HAZARD U HRANI

Katedra za higijenu i tehnologiju namirnica animalnog porekla,
Fakultet veterinarske medicine

BEZBEDNOST

- *"Safety is relative. It is not an inherent biological characteristics of a food. A food may be safe for some people but not for others, safe at one level of intake but not another, or safe at one point in time but not later. Instead, we can define a safe food as one that does not exceed an acceptable level of risk. Decisions about acceptability involve perceptions, opinions, and values, as well as science."*

Nestle M. 2003. Safe Food: Bacteria, Biotechnology and Bioterrorism. Berkeley: University of California Press

"SOUND SCIENCE" – "SCIENCE BASED"

- *"Science is the trump card that we play in disputes about values."*

  Pielke R. and Rayner S. 2004. Editors' introduction. Environmental Science and Policy 7: 355-56

- *"The appeal to –science- will not necessarily resolve disputes. We might assume science speaks a universal language of truth, but it does not. Scientific knowledge is especially contested in such complex domans as human health. Citizens often ask question to which science can have no answers, which simply highlights that scientific risk assessment often are forced to make implicit value judgments to come to a conclusion."*

  Kachatourians, G. 2001. How well understood is the "science" of food safety? In P. Phillips and R. Wolfe (Eds.), Governing Food: Science, safety and trade (pp. 13-23). Montreal: McGill-Queen's University Press

ACTA ABP BIOCHIMICA POLONICA

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285–297
on-line at: www.actabp.pl

Review

Salmonella and cancer: from pathogens to therapeutics*

Paulina Chorobik, Dominik Czaplicki, Karolina Ossysek and Joanna Bereta✉

Department of Cell Biochemistry, Faculty of Biochemistry, Biophysics and Biotechnology, Jagiellonian University in Kraków, Kraków, Poland

Bacterial cancer therapy is a concept more than 100 years old — yet, all things considered, it is still in early development. While the use of many passive therapeutics is hindered by the complexity of tumor biology, bacteria offer unique features that can overcome these limitations. Microbial metabolism, motility and sensitivity can lead to site-specific treatment, highly focused on the tumor and safe to other tissues. Activation of tumor-specific immunity is another important mechanism of such therapies. Several bacterial strains have been evaluated as cancer therapeutics so far, *Salmonella* Typhimurium being one of the most promising. *S.* Typhimurium and its derivatives have been used both as direct tumoricidal agents and as cancer vaccine vectors. VNP20009, an attenuated mutant of *S.* Typhimurium, shows significant native toxicity against murine tumors and was studied in a first-in-man phase I clinical trial for toxicity and anticancer activity. While proved to be safe in cancer patients, insufficient tumor colonization of VNP20009 was identified as a major limitation for further clinical development. Antibody-fragment-based targeting of cancer cells is one of the few approaches proposed to overcome this drawback.

Key words: bacterial cancer therapy, immunotherapy, cancer vaccine, tumor targeting, *Salmonella*, VNP20009

Received: 01 May, 2013; accepted: 26 June, 2013; available on-line: 05 July, 2013

Coley's treatment have been non-reproducible, uncertain, and unpredictable and therefore his therapy often met with strong criticism from the medical community. At the beginning of the 20th century it was gradually displaced by newly developing radiotherapy, which resulted in fast tumor destruction and pain relief, although not necessarily in complete tumor eradication, especially at the stage of advanced, metastatic disease.

With the progress of immunology it became clear that the mechanism of action of Coley's toxin involves activation of the immune system and a multilevel modulation of immune response. This understanding restored interest in possible therapeutic applicability of Coley's approach. Richardson and coworkers (1999) compared the effectiveness of Coley's toxin with contemporary cancer therapies based on published results concerning patients treated with Coley's toxin and matched controls from National Cancer Institute's Surveillance Epidemiology End Result database (Richardson *et al.*, 1999). They found higher rates of ten-year survival of Coley's patients compared to patients subjected to modern treatment in kidney cancer (33 *vs.* 23%), ovarian cancer (55 *vs.* 29%), and sarcoma (50 *vs.* 38%), which gives food for thought. The attempts to re-evaluate Coley's concept are undertaken anew. In 2012 the new phase 1 clinical trial investigating the safety and the dosage of biochemically well-defined and good manufacturing practice (GMP)–compliant Coley's toxin, presently known as MBV

SCIENTIFIC REPORTS

OPEN

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Published: 28 July 2016

Engineering *Salmonella* as intracellular factory for effective killing of tumour cells

Eva María Camacho, Beatriz Mesa-Pereira, Carlos Medina, Amando Flores & Eduardo Santero

Salmonella have many desirable properties as antitumour-agent due to its ability to proliferate inside tumours and induce tumour regression. Additionally, this bacterium can be genetically engineered to deliver therapeutic proteins intratumourally. The main limitation of this approach is the efficient release of therapeutic molecules from intratumoural bacteria. Here we have developed an inducible autolysis system based in the lysis operon of the lambda phage that, in response to anhydrotetracycline, lysates Salmonella thus releasing its content. The system was combined with a salicylate cascade system that allows efficient production of therapeutic molecules in response to aspirin and with a *sifA* mutation that liberates bacteria from the vacuoles to a cytosolic location. The combination of these three elements makes this strain a putative powerful instrument in cancer treatment. We have used this engineered strain for the intracellular production and delivery of Cp53 peptide. The engineered strain is able to sequentially produce and release the cytotoxic peptide while proliferating inside tumour cells, thus inducing host cell death. Our results show that temporal separation of protein production from protein release is essential to efficiently kill tumour cells. The combined system is a further step in the engineering of more efficient bacteria for cancer therapy.

ЗАКОН О БЕЗБЕДНОСТИ ХРАНЕ

"Службени гласник РС", број 41 од 2. јуна 2009, 17 од 14. марта 2019.

V. БЕЗБЕДНОСТ ХРАНЕ И ХРАНЕ ЗА ЖИВОТИЊЕ

1. Општи услови за безбедност хране

Забрана

Члан 25.

Забрањено је стављање у промет хране која није безбедна. Храна није безбедна, ако је штетна по здравље људи и ако није погодна за исхрану људи.

Храна није погодна за исхрану људи, ако је та храна неприхватљива за употребу којој је намењена, због контаминације спољним или неким другим фактором, као и због труљења, кварења или распадања.

ЗАКОН О БЕЗБЕДНОСТИ ХРАНЕ

"Службени гласник РС", број 41 од 2. јуна 2009, 17 од 14. марта 2019.

Храна није безбедна уколико садржи:

1) средства за заштиту биља, биоциде или контаминенте или њихове метаболите или производе разградње изнад максимално дозвољених концентрација;

2) средства за заштиту биља, односно биоциде чија употреба није одобрена или дозвољена;

3) супстанце са фармаколошким дејством или њихове метаболите који се не смеју давати животињама које служе за производњу хране или прекорачују максимално дозвољене количине остатака или нису одобрени или регистровани за примену на животињама које служе за производњу хране или нису одобрени као адитиви у храни за животиње које служе за производњу хране;

4) супстанце са фармаколошким дејством или њихове метаболите код лечених животиња, а да није испоштован прописани период каренце;

5) микроорганизме, вирусе, паразите и њихове развојне облике који представљају опасност за здравље људи;

6) материје (физичке, хемијске, радиоактивне) које саме или заједно са другим материјама прелазе максимално дозвољене вредности и представљају опасност по здравље људи

PRAKSA KOJA GARANTUJE……

3 OSNOVNE OPERACIJE:

1. zaštita od nepoželjne kontaminacije
2. prevencija razvoja neprihvatljive kontaminacije
3. efikasno uklanjanje kontaminacije/kontaminanata

PASTERIZACIJA (TERMIČKA OBRADA)

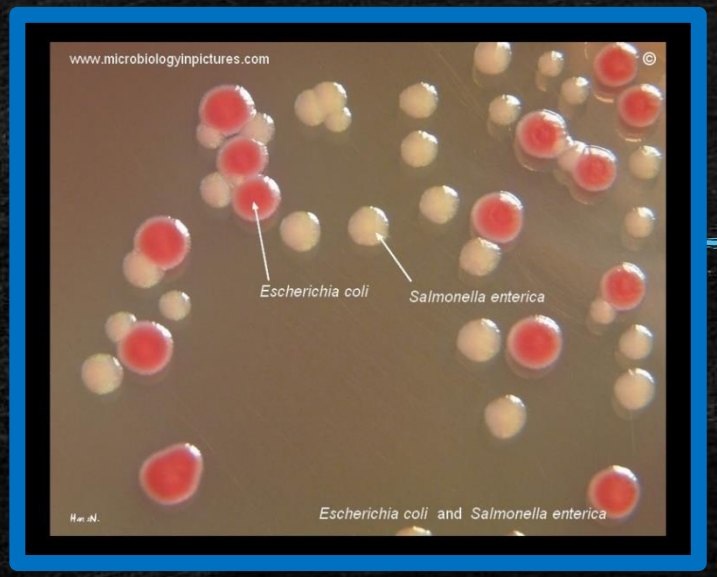
DOBRA HIGIJENSKA PRAKSA

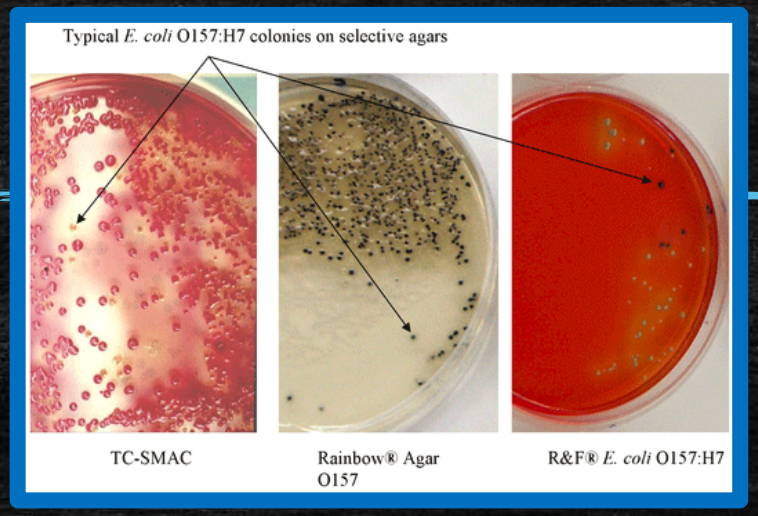
KONTROLA TEMPERATURE

BEZBEDNOST *vs* KVALITET

❖ Bezbednost namirnica - garancija da hrana neće nauditi potrošaču kada se priprema i/ili konzumira u skladu sa planiranom namenom

❖ Većina atributa bezbednosti namirnica se ne može direktno zapaziti, već se zahteva laboratorijska procedura za njihovu detekciju.





BEZBEDNOST *vs* KVALITET

- Atributi kvaliteta se lako zapažaju – gledanjem, mirisanjem, ili jednostavnim merenjem (uočavanje promene senzornih atributa - promene opšteg izgleda, mirisa, ukusa, konzistencije

Definicija HAZARDA

- Biološki, hemijski ili fizički agens ili uslovi u hrani sa potencijalom da izazovu negativne efekte po zdravlje.

(Codex Alimentarius Commission)

- Uslovi ili fizičke situacije sa potencijalom nepoželjnih posledica.

(Society for Risk Analysis)

BIOLOŠKI HAZARD

HEMIJSKI HAZARD

FIZIČKI HAZARD

Definicija RIZIKA

- Situacije koje uključuju izloženost opasnostima.
- Verovatnoća da će se nešto neprijatno dogoditi.

(definicija iz Compact Oxford Dictionary of Current English)

<u>Rizik- definicija koja se koristi u analizi rizika</u>

- Nepovoljan događaj koji se može desiti u budućnosti.

2 komponente:

- verovatnoća da će se događaj desiti,
- posledice događaja koji će se desiti.

Rizik u odnosu na opasnost

- *Opasnost*: nešto sa potencijalnim negativnim uticajem
- *Rizik*: verovatnoća opasnosti, obično procenjena kao kombinacija verovatnoće i posledica specificiranog hazarda koji je realizovan

J Environ Sci Health B. 2017 Dec 2;52(12):864-870. doi: 10.1080/03601234.2017.1361764. Epub 2017 Sep 26.

Enterotoxin production and antimicrobial susceptibility in Staphylococci isolated from traditional raw milk cheeses in Serbia.

Bulajic S[1], Colovic S[2], Misic D[3], Djordjevic J[1], Savic-Radovanovic R[1], Asanin J[3], Ledina T[1].

Author information

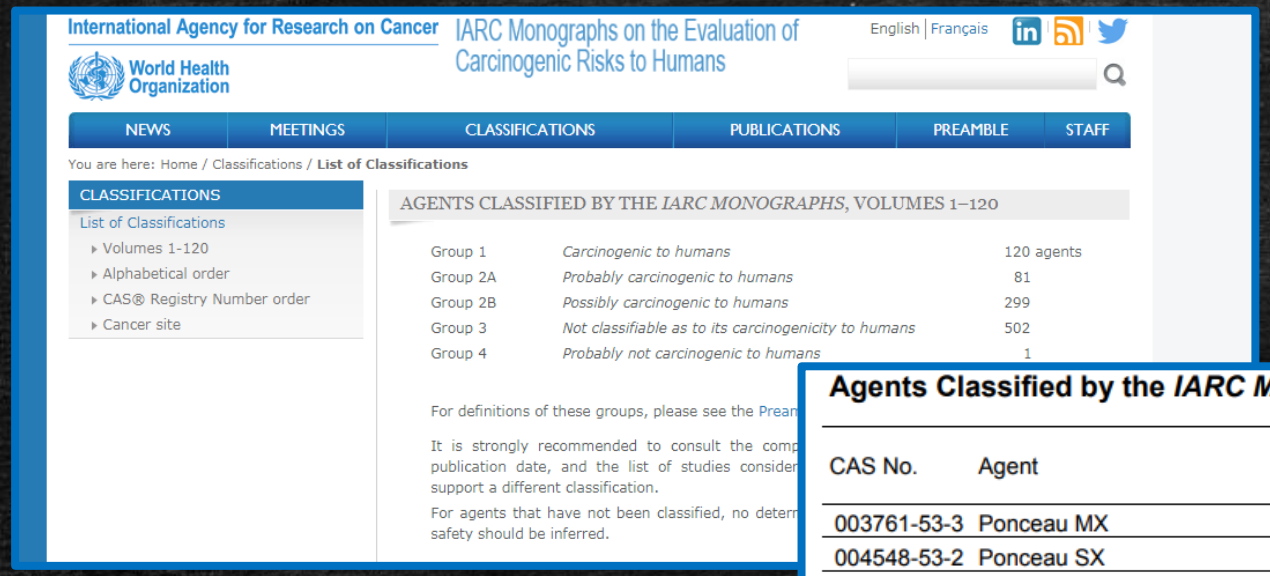
Abstract

This study was undertaken to determine the prevalence of coagulase positive staphylococci (CPS) by examining a total of 71 raw milk cheeses. Additionally, enterotoxigenicity, antimicrobial susceptibility and the presence of mecA and mecC genes in the staphylococcal isolates were investigated. The isolation and enumeration procedure of CPS followed the International Organization for Standardization (ISO) standard. The presumptive staphylococci were identified by matrix-assisted laser desorption ionization-time of flight mass spectrometry (MALDI-TOF MS) using the VITEK MS system. VIDAS® Staph enterotoxin II assay was used for the detection of classical enterotoxins. Antimicrobial susceptibility testing (AST) was accomplished performing the disk diffusion method. All suspected methicillin resistant staphylococci were investigated for the presence of mecA and mecC genes by PCR assay. A high prevalence (87.32%) of CPS was detected in the cheeses at contamination levels up to 5.58 log CFU g^{-1}. Among 47 staphylococcal isolates screened for enterotoxin production, only one isolate, identified as S. hyicus, was confirmed as being enterotoxigenic. Resistance to penicillin (63.70%) was the most common resistance among the tested Staphylococcus aureus isolates. The dominant phenotypic resistance patterns in coagulase negative staphylococci (CNS) were resistance to ofloxacin and fusidic acid. All CNS isolates were susceptible to the clinically important antibiotics clindamycin, chloramphenicol, gentamicin, linezolid, rifampicin and trimethoprim-sulfamethoxazole. The mecA and mecC genes were not detected. To the best of our knowledge, this is the first study concerning evaluation of the presence of methicillin resistant staphylococci (MRS) in dairy products in Serbia.

KEYWORDS: Antimicrobial resistance; Serbian raw milk cheeses; enterotoxin production; staphylococci

PMID: 28949803 DOI: 10.1080/03601234.2017.1361764

[Indexed for MEDLINE]



Agents Classified by the *IARC Monographs*, Volumes 1–120

CAS No.	Agent	Group	Volume	Year[1]
003761-53-3	Ponceau MX	2B	8, Sup 7	1987
004548-53-2	Ponceau SX	3	8, Sup 7	1987
023746-34-1	Potassium bis(2-hydroxyethyl)dithiocarbamate	3	12, Sup 7	1987
007758-01-2	Potassium bromate	2B	Sup 7, 73	1999
002955-38-6	Prazepam	3	66	1996
029069-24-7	Prednimustine	3	50	1990
000053-03-2	Prednisone	3	26, Sup 7	1987
000125-33-7	Primidone	2B	108	2016
	Printing inks	3	65	1996
	Printing processes (occupational exposures in)	2B	65	1996
000366-70-1	Procarbazine hydrochloride (NB: Overall evaluation upgraded to Group 2A with supporting evidence from other relevant data)	2A	26, Sup 7	1987
	Processed meat (consumption of)	1	114	In prep.

001402-68-2	Aflatoxins	1	56, 82, 100F, Sup 7	2012
006795-23-9	Aflatoxin M1	2B	56	1993
002757-90-6	Agaritine	3	31, Sup 7	1987
	Alcoholic beverages	1	44, 96, 100E	2012

BIOLOŠKI HAZARD

- Bakterije, virusi, kvasci, plesni i paraziti

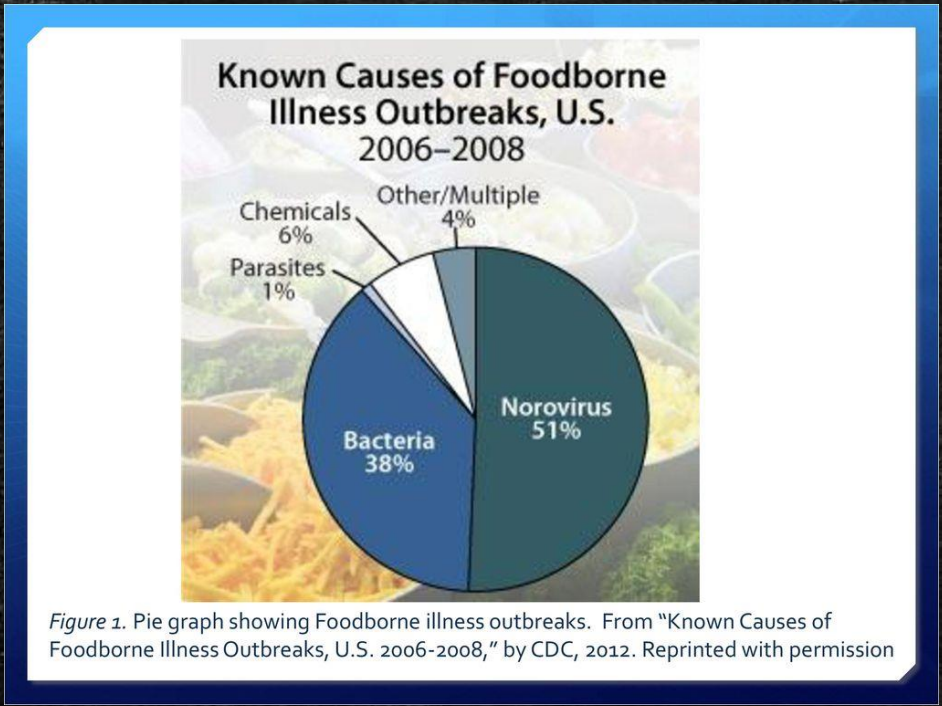


Figure 1. Pie graph showing Foodborne illness outbreaks. From "Known Causes of Foodborne Illness Outbreaks, U.S. 2006-2008," by CDC, 2012. Reprinted with permission

1) korisni

2) MO kvara

3) patogeni

Common Foodborne Bacteria

- *Bacillus cereus*
- *Campylobacter* spp.
- *Clostridium botulinum*
- *Clostridium perfringens*
- *E. coli*
- *Listeria monocytogenes*
- *Salmonella* spp.
- *Staphylococcus aureus*
- *Yersinia enterocolitica*

BIOLOŠKI HAZARD - bakterije

OBOLJENJA PRENOSIVA HRANOM

- **UZROČNICI:**

i. **Alimentarne infekcije**
(*Salmonella* spp., *Listeria monocytogenes, Campylobacter jejuni, Vibrio parahaemolyticus, Vibrio vulnificus*, *Yersinia enterocolitica*)

ii. **Alimentarne intoksikacije**
(*Bacillus cereus –emetični toksin, Staphylococcus aureus, Clostridium botulinum)*

iii. **Alimentarne toksoinfekcije**
(*Clostridium perfringens, STEC, Bacillus cereus - enterotoksini*)

GDE PATOGENI "ŽIVE"

Primarni habitat zemljište:
- ✓*Listeria monocytogenes*
- ✓*Bacillus cereus*
- ✓*Clostridium perfringens*
- ✓*Clostridium botulinum*

"Stanovnici" intestinalnog trakta životinja:
- *Salmonella* vrste
- *E. coli* O157:H7
- *Campylobacter jejuni*
- *Yersinia enterocolitica*

USLOVI

- For a **foodborne illness** to occur, the following conditions must be present:
- The microorganism or its toxin must be present in food.
- The food must be suitable for the microorganism to grow.
- The temperature must be suitable for the microorganism to grow.
- Enough time must be given for the microorganism to grow (and to produce a toxin).
- The food must be eaten.

SCIENTIFIC REPORT

EFSA Journal

APPROVED: 12 November 2021

doi: 10.2903/j.efsa.2021.6971

The European Union One Health 2020 Zoonoses Report

European Food Safety Authority
European Centre for Disease Prevention and Control

Abstract

This report of the EFSA and the European Centre for Disease Prevention and Control presents the results of zoonoses monitoring activities carried out in 2020 in 27 EU Member States (MS) and nine non-MS. Key statistics on zoonoses and zoonotic agents in humans, food, animals and feed are provided and interpreted historically. Two events impacted 2020 MS data collection and related statistics: the Coronavirus Disease 2019 (COVID-19) pandemic and the withdrawal of the United Kingdom from the EU. In 2020, the first and second most reported zoonoses in humans were campylobacteriosis and salmonellosis, respectively. The EU trend for confirmed human cases of these two diseases was stable (flat) from 2016 to 2020. Fourteen of the 26 MS reporting data on *Salmonella* control programmes in poultry met the reduction targets for all poultry categories. *Salmonella* results for carcases of various species performed by competent authorities were more frequently positive than own-checks conducted by food business operators. This was also the case for *Campylobacter* quantification results from broiler carcases for the MS group that submitted data from both samplers, whereas overall at EU level, those percentages were comparable. Yersiniosis was the third most reported zoonosis in humans, with 10-fold less cases reported than salmonellosis, followed by Shiga toxin-producing *Escherichia coli* (STEC) and *Listeria monocytogenes* infections. Illnesses caused by *L. monocytogenes* and West Nile virus infections were the most severe zoonotic diseases with the highest case fatality. In 2020, 27 MS reported 3,086 foodborne outbreaks (a 47.0% decrease from 2019) and 20,017 human cases (a 61.3% decrease). *Salmonella* remained the most frequently reported causative agent for foodborne outbreaks. *Salmonella* in 'eggs and egg products', norovirus in 'crustaceans, shellfish, molluscs and products containing them' and *L. monocytogenes* in 'fish and fish products' were the agent/food pairs of most concern. This report also provides updates on tuberculosis due to *Mycobacterium bovis* or *Mycobacterium caprae*, *Brucella*, *Trichinella*, *Echinococcus*, *Toxoplasma*, rabies, *Coxiella burnetii* (Q fever) and tularaemia.

Keywords: *Campylobacter*, foodborne outbreaks, *Listeria*, monitoring, parasites, *Salmonella*, zoonoses

Requestor: European Commission

Question number: EFSA-Q-2020-00787

Correspondence: zoonoses@efsa.europa.eu

Historijat

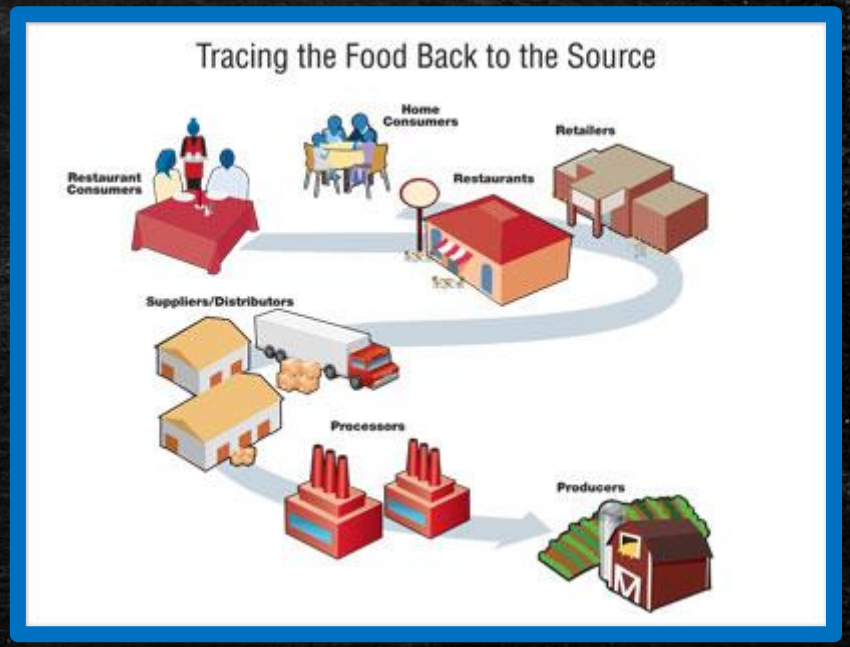
- Rane 1900's
  - Kontaminirana hrana i voda uzrok
- Sanitarna revolucija
  - Tretman pijaće vode, uspostavljanje kanalizacije
  - Važnost pranja ruku i sanitacije prostora
  - Pasterizacija mleka (1864.) – 1908
  - Hlađenje (frižideri) u domaćinstvima -1913
  - Životinje se identifikuju kao izvori

Transmisija

- Oralni put
- Način kontaminacija varira
  - organizam,rezervoar,rukovanje/ procesiranje,unakrsna kontaminacija
- Ljudi kao rezervoar
  - norovirusi, *Campylobacter, Shigella*
- Životinje kao rezervoar
  - *Campylobacter*, *Salmonella*, *E. coli* 0157:H7, *Listeria*

Kontaminacija

- Kroz lanac hrane – nekoliko mesta
  - Farma
  - Mlekara/Klanica
  - Proizvodni proces
  - Promet
  - Domaćinstvo



VIRUSI
PARAZITI

- **NOROVIRUS**
- SAPOVIRUS
- ENTEROVIRUS
- HEPATOVIRUS (HEPATITIS A VIRUS)
- ASTROVIRUS
- ROTAVIRUS

- PROTOZOA:
  - ✓ *Cryptosporidium* sp.
  - ✓ *Cyclospora cayetanensis*
  - ✓ *Entamoeba histolytica*
  - ✓ *Giardia* sp.
  - ✓ *Toxoplasma gondi*
  - ✓ *Cystoisospora belli*
- NEMATODE:
  - ✓ Anisakis
  - ✓ Trihinela

HEMIJSKI HAZARDI

- biološki toksini – mikotoksini (aflatoksini, ohratoksin, zearalenon..
- zagađivači okoline (environmental contaminents) - teški metali, dioksini
- deterdženti i sredstva za sanitaciju
- praksa u poljoprivredi: pesticidi, herbicidi i insekticidi
- aditivi, pomoćna sredstva i boje koje nisu dozvoljene
- rezidue veterinarskih lekova
- kontaminanti predstavljeni kroz proces proizvodnje (akril amid)
- kontaminanti poreklom "food-contact" materijala (plastične mase)

FIZIČKI HAZARD

Komadići stakla, metalni oprljci, nokti,nakit,delovi mašine, delovi plastike

Ništa nije škodljivo, i sve je škodljivo, sve je pitanje doze. *SOLA DOSIS FACIT VENENUM.*
KLOD BERNAR

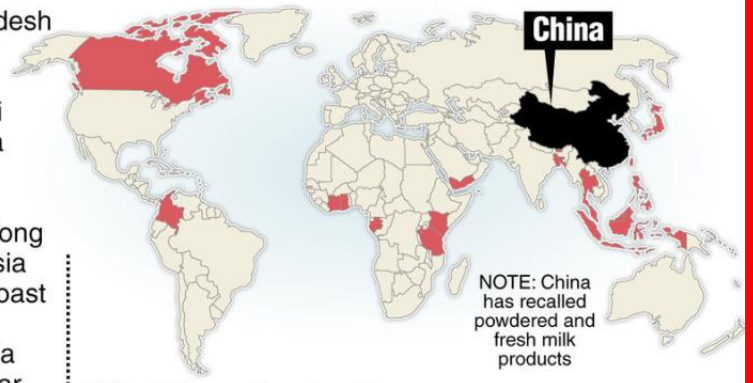
CHINESE MILK SCANDAL 2008.

Banned dairy from China

Countries are banning and recalling Chinese dairy imports, fearing melamine-tainted milk has made its way to their markets.

Countries that have banned or recalled Chinese dairy products

- Bangladesh
- Bhutan
- Brunei
- Burundi
- Canada
- Gabon
- Ghana
- Hong Kong
- Indonesia
- Ivory Coast
- Japan
- Malaysia
- Myanmar
- Philippines
- Singapore
- Taiwan
- Tanzania
- Yemen



What is melamine?

- Used as filler substance in tainted baby formula; when testing for nutritional value melamine shows up as a protein, product appears more nutritious
- Not toxic, but causes kidney stones and renal failure

Source: AP, Reuters Graphic: Melina Yingling © 2008 MCT

ALERGENI

REGULATIVA (EU) 1169/2011 propisuje **obavezno označavanje** prisustva najznačajnijih nutritivnih alergena

Velikih osam alergena

Kikiriki
Koštunjavo voće – orašasti plodovi (bademi, orasi, lešnici)
Mleko
Jaja
Soja
Riba
Ljuskari (jastog, kraba...)
Brašno

Правилник о декларисању, означавању и рекламирању хране

("Службени гласник РС", бр. 19 од 8. марта 2017, 16 од 5. марта 2018, 17 од 28. фебруара 2020.)

- Обавезно је означавање у списку састојака и додатно наглашавање употребом: другачијег фонта, који се јасно разликује од фонта којом су наведени остали састојци, другачијег стила или боје позадине;
- Није потребно наводити алерген ако назив хране јасно упућује на тај састојак (пшенично брашно, јогурт, маслац,...);
- Угоститељски објекти, приликом презентације хране коју нуде крајњем потрошачу, пре конзумације, треба да истакну све потребне информације о присутности састојака хране који могу да изазову алергије и/или интолеранције

Правилник о декларисању, означавању и рекламирању хране

("Службени гласник РС", бр. 19 од 8. марта 2017, 16 од 5. марта 2018, 17 од 28. фебруара 2020.)

- У Прилогу 1 Правилника дати су састојци који могу да изазову алергије и/или интолеранције
- 1) житарице које садрже глутен, тј. пшеница, раж, јечам, овас и варијетети добијени њиховим укрштањем, као и производи од тих житарица
- 2) љускари (ракови) и производи од љускара;
- 3) јаја и производи од јаја;
- 4) риба и производи рибарства
- 5) кикирики и производи од кикирикија;
- 6) соја и производи од соје

- 7) млеко и производи од млека (укључујући лактозу)
- 8) језграсто воће: бадем (Amygdalus communis L.), лешник (Corylus avellana), орах (Juglans regia), индијски орах (Anacardium occidentale), пекан орах (Carya illinoiesis), бразилски орах (Bertholettia excelsa), пистаћ (Pistacia vera), макадамиа орах и Queensland орах (Maccadamia ternifolia) и њихови производи
- 9) целер и производи од целера;
- 10) слачица и производи од слачице;
- 11) семе сусама и производи од сусама;
- 12) сумпор-диоксид и сулфити у концентрацијама већим од 10 mg/kg или 10 mg/l изражено као SO2
- 13) лупина и производи од лупине;
- 14) шкољкаши и остали мекушци и њихови производи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QUESTIONS
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