IB
Hazard identification and prevention

Teacheesy

Farmhouse and Artisan Cheese & Dairy Producers European Network

Erasmus+

Hazard Analysis

Hazards can originate from environment, farming, processing.

- **Chemical hazards**
- **Physical hazards**
- **Microbiological hazards**

Chemical hazards

- Additives, enzymes and other ingredients
- **Allergens**
- **Antibiotics, other veterinary medicines and biocides**
- Pesticides
- Detergent and disinfectant residues
- Dioxins and PCBs
- Heavy metals
- Aflatoxin M1
- Various like migration from food contact materials, smoke, …

Most significant for farmhouse and artisan cheese and dairy production

Allergens

Image source: eufic.org

Allergens

Hazard:

- Presence of allergens may pose a significant risk to consumer health

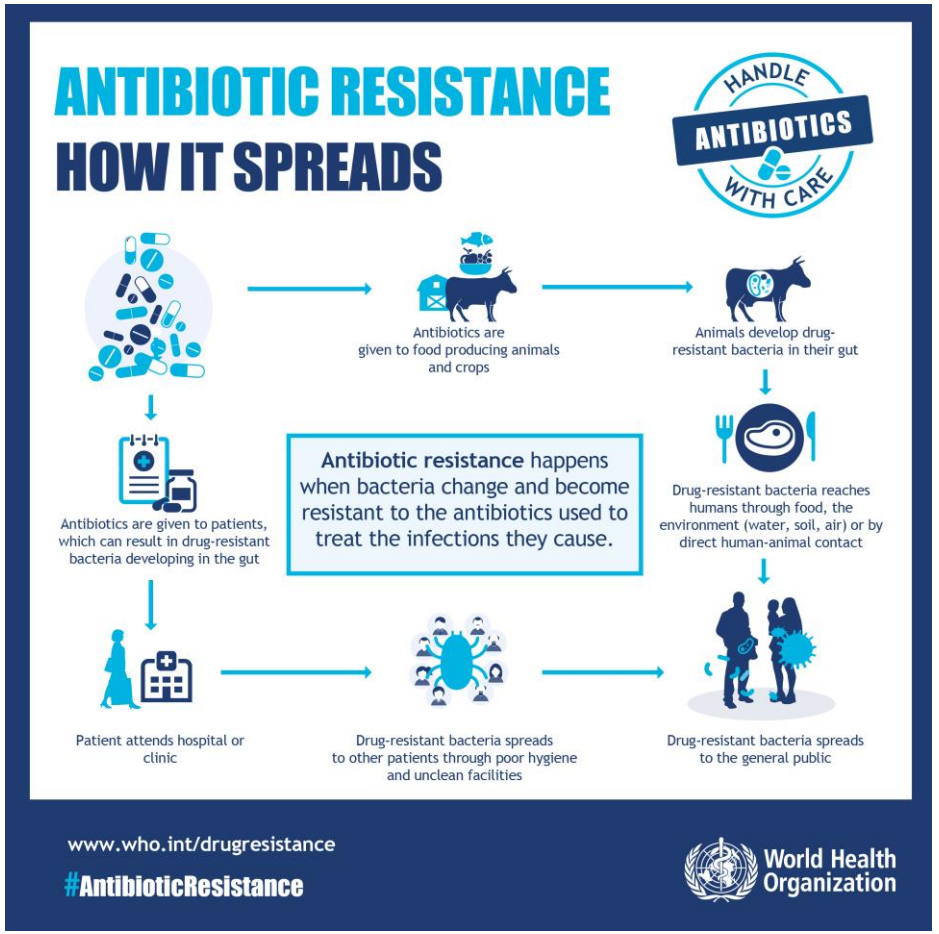
Preventive measures:

- Evaluate ingredients for the presence of allergens
- Presence of allergenic ingredients, including milk, must be declared in line with EU 1169/2011
- Attention: sometimes the presence of an allergen in an ingredient or additive is no so obvious like lysozyme from egg

Antibiotics, other veterinary medicines and biocides

Image source: Delaval

Image source: dvm360.org



Antibiotics, other veterinary medicines and biocides

Hazards:

- Milk contaminated with residues from veterinary medicines, including antibiotics and parasite treatment can pose a risk to human health
- Antibiotics may inhibit growth of starter cultures

Preventive measures:

- Use authorised medicines, follow instructions for use carefully
- Milk treated animals separately and exclude this milk from the food chain

Physical hazards

Most significant for farmhouse and artisan cheese and dairy production

Foreign bodies:

- **Glass**, wood, plastic and **metal** from equipment and premises
- Miscellaneous foreign bodies: from teats during milking, from personnel and visitors (like buttons, jewelry, coins, pens, hair, nail varnish, …)

Foreign bodies: glass, plastic and metal from equipment and premises

Foreign bodies: glass, plastic and metal from equipment and premises

Hazard

- Splinters or fragments from damaged equipment or broken items pose a serious risk to human health.
- (Fragments of) packaging from starter cultures and other ingredients may pose a choking hazard.

Preventive measures

- Maintain premises and equipment in good condition.
- Check whether glass and metal components are intact before and after production.
- Glass breakage should be recorded and production suspended while breakage is cleaned up. Potentially contaminated product should be destroyed. Protective clothing should be changed after cleaning up glass breakage.
- Dispose of packaging material of starter cultures and other ingredients immediately after use.

Microbiological hazards

- ***Brucella* spp** (except *B. ovis* which is not pathogenic for humans)
- ***Mycobacterium bovis*** and ***M. tuberculosis***
- Shigha toxin-producing *Escherichia coli* (STEC, also known as VTEC)
- ***Listeria monocytogenes***
- ***Salmonella* spp**
- **Enterotoxins produced by Coagulase positive *Staphylococci***
- Viruses
- *Camplylobacter*

Most significant for farmhouse and artisan cheese and dairy production

Brucella spp (except *B. ovis* which is not pathogenic for humans)

- *Brucella* is agent for brucellosis, an infectious disease
- Main reservoirs of *Brucella* are
  - Cattle (*B. abortus*)
  - Sheep and goat (*B. melitensis*)
  - Domestic swine (*B. suis*)
- Human infection can occur by
  - Consuming contaminated food (raw milk, raw milk products)
  - Contact with infected animals

Brucella spp (except *B. ovis* which is not pathogenic for humans)

Legislation:

- 853/2004: specific hygiene rules
- National regulations for surveillance of animals
- National programmes to prevent human brucellosis (prevention and eradication of infection among lifestock)

Preventive measures:

- Use only milk for brucellosis-free herds or farms
- Milk of healthy animals from not officially brucellosis-fee herds must be treated to ensure its safety in accordance with 853/2004 and with approval of the competent authority

Mycobacterium bovis and *M. tuberculosis*

- *M. tuberculosis* causes human tuberculosis
- Main reservoirs of *M. tuberculosis* are:
  - Humans and primates and occasionally other mammals
- Main reservoirs of *M. bovis* are:
  - Cattle, goats, pigs

- Human infection can occur by inhalation of contaminated aerosols or infected dust, infection of wounds, ingestion of raw or insufficiently heat-treated milk.

Mycobacterium bovis and *M. tuberculosis*

Legislation:

- 853/2004: specific hygiene rules
- National regulations for surveillance of animals
- National programmes to prevent human tuberculosis (prevention and eradication of infection among livestock)

Preventive measures:

- Use only milk from tuberculosis free herds
- Milk of healthy animals from not tuberculosis-fee herds must be treated to ensure its safety in accordance with 853/2004 and with approval of the competent authority

Listeria monocytogenes

- Some species of *Listeria* are pathogenic to humans, *L. monocytogenes* in particular. Listeriosis can leave permanent damage and lead to death.
- *Listeria* can be found in soil, forage and fermented forage, ...
- *Listeria* can form biofilms (difficult to eradicate).
- *Listeria* are excreted in faeces of animals and contaminate the environment.

- Infection by ingestion of contaminated foodstuff.
- Contamination of milk due to unclean teats or milking area.
- Contamination of cheese making premises by movement of people, equipment, milk or products.

Listeria monocytogenes

Legislation:

- Regulation (EC) 2073/2005:
  - When Listeria can grow: absent in 25 g of product (before leaving the immediate control of the producer).
  - When Listeria can not grow: <100 / g of product during shelf life of product.
  - Environmental monitoring when product poses *Listeria* risk for public health

Preventive measures:

- Control quality of feed (from harvesting to distribution)
- Follow GHP measures in section II and IV of the Guide

Salmonella spp.

- *Salmonella* can cause salmonellosis, one of the main gastroenteric diseases in developed countries.
- Main reservoirs: tract of mammals (swine, cattle) and birds, rodents and reptiles.
- *Salmonella* present in animal faeces can contaminate pastures, soil and water.

- Infection by ingestion of contaminated foodstuffs.
- Contamination of milk by unclean teat and milking areas.
- Contamination of dairy products by milk, handling by asymptomatic carriers or through contaminated water.

Salmonella spp.

Legislation:

- Regulation (EC) 2073/2005: absent in 25 g of cheese, butter and cream made of raw milk or milk treated at lower temperature than pasteurisation, and likewise for ice creams, excluding products where the manufacturing process or product composition will eliminate the *Salmonella* risk.

Preventive measures:

- Isolate animals that are clinically ill
- Prevent spreading the bacteria (adapted system for manure)
- Protect water and feed from faecal contamination
- Control vermin and birds that can excrete *Salmonella*
- Follow the GHP measures in section II and IV of the Guide

Enterotoxins produced by Coagulase-Positive Staphylococci (including *S. aureus*)

- Coagulase-positive staphylococci can form enterotoxins in food when their level exceeds 10^5-10^6 cfu/g
- Staphylococcal enterotoxins are heat resistant proteins.
- Staphylococci are resident on skin, mucosa and nasopharynx of warm-blooded animals (mammals, birds) including humans.
- Coagulase producing staphylococci are one of the bacteria that are responsible for clinical and subclinical mastitis.
- Contamination of milk through infected animals, teats, hands of the milker, milking equipment.

Enterotoxins produced by Coagulase-Positive Staphylococci (including *S. aureus*)

Legislation:

- Regulation (EC) 2073/2005: process hygiene criterion for number of staphylococci at the point where number is expected to be at its highest.
- Regulation (EC) 2073/2005: food safety criterion: when number of staphylococci exceeds 10^5cfu/g check for toxins is needed.

Preventive measures:

- Control and monitor of veterinary hygiene
- GHP measures in section II and IV of this Guide

Summary: Hazards identified as most significant for farmhouse and artisan cheese and dairy production

Chemical

- Allergens
- Antibiotics, other veterinary medicines and biocides

Physical

- Glass foreign bodies
- Metal foreign bodies

Microbiological

- *Brucella spp*
- *Mycobacterium bovis and M. tuberculosis*
- *Listeria monocytogenes*
- *Salmonella* spp
- Enterotoxins produced by Coagulase positive *Staphylococci*

Tools available for this section

2.1 Power Point 'Are there microbes in my dairy?'
2.6 Power Point Chemical hazards
2.7 Power Point Physical hazards