoleptic characteristics are for the product in question and in which regulation this is stated;
- indicate which authorities may supervise compliance with the technological process
- production and parameters of this product.

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Hygiene of distribution of food goods

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Control of RVPS on the roads

The company Najlepšia s.r.o., realizes within Sr. the distribution of food goods to ZSS, as well as to retail outlets. As part of the distribution of food goods, the distribution vehicle was stopped and inspected by RVPS inspectors. The driver transporting the food goods - chilled poultry meat, soft meat products, chilled pork and beef; various deep frozen goods, had obtained a full secondary education - high school diploma by graduating from high school. According to the temperature slip, the refrigeration temperatures ranged from 0 °C to +4 °C and the freezing temperatures from -18 °C to -16 °C.

Tasks to solve:

- what relevant documents, certificates should the driver carry and produce on request ?
- have the temperature regimes for the commodities transported been found to be satisfactory ? Please indicate the specific legislative provisions defining the temperature conditions for the food commodities listed. Is a temperature of -16°C satisfactory for deep-frozen goods ?
- distributed food goods are packed in consumer and then transport (carton) packaging. Can the cartons of food goods be stored directly on the floor of the vehicle loading area ?

Vehicles for the distribution of foodstuffs

The vehicle, which is primarily intended for the distribution of food goods and is designed and equipped for this activity according to the requirements, was used by its owner for the transport of non-food goods - cardboard packaging, plastic products, textiles.

Tasks to solve:

- Please list all relevant SK and EU legislation that deals with requirements for vehicles intended for the transport of foodstuffs;
- assess whether it is possible, based on the requirements of the legislation, to use cars intended for food distribution also for the distribution of non-food goods.

Microbiological requirements of food products

Microbiology of delicatessen products

As a food business operator - PPP, you produce cold cuisine products in your establishment - delicatessen products with and without mayonnaise, e.g. salads, sandwiches, etc., which are then sold in the commercial network (retail).

Tasks to solve:

- Please indicate the relevant legislative regulation, valid in the Slovak Republic, which sets microbiological criteria for food.

- List the specific MB process hygiene product criteria to be met by cold deli products in the retail chain;
- List the specific MB safety criteria to be met by cold deli products in the commercial network;

Hygiene of the production process - slaughterhouse

You are the operator of a slaughterhouse where slaughter cattle, pigs and also poultry (turkeys, broilers) are slaughtered.

Tasks to solve:

- indicate the specific legislative provision defining the process hygiene criteria to be applied in slaughterhouses to carcases after slaughter and processing.
- list the specific micro-organisms or families and their permissible limits that may be present on the carcasses. Indicate the measures to be applied at the slaughterhouse should the limits for the M.O. or families be exceeded.

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Control of food sales and catering

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RVPS inspectors found that the supermarket was selling freezer-packed beef that was not labeled with a cutting approval number.

Will this be subject to their scrutiny?

Which supervisory authorities could supervise this meat in the supermarket?

Has there been a violation here?

An RVPS inspector found during an inspection at a market that one stall was selling hot dogs containing soy, with no allergen information listed anywhere nearby.

Which supervisory authorities can supervise the operation of food services in marketplaces?

Do allergens have to be listed nearby when sold?

Is sausage a food of animal origin?

The RVPS inspector found that pork patties and chocolates from Austria with an expired best before date were brought into the food warehouse.

Which supervisory authority will supervise the food in the warehouse?

Can food be marketed beyond its best before date?

Who is notified of the arrival of a consignment of food from another Member State?

RVPS inspectors found during an inspection of a school cafeteria that cooks were not using headgear or disposable gloves when serving food. Further, they discovered a mixture used to prepare fritters that was past its expiration date. Will this be subject to his scrutiny?

Which supervisory authorities supervise the provision of catering services?

Which supervisory authority will supervise the compound for the preparation of the faggots?

What legislation has been breached?

During an inspection of a butcher's shop, an RVPS inspector found that the eggs sold there as cage-free eggs had a code 3, which corresponds to cage-free eggs.

Which supervisory authority will inspect the butcher's shop and why?

What legislation has been infringed?

During an inspection at the restaurant, the RÚVZ inspector found that the marinated chicken wings were stored loose on the work surface at room temperature instead of in a refrigerator.

Which supervisory authority(ies) carries out inspections in restaurants?

Could the RHA oversee these marinated wings?

Who would supervise the wings if she wasn't marinated?

Has there been any misconduct here?

The RVPS inspector was inspecting a grocery store that does not process meat, but sells meat products, eggs and milk.

Which authorities will carry out the supervisory activities in this shop?

Which authority will supervise the food of the RU in this outlet?

Which authority will supervise the other food in this outlet?

The RVPS inspector found he was inspecting a supermarket into which honey had been imported directly from a producer in Denmark. Will this inspection be under the responsibility of the RVPS?

Which supervisory authority(ies) could supervise the supermarket?

Which supervisory authority will supervise this honey?

Inspectors of the RÚVZ ordered the closure of the restaurant. The reason for this was the intestinal problems of the guests after visiting the restaurant and the subsequent detection of *Campylobacter* bacteria on the served chicken steak. The RÚVZ subsequently launched an investigation.

Which authorities carry out supervisory activities in restaurants?

Which supervisory authority carries out surveillance when foodborne illness is detected?

Is the closure of a restaurant within the competence of the RÚVZ?

The RVPS inspector found that the scales in the butcher's shop were deliberately set to under-weight the meat and meat products and thus charge a higher price. Is this inspection within his remit?

Which supervisory authority exercises control over weighing in the butcher's shop?

An RVPS inspector found during an inspection of a retail outlet that the ham sausage did not contain the required amount of meat as stated on the packaging. This shop does not process meat but sells game meat.

Which supervisory authority will supervise this shop and over what?

The RVPS inspector inspecting the supermarket found that in the sales area where the meat is processed, the temperature in the refrigerated counter was 10 °C and the temperature of the meat was 8 °C. He therefore went to check the temperature in another counter where meat products are sold.

Which supervisory authority carries out the inspection of the sales area where the meat is processed? Which supervisory authority carries out controls in a sales area where only meat products are sold?

The RVPS inspector inspecting a milk vending machine in Nitra, which offers raw milk, found that the sampled milk contained *Staphyloccocus aureus* in the amount of 550 cfu/ml.

Which authority supervises milk vending machines? Which legislation regulates the sale of raw milk? Have there been any violations?

During an inspection at the market, an RVPS inspector found that honey was being sold there that was exposed to direct sunlight and high temperatures.

Which supervisory authorities supervise the sale of honey at the market?

Will the honey be subject to inspection by an RVPS inspector?

Has there been a breach of the law here?

The RÚVZ inspector was carrying out an inspection in the restaurant. He also wanted to check wild boar sausages, which are imported directly from the producer in Hungary. However, the owner of the restaurant did not allow him to do so, claiming that it was no longer unprocessed meat.

What supervisors are supervising the restaurant?

Will sausages be subject to inspection by an RVPS inspector?

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Control of food labelling

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An RVPS inspector found during an inspection in a supermarket that frozen pork was not marked with the date of freezing or the words "do not refreeze after thawing". Furthermore, the meat also lacked proof of origin.

Who will supervise this pork?

Must the date of freezing and the words 'do not refreeze after thawing' appear on the packaging of frozen food?

Can this meat of unknown origin be sold?

What legislation corrects the requirements for frozen food?

During an inspection of a supermarket, an RVPS inspector found that mineral waters were missing the ingredients list on the packaging.

Which piece of legislation and its provisions govern this issue?

Is this mandatory on food packaging?

Does this need to be stated for mineral waters?

An RVPS inspector found during an inspection in a supermarket that packaged minced beef was labelled "Made in Austria". However, he could not find the approval number of the slaughterhouse or the approval number of the cutting plant.

In which piece of legislation can we find the beef labelling requirements?

How is packaged beef labelled?

How is ground beef referred to?

Is this designation correct?

The RVPS inspector found that goat cheese sold at the market was labelled with the word natural. He also found that homemade lemonade was being sold at the same stall. Who will supervise here and what will be the procedure?

Which piece of legislation and its provisions govern this issue?

Can cheeses be labelled in this way?

Which foods can be labelled "homemade"?

The RVPS inspector found that expired yoghurt was being sold. These yoghurts are labelled with the word 'discount' and are separated from the others. Does this comply with the legislation?

Which piece of legislation and its provisions govern this issue?

Can these yoghurts be sold?

During an inspection of a butcher's shop, the RVPS inspector found that ham labelled as top quality ham had a net muscle protein content of 14 % and further found that they were selling a fatty sausage containing only 50 % meat and 45 % fat.

Which piece of legislation and its provisions govern this issue?

What are the requirements for the sausages?

How do we divide hams according to quality?

Has there been a violation here?

The RVPS inspector found that the peaches sold in the supermarket were largely rotten.

Which piece of legislation and its provisions govern this issue? Is fruit marked with a best before date? Can these peaches be sold?

An RVPS inspector found that potatoes sold in a supermarket were irradiated with a low dose of radiation to reduce their ability to germinate. Does this comply with the legislation?

Which piece of legislation and its provisions govern this issue?

Is it possible to irradiate potatoes?

What are the reasons for food scalding?

Which foods can be irradiated and where is it mentioned?

The RVPS inspector found during an inspection in a supermarket that eggs were being sold which had the code SK 123 on the packaging and the code 2 NL 5621 on the eggs.

Which piece of legislation and its provisions govern this issue?

Has there been a breach in the labelling of eggs?

Is this about deceiving the consumer?

The RVPS inspector found that the sales clerks cut up ham sausage in the morning that was being sold at the counter as unwrapped. The salami, which is not sold by the next day, is then packaged and sold as packaged.

Which piece of legislation and its provisions govern this issue?

Is it possible to sell ham sausage in this way?

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Food control in gastronomy

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At a fast food stand, RÚVZ inspectors found that the stands were manned by employees who did not show their health cards.

Which piece of legislation and its provisions govern this issue?

Is the activity epidemiologically serious?

Are employees eligible to sell food?

The RÚVZ inspector found that the saleswoman in the pastry shop has a health card, but she goes to the toilet very often. The shop assistant herself complained to the inspector that she was having "digestive problems" today, that her daughter was also having this and had been shown to have Salmonella, but that there was no one to cover for her today when she was selling cakes, so she had to work a shift at the behest of the operations shift.

Which piece of legislation and its provisions govern this issue?

Is a saleswoman qualified to sell food?

Who must ensure that there is no risk to human health?

RÚVZ inspectors found 220 kg of unlabelled beef in the hotel. The operator was unable to produce documents on the origin of the meat.

Which piece of legislation and its provisions govern this issue?

Does the operator have to have receipts for the raw materials used?

What should the RÚVZ inspector do?

During an inspection of Mr Vu Thu Mong's fast food restaurant, the RÚVZ inspector found dirt in the storage area, improperly stored foodstuffs, and significantly neglected cleaning.

Which piece of legislation and its provisions govern this issue?

What should the RÚVZ inspector do?

The RÚVZ inspector found that there is a lot of construction debris, dust and dirt in the production area of the confectionery, because the reconstruction is currently underway. Dust and debris can fall into the cake batter.

Which piece of legislation and its provisions govern this issue?

Can the patisserie be open to the public during the renovation?

What should the RÚVZ inspector do?

Does the owner of the sweet shop have a remedy?

The RÚVZ received a complaint at the petrol station from Mr Malý that the cooks were smoking in the dishwashing area. The cooks defend themselves by saying that they cannot go outside the petrol station to smoke because it is forbidden there for safety reasons and they cannot smoke when dispensing food.

Which piece of legislation and its provisions govern this issue?

Can chefs smoke in the room where the dishes are washed?

An inspector of the RÚVZ found during an inspection in a restaurant that the cooks were using frying oil that had a strange smell and taste. The inspector also found charred, charred food residues at the bottom of the frying pan.

Which piece of legislation and its provisions govern this issue?

Is frying oil considered a food?

Can such frying oil be used?

In a pub, an inspector of the RÚVZ discovers that the cook is using unlabelled eggs to make an omelette, which the pub serves for breakfast. It was also found that the owner of the pub also keeps 40 hens from which these eggs come.

Which piece of legislation and its provisions govern this issue?

Can unlabelled eggs get into a restaurant?

Do eggs have to be graded by weight?

Is there a limit to how many eggs he can use this way?

Mr Skalny lodged a complaint with the RÚVZ because he suspects that the pub on the corner is tapping a different type of beer than what is written on the menu and on the taps. Mr Skalny is a beer expert and can tell the different types of beer by taste.

Which legislation and its provisions regulate this issue?

Has Mr Skalny contacted the correct supervisory authority?

An inspector of the RÚVZ found in one restaurant that cooks cut off mouldy parts of dumplings and served the parts without mould as a side dish with Moravian sparrow.

Which piece of legislation and its provisions govern this issue?

Is the food considered safe?

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An inspector of the RÚVZ took samples of wild boar goulash that was cooked and offered in a restaurant. The laboratory confirmed the presence of wild boar protein, as well as fallow deer and deer protein.

Which piece of legislation and its provisions govern this issue?

How should the food be labelled?

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Health food safety

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1. A customer bought gluten-free biscuits. The ingredients stated that they were made from oats.

a) Can oats be classified as a gluten-free cereal?

(b) What conditions must a product meet in order to be labelled gluten-free?

2. Products labelled as Pardubický perník are characterised by the addition of ammonium.

a) What is the function of this substance in gingerbread?

(b) What other preparations are included in this group of substances?

3. The customer bought a Christmas tree. When he wanted to consume it, he found that the smell and taste of the Christmas cake was stale.

a) Where could there have been an error in the manufacturing process?

4. A customer bought a dress made of puff pastry. She wonders what causes the product to have such a fragile texture.

a) How are puff pastry doughs loosened?

(b) How are puff pastry doughs made?

5. You are a quality manager in a cola beverage company. During a press conference, you respond to journalists' questions about the quality of the sodas in your portfolio. Cola-flavored lemonade is a representative of sugar-free cola. It contains the sweeteners aspartame and acesulfame K.

a) What are the advantages of sweeteners compared to sucrose?

(b) What must the consumer be warned if the product contains aspartame?

c) How do we divide sweeteners? Name at least 1 from each group.

d) What is the use of sweeteners in food processing.

6. A customer with second-degree obesity purchased cane sugar from a market chain, believing it to be healthier than sugar derived from beetroot, in order to avoid consuming refined sugar, which adversely affects his health.

(a) What is the difference (chemically) between sugar obtained from sugar cane and sugar beet?

b) Which diseases are associated with high sugar consumption? State the basic function of carbohydrates in the body.

(c) What are the usable by-products of sugar production?

7. You are working as a development technologist in a spice processing plant, and while developing a spice blend, you are solving a problem with ground peppers that are too dark in color. You know that there is a possibility to improve the low colouring of the peppers by adding synthetic colouring agents.

(a) What regulation governs the quality requirements for spices and how does it address the colour of peppers? What international colour rating system is used?

(b) What causes the typical colour of peppers and what causes the poor quality of peppers in terms of colour?

(c) What is the legislative view on colour modification of peppers using dyes?

8. Chai spice is a blend of extracts of cinnamon, ginger, cardamom, allspice, nutmeg and cloves, which further contains only the emulsifier polysorbate 80. This extract won the Great Taste Awards in 2016.

a) What are the benefits of spices in the form of extracts and what are oleoresins?

(b) State the content of cinnamon stick and justify why its content is significant.

(c) State the commercial types of spices and explain the differences between them.

9. A customer bought a larger quantity of vinegar than usual, intending to use it to preserve food. At home, she found the vinegar to be slightly cloudy. Because she had bought a larger quantity, she was wondering whether to go and claim it.

a) Is the slight cloudiness of the vinegar a fault? At what stage in the production of vinegar is the content of the substances causing the turbidity reduced and which substances are they?

b) List the basic methods of vinegar production. Which method of vinegar production produces a vinegar mother?

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