

COURSES

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FOOD-101 Food Processing Technology 3 cr**Exam, autumn 2021 (Moodle)**

Part 1 Short questions, 2–5 sentences

1. Give three examples of different emulsions and tell what kind of emulsions they are.
2. What are equilibration processes? Give examples.
3. What factors are important to consider when calculating heat treatment parameters.
4. How and why does HPP destroy or inactivate microbes?
5. Mention three methods to study crystallization
6. How and why microencapsulation is used?
7. What is the amount of bacterial cells after thermal processing of 8 minutes at 113°C when $D_{113} = 4$ min and the initial microbial population is 5×10^4 per container?
8. Role of ice crystals in freezing and thawing.
9. What is water activity? Describe its relevance in food processing.
10. Mention three separation methods discussed during the course and their main characteristics.
11. Give three examples of different emulsions and tell what kind of emulsions they are.

Part 2 (separate essay)

Answer to the following question with an essay type text. Max points 10 p.

Describe, using methods discussed in this course, how food raw material can be processed into different products. (Explain several possibilities, both products and ways to do them, depending on the raw material). Choose one or two of the following: berries, apples, coffee, milk, pork meat. You can choose also something else. Draw a flow chart or a diagram of the whole process(es) to support your essay. Usually one diagram with several branches is suitable. Mention also the theory of the methods and the effect of processing

on the quality of the products. Suitable length is 2-6 pages + flow chart(s). However, it is more about the contents than length.

If you do Part 2 with a fellow student, both submits the file. Put your last names in alphabetical order into the file name.

Important aspects in the essay:

Clarity of the text, scientific style

Scope (are you answering what is being asked)

Logical sequency of explanation (jäsentely), use subheadings if needed

Theory and practical examples in balance

Innovative, own voice (your own voice is important)

Relevant details in proper context (asianmukaiset yksityiskohdat oikeassa asiayhteydessä)

No cover page but remember to put your name(s) on head of the text, too.

Exam, autumn 2020

Part 1 (Moodle)

1. Points to consider when choosing emulsion ingredients.
2. Mention three centrifuge type of equipments and explain how they can be applied
3. What factors are important to consider when calculating heat treatment parameters
4. What is blanching? When and how is it used?
5. Describe the steps of crystallisation process.
6. Describe the steps of drying.
7. The D value of *Yersinia enterocolitica* in milk is 1.6 min at the temperature of 58°C. The z value is 4.3. What is the D-value of *Yersinia enterocolitica* at 62.3°C?
8. What structural and other damage or side effects can occur during freezing?
9. What are mass and energy balances and what are their relevance in food processing?

10. The role of pressure in the context of filtration.

Part 2 (essay)

Choose one of the following questions and answer with an essay type text. Max points 20.

1. Describe, using methods discussed in this course, how berries or vegetables can be processed into different products. You can choose the raw material. Draw a flow chart or a diagram to support your essay. Describe also the theory of the methods and the effect of processing on the quality of the products.
2. Explain the theory and practice of five separation methods discussed in this course. Give practical examples. Discuss also their advantages and limitations. You can draw flow charts to show how the separation methods are part of the whole process.

Exam, autumn 2019

Short answers

1. Compare conduction and convection
2. Give examples of suitable products to be treated with HPP (High Pressure Processing)
3. Mention factors that play a role in crystallization
4. What is free water?
5. How is the processing time of sterilization decided?
6. Why thawing is not the reverse process of freezing?
7. Name at least six separation methods discussed during the course
8. Why is cooling often needed after harvest? What are the drawbacks of cooling?
9. Describe the steps that occur when food material is being frozen
10. What is concentration coefficient?

Essay. Choose one of the following topics.

1. Describe, using methods discussed in this course, how berries such as strawberries or fruit like apples can be processed into different products. You can choose the raw material. Draw a flow chart or a diagram to support your essay. Describe also the theory of the methods and the effect of processing on the quality of the products.
2. Explain why drying is used as a common food processing method. Give the theoretical background of drying and examples of drying methods discuss

FOOD-102 Food Structure 3 cr**Exam, autumn 2020 (Moodle)**

1. Explain these three (a-c) parameters, each by one or two sentences:
 - a. Explain the shear strain in rheological measurements.
 - b. Explain what is texture in foods.
 - c. Explain what is solid glass state in food matter.

Choose only one of these two essay topics:

2. In order to characterise the rheological properties of a viscoelastic food material, suggest the methods that could be used and how the results describe the material properties.

or

3. Describe the formation of food emulsions, emulsion types and how to evaluate and measure emulsion properties.

Exam, spring 2020

1. Measuring mechanical properties of solid food; explain stress, strain (deformation) and elastic modulus.
2. The role of colloidal interactions in emulsion formation.
3. Describe the Newtonian and non-Newtonian behavior of a fluid and also describe the subcategories (both the time-dependent and time-independent) of the non-Newtonian behavior.

Exam, autumn 2019

1. Describe the principle of contact angle measurement. What information can be obtained from the measurement? You can use an illustration to aid your description.
2. Mechanisms of emulsion instability
3. The Casson flow model for chocolate, explain the yield stress and plastic viscous flow. What is curve fitting?

Exam, spring 2/2019

1. In order to characterize the properties of a soft gel material (like yoghurt), suggest the methods that could be used and how the results describe the material.
2. Describe the formation of food emulsions. Emulsion types and how to evaluate and measure emulsion properties.
3. Measuring mechanical properties of solid foods. What is texture profile analysis, TPA, and describe the possibilities and limitations of TPA in food research.

Exam, spring 1/2019

Answer three out of four.

1. Define terms food structure and food texture. Discuss about the length scale, dimensions of various food structures and how these affect their character.
2. In order to characterize the rheological properties of viscous material (like a batter or creamy soup) suggest the measurements, methods that could be used and how the results describe the material.
3. Physical stability of disperse systems.

4. Explain the rheological measurements by DMA, dynamic mechanical analyzer. In addition give some examples of food samples measured by this method.

Exam, autumn 2017

1. Explain the difference between elasticity and viscoelasticity.
2. Explain food structure and texture
3. Compare different scales together (micro and macro).
4. Describe the rheological differences between elastic and viscoelastic material.
5. Mechanic properties of material. Explain terms a. stress
 - b. strain
 - c. elastic modulus

FOOD-103 Food Additives 5 cr**Exam, autumn 2022**

1. How can red colour be achieved in foods with using food additives? Introduce three red colours of different chemical nature by describing their origin, chemical and technological properties, and examples of food applications.
2. How are phosphoric acid and phosphates used as food additives?
3. What type of food additives can be used to extend the shelf-life of food products? Introduce three food additives of different chemical nature by describing their mode of action.
4. Identify all the ingredients in the ice cream that are food additives – note that the food additive category is not shown in the list. Name the categories and briefly describe the technological function of the food additives of each category in this food product.

Ingredients:

Cream, fat free milk, water, sugar, milk protein, lactose, fructose, starch syrup, cocoa butter, full fat milk powder, mono- and diglycerides of fatty acids, soy lecithin, polyglyserol-polyricinoleate, Locust bean gum, guar gum, processed Euchema-algi, vegetable fat, natural vanilla flavouring, ground vanilla, fat free milk powder, carotenoids

Exam, spring 2021 (Moodle)

1. How is the safety of food additives assessed? Describe all the aspects that are included in the scientific assessment of safety by EFSA
2. Introduce three (chemically) different types of preservatives examples with describing their identity (chemical characterisation), food applications, and possible health concerns.
3. How are phosphates used as food additives? Describe three different uses (food additive categories) with examples of food applications.

4. Identify the food additives used in the food product and briefly explain their purpose of use in this food. Please note that:

- food additive categories not shown
- wrong identification will deduct points (0.5 points if both the food additive and its purpose of use is not correct)

Ingredients:

WATER, SUGAR, COCONUT OIL, CORN SYRUP, SUNFLOWER OIL, PECANS, NON-ANIMAL WHEY PROTEIN, CONTAINS LESS THAN 2% MALTODEXTRIN, NATURAL FLAVOR, CORNSTARCH, PALM OIL, CALCIUM POTASSIUM PHOSPHATE CITRATE, SALT, DISODIUM PHOSPHATE, MOLASSES, SEA SALT, CAROB BEAN GUM, MONO AND DIGLYCERIDES, CAMEL COLOR, SOY LECITHIN, CARRAGEENAN, MALT EXTRACT.

Exam, autumn 2020

1. What are the labeling requirements including food safety and allergy reasons regarding use of food additives?
2. What are hydrocolloids? Please give three examples of different hydrocolloids used as food additives: describe their origin, properties and two examples of food applications.
3. Identify the food additives used in the food product (see list of ingredients) and describe their purpose in this food * insert ingredient list *
4. Give three examples of different types (by chemical nature) of preservatives used as food additives. Describe their origin, how they function as preservatives and any possible causes for consumer concerns.

Exam, autumn 2019

1. How is the safety of food additives evaluated?
2. How can yellow colour can be achieved in food using food additives? Describe 3 yellow colour of different chemical nature by describing their origin, chemical, and technological properties and food use examples

3. How are phosphates used as food additives? Describe three different uses with examples of food applications.
4. Identify the food additives used in food product shown below (Fazer cookies) and briefly explain their purpose of use in food.

Exam, autumn 2018

1. What are reasons (principals) to use food additives? Please give examples of food additives and their applications.
2. How can yellow colour be achieved in foods by use of food additives? Introduce three yellow colours of different chemical nature by describing their origin, chemical and technological properties and food use examples.
3. How are phosphates used as food additives? Describe three different uses with examples of food applications.
4. Fazer Carnival cookie. Identify food additives used in the food product shown below and briefly explain their purpose of use in food.

Exam, spring 3/2018

In English

1. How the safety of food additives is evaluated?
2. How yellow colour in food product can be achieved by using food additives? Describe three colour substances and their origin, chemical and technological properties and examples of food use.
3. Glutamate as aroma enhancer: natural sources, use in foods and possible adverse effects
4. Identify the food additives used in the food product shown below (Jaffa orange soft drink) and describe their role in this product (reason to use them)

Suomeksi

1. Miten arvioidaan elintarvikelisiä aineiden turvallisuus?
2. Miten voidaan elintarvikelisiä aineita käyttäen aikaan saada keltainen väri elintarvikkeeseen? Esittele kolme väriainetta kuvailemalla niiden alkuperä, kemiallisia ja teknologiasia ominaisuuksia sekä esimerkkejä elintarvikekäytöstä.
3. Glutamaatti arominvahventena: luontaiset lähteet, käyttö elintarvikelisiä aineena, mahdolliset haittavaikutukset.
4. Identifioi alla olevassa tuotteessa (Jaffa Super veriappelsiini) käytetyt lisäaineet ja kerro lyhyesti niiden käytön tarkoitus ko. tuotteessa

Exam, spring 2/2018

1. Why are phosphates used as food additives? Describe three different uses with examples of food applications.
2. What are intensive sweeteners? Introduce three examples with describing their origin, chemical and technological properties and food applications.
3. Glutamate as flavour enhancer. Describe what is glutamate, its natural sources, food additive use applications and any adverse effect.
4. Identify the food additives used in the food product (ice cream) shown below and briefly explain their purpose of use in this food.

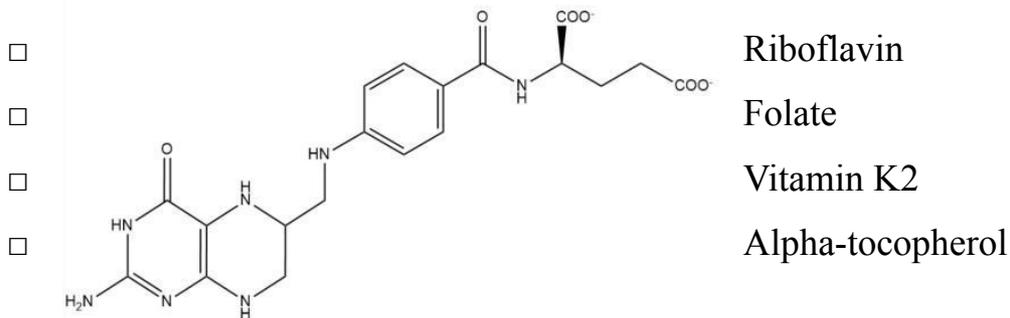
FOOD-106 Vitamins and Other Bioactive Substances 5 cr

Exam, spring 2022

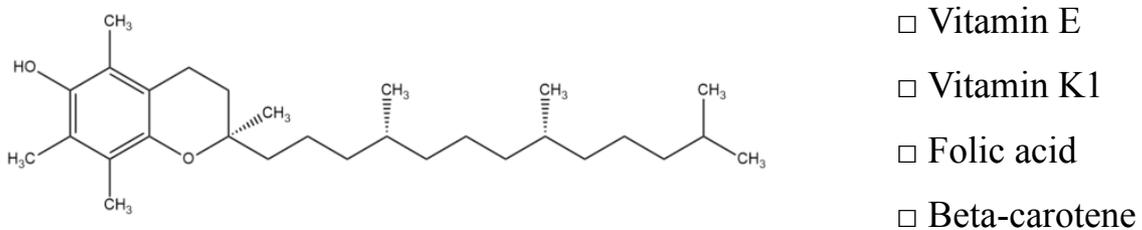
Part 1 – Short questions

1. Choose the correct names for the following structures:

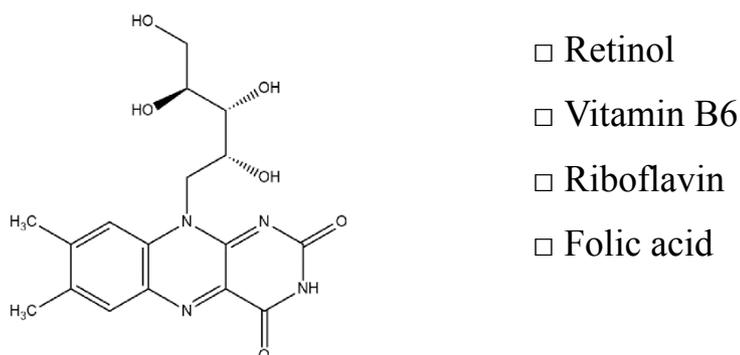
a)



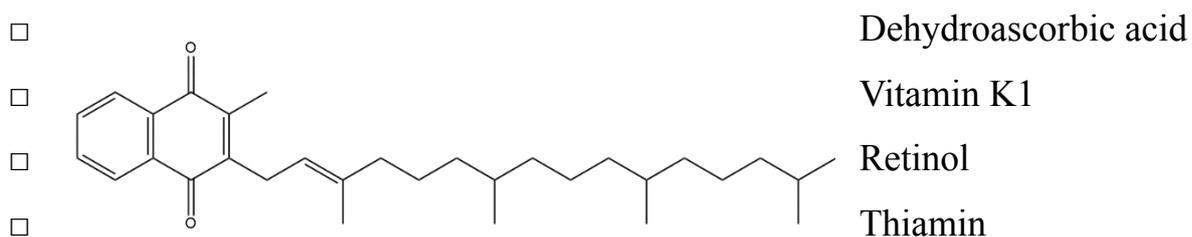
b)



c)



d)



2. Which vitamin deficiency leads to the following disorders?

- a) Fetal resorption
- b) Scurvy
- c) Pellagra
- d) Pernicious anaemia

3. Connect the vitamin with its correct pretreatment/extraction method

- a) Dehydroascorbic acid Acid hydrolysis
- b) Folate Alkaline hydrolysis & solvent extraction
- c) Riboflavin Extraction with metaphosphoric acid
- d) Vitamin A Buffer and enzyme treatment

4. Which of these have (pro)vitamin A activity

- Lycopene
- Beta-carotene
- Lutein
- Retinol
- Alpha-carotene

5. Choose the correct recommended daily intake level for the following vitamins (approximately, for adults):

- a) Vitamin B12
 - A few micrograms
 - Tens of micrograms
 - A few milligrams
 - Tens of milligrams

- b) Biotin
 - A few micrograms
 - Tens of micrograms

- A few milligrams
- Tens of milligrams

- c) Riboflavin
- A few micrograms
 - Tens of micrograms
 - A few milligrams
 - Tens of milligrams

- d) Vitamin K
- A few micrograms
 - Tens of micrograms
 - A few milligrams
 - Tens of milligrams

Part 2 – Open questions

1. Vitamins in a food composition database

Below is a fragment of food composition database showing contents of selected bioactive compounds (per 100 g) in a tomato and vegetable juice.

- a) Which of the compounds are not classified as vitamins?
- b) What does “Vitamin C, total ascorbic acid” mean?
- c) Where does “Folate, DFE” come from?
- d) What does “Vitamin A, RAE” mean and where is it derived from?
- e) What is the vitamin E content of this product?
- f) Which of the vitamins has/have probably been added to this product?

Nutrient	Amount	Unit	Nutrient	Amount	Unit
Vitamin C, total ascorbic acid	54.3	mg	Vitamin B-12	1.25	µg
Thiamin	0.05	mg	Vitamin A, RAE	35	µg
Riboflavin	0.033	mg	Retinol	0	µg
Niacin	0.722	mg	Carotene, beta	377	µg
Vitamin B-6	0.071	mg	Carotene, alpha	93	µg
Selenium, Se	0.2	mg	Cryptoxanthin, beta	0	µg
Folate, total	21	µg	Lycopene	7119	µg

Folic acid	0	µg	Lutein + zeaxanthin	278	µg
Folate, food	21	µg	Alpha-tocopherol 1.02	mg	
Folate, DFE	21	µg	Phylloquinone	6.1	µg
Choline, total	8.1	mg			

2. Vitamin D status

A researcher wants to compare vitamin D intake and status in Finland and in Turkey. How can vitamin D status be measured or estimated? How to estimate the dietary intake?

Discuss the challenges.

3. How to increase the vitamin B12 content in foods?

Introduce different means how vitamin B12 content can be increased in foods. Discuss the strengths and weaknesses of the proposed approaches.

4. Role of the phenolics in foods

Tell about the different effects of phenolic compounds on food quality and properties.

Exam, autumn 2019

1. "Vitamin" and "bioactive compound". Describe and compare.
2. Plant sterols as bioactive compounds. Tell about the bioactivities of plant sterols in humans.
3. Factors affecting iron absorption. Discuss the role of different factors - both diet and host related.
4. Adequacy of vitamin B12 intake among different population groups.
5. Challenges in vitamin analysis. Evaluate critically characteristics that can make vitamin analysis challenging.

FOOD-109 Food fermentation and Enzyme Technology 5 cr**Exam, spring 2022**

Answer 4 out of the 6 questions: 2 on fermentation and 2 on enzymes

Fermentation

- 1) Explain the alcoholic fermentation of yeasts and define the yeast role in the context of beer and wine production.
- 2) Sourdough fermentation: explain the role of the microorganisms involved and the changes taking place during this process.
- 3) Explain the role of lactic acid bacteria during fermentation of milk-derived products and describe it in the context of 2 food examples.

Enzyme technology

- 4) How new or improved industrial enzymes are developed and what needs to be considered when new enzyme products are planned to the market?
- 5) Describe what enzymes act on food lipids, their action mechanisms and differences, and what role (positive and/or negative) they can have in food manufacturing.
- 6) Give example of four different enzymes that are used to process cereal flours and explain why, thus how they work (substrates and reactions catalyzed) and what benefits they achieve in processes and products.

Exam, spring 2018

1. Describe the sourdough fermentation emphasizing the role of microbes involved and the changes occurring during the process (e.g. flavor and nutritional modifications).

2. Analyze the role and outcome of yeast fermentation in the manufacturing of beer and/or wine.
3. Elucidate the use/role starter cultures in the process of cheese making. Additionally, explain the potential use of enzymes in cheese manufacturing (you can refer to one or more cheese examples).
4. Factors affecting enzyme activity and efficiency and how these affect use of enzymes in food processing (e.g. what needs to be considered when using enzymes as process aids).
5. Describe the malting process from enzymes perspective. Present also examples of use of malt as an enzyme source.

FOOD-110 Cereal and Pulse Ingredient Functionality 2 cr**Exam, autumn 2019**

Answer three out of four

1. Discuss the differences between oat proteins and other grain (cereal and grain legume) proteins. Discuss the treatments done to the grain ingredients in the mill before they are used for food production and how this influences the functionality.
2. The role of lipases (including phospholipases and glycolipases) in breads
3. How to texturise plant proteins, describe the methods and characterise the protein during and after the texturising treatments.
4. You are a product development manager in a bakery company. You are given a task to boost flavor formation in bread making as naturally as possible. What would be your approach and why?

FOOD-111 Dairy science and technology 1, 2 cr

Exam, autumn 2022

1. Bovine raw milk microbiota and how it affects the quality of dairy products
2. Biosynthesis of bovine milk fat
3. Milk heat treatments and the effects on milk proteins

FOOD-401 European Food Safety 5 cr**Exam, spring 2022 (Moodle)**

1. Please describe the nature of biological hazard regarding the following with using examples: (5p)

- a) African swine fever
- b) use of animal by-products
- c) listeria

2. Please introduce 5 science based concerns regarding chemical substances in food. What is the reason for the concern and what are the main food sources of this hazard. (5p)

3. Please elaborate on why it would be beneficial to the consumer to be informed with (5p) a) front-of-pack nutrition labeling in addition to current nutrition declaration b) green claims based on harmonized EU-wide methodology

4. Please justify with reference to the appropriate EU regulation why placing of following foods on the EU market is prohibited: (5p) a) Canola oil sold as olive oil b) Food product containing plant cell culture as an ingredient c) Food supplement with claim on probiotics

Exam, spring 2020

1. Issues of chemical safety concern in Europe.
2. What are food improvement agents and how is their safety evaluated?
3. What is food fraud? Please give examples of our different types of adulteration.
4. Good practice in households, food industry and retail to reduce food waste. Please give at least 2 examples for each actor taking into account EU actions and recommendations.

Exam, spring 5/2018

1. Issues of chemical safety concern in Europe.
2. Safety assessment and legislation on food improvement agents.
3. Food fraud. Please give examples of five different types of adulteration.
4. Good practices in households, food industry and retail to reduce food waste.

Exam, spring 2/2018

1. Food improvement agents.
2. Zoonoses - give four examples and explain their current situation in Europe
3. Mandatory and obligatory food labelling.
4. Food fraud - give four examples

FOOD-402 Chemical Risk Factors 5 cr**Exam, autumn 2022**

Exam can be written in Finnish, Swedish or English language. Justify your answers.

Printed dictionary allowed (no electronic/digital devices)

Answer four questions only.

1. Harmful heavy metals – background of the situation earlier and today.
2. How acrylamide is formed in foods? Write the main reactions and formation routes. Describe also in details the means to control the formation of acrylamide.
3. Food irradiation – how it is done? Give also the arguments for and against its use – discuss the arguments' background.
4. Chemical formation of N-nitroso compounds and their relevance to food safety.
5. Food frauds. What are the harms fraudulent food business can cause?

Exam, spring 2/2019

Answer four out of five questions.

1. Dioxin and related furan compounds (PCDD/F) in food chain.
2. Radioactive residues in foods (you can review Finland's situation).
3. Means to control the formation of acrylamide in foods.
4. Formation of N-nitroso compounds and their relevance to food safety.
5. Food irradiation – arguments for and against its use – discuss also the arguments' grounds.

Exam, spring 1/2019

1. Harmful heavy metals in foods - main sources and intake, a short overview to the past and the future trends.

2. Radioactive residues in foods (you can review Finland's situation).
3. Means to control the formation of acrylamide in foods.
4. Natural hazardous substances in foods - describe the main components and their relevance to food safety.
5. Food irradiation - arguments for and against its use - discuss also the arguments' grounds.

Exam, spring 2/2016

1. Harmful heavy metals in foods - main sources and intake, a short overview to the past and future trends
2. Dioxin and dioxin-like PCBs in food chain
3. Means to control the formation of acrylamide in foods
4. Formation (routes) of N-nitroso compounds in foods
5. Radioactive residues in foods and drinking water

Exam, autumn 2015

1. Harmful heavy metals in food. Intake and most common sources. A brief overview of the trends of the past and now.
2. Acrylamide. Ways to control/manage.
3. Something on PAH.
4. Irradiation, arguments for and against. Explain also the basis of the arguments.

FOOD-403 Food Toxicology and Risk Assessment 5 cr**Exam, spring 5/2019**

Answer all four questions.

1. Explain the following concepts

- a) Allergen
- b) AUC
- c) Endocrine disruptor

2. A new food additive has been developed. What should be taken into consideration when evaluating the safety of this food ingredient.

3. Below are results from a 90-day study in rats concerning the safety of a novel food (NF) ingredient. What is a) the NOAEL in this study (please explain on what basis) b) the ADI of the NF ingredient (please show how it is derived from the NOAEL value)? *text*

4. What info can be gained from the figure below regarding Vitamin C? *picture*

Exam, spring 4/2019

Answer all four questions.

1. Explain the following concepts:

- a) hazard vs. risk
- b) ADME
- c) Ames test

2. A new plant based novel food ingredient has been developed. What should be taken into consideration when evaluating the safety of this ingredient?
3. Describe the principles (length, species, doses, measurements...) of a subchronic toxicity study as performed according the OECD guidelines.
4. Methanol is one of the metabolites of aspartame. What is the contribution of aspartame-derived methanol to the methanol exposure of all sources in five population groups (min-max%) (please elaborate on sources and population groups) *taulukko*

Exam, spring 2017

1. Explain:
 - a) ADME
 - b) Hormone disruptors
 - c) NOAEL
 - d) ADI
2. Novel food/Green Tea extract
3. Hepatotoxicity / Noni-fruitjuice

FOOD-604 Advanced Lectures in Packaging Technology 2 cr**Exam, spring 2022 (Moodle)**

1. Describe how transport of water vapor through a packaging material occurs and indicate three different ways in which the relative humidity inside the packaging can be controlled.

(6p) / Kuvaile kuinka vesihöyryn kulkeutuminen pakkausmateriaalin läpi tapahtuu ja osoita kolme erilaista tapaa joilla pakkauksen sisäilmatilan kosteuspitoisuutta voidaan hallita. (6 p)

2. You are in charge of selecting a packaging material for a hot food take away packaging.

It has been indicated to you that you need to select a

- a) folding boxboard container with thin bio-PE coating
- b) folding boxboard container with a thin biodegradable coating
- c) a fully compostable molded bagasse container. Indicate your choice and explain the reasoning behind it. (6. p) /

Sinä vastaat pakkausmateriaalivalinnasta kuumalle take away ruualle. Sinulle on ilmoitettu että sinun tulee valita pakkaus seuraavista vaihtoehdoista:

- a) taivekartonkipakkaus jossa on ohut bio-PE päällystys
- b) taivekartonkipakkaus jossa on ohut biohajoava päällystys
- c) täysin kompostoituva kuituvalospakkaus joka on tehty bagassista

Kerro minkä valitsisit ja perustele valintasi. (6 p.)

3. France will ban plastic packaging for a large variety of whole fruit and vegetables from January 2022 in a bid to reduce plastic waste. The ban includes packaging for leeks, courgettes, aubergines, peppers, cucumbers, potatoes and carrots, round tomatoes, onions and turnips, cabbages, cauliflowers, squashes, parsnips, radishes, Jerusalem artichokes,

and root vegetables. Fruits such as apples, pears, oranges, kiwis, lemon, citrus, prunes, melon, pineapples and mango will also no longer be sold in plastic.

Discuss what alternative packaging solutions could appear to replace plastic packaging. Will all the fruits and vegetables be equally impacted by the ban? What consequences can the ban result for the retailers or consumers? (6 p.)

Ranska kieltää muovipakkaukset useille kokonaisille hedelmille ja vihanneksille tammikuusta 2022 lähtien muovijätteen vähentämiseksi. Kielto koskee seuraavia kasviksia: purjo, kesäkurpitsa, munakoiso, paprika, kurkku, peruna, porkkana, pyöreitä tomaatteja, sipulia ja nauriita, kaalia, kukkakaalia, kurpitsaa, palsternakkaa, retiisiä, maa-artisokkaa ja juureksia. Hedelmistä seuraavia: omenoita, päärynöitä, appelsiineja, kiivejä, sitruunaa, sitruksia, luumuja, melonia, ananasta ja mangoa ei myöskään enää myydä muoviin pakattuna.

Keskustele, millaisia vaihtoehtoisia pakkausratkaisuja voisi käyttää korvaamaan muovipakkauksia. Vaikuttaako kielto kaikkiin hedelmiin ja vihanneksiin samoin? Mitä seurauksia kiellolla voi olla vähittäiskauppiaille tai kuluttajille? (6 p.)

4. Sustainability of food packaging is not a simple to define. Discuss different factors that need to be accounted in a thoroughly conducted evaluation. (6 p) /Elintarvikepakkausten kestävyys/ekologisuuden määrittäminen ei ole suoraviivaista. Keskustele eri tekijöistä, jotka pitää huomioida, jotta kattava kestävyysarviointi voidaan tehdä. (6 p.)