Protecting the Middle East Food Supply from Intentional Contamination, Cairo 29-31/01/08

Chemical and microbiological hazards in human food, introduced maliciously through animals in the farms

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Public health problems that can arise from animal feed

- These can be divided into three groups:
  - Microbiological

  - Chemical

  - Radioactive

Public health problems that can arise from animal feed

- These agents can be present in the animal feed:
  - Coincidentally
  - Introduced by men
    - Unintentionally
    - Intentionally

Governments' responsibility

- Coping of the state with threats of unsafe food for human consumption is mainly preventive and responsive.

Prevention

- The prevention is built on changes that have to be effectuated in the farms in order to minimize the risk of animals' food contamination.

Response to an event

- The response is built on constant monitoring and preparedness in case of an event, including the minimization of panic and thrust loss of the public.

Most efforts

- Should be based upon preparedness and prevention rather than reaction after detection of the problem.

Factors which influence the risk of contamination of human food through animal feeds:

Microbiological hazards

- Prevalence and availability;
- Virulence to human;
- Survivability;
- Possibility of reproduction in the animal feed;
- Possibility of reproduction or presence within the animal with no manifestation of symptoms in the animal;

Factors which influence the risk of contamination of human food through animal feeds:

- Prevalence and availability;
- Toxicity to human;
- Resistance in the environment;
- Agent characteristics;
- Lack of organoleptic or visual changes;
- Possibility of presence within the animal with no manifestation of symptoms in the animal;

Feeds and feed ingredients that can be problematic:

- Complete feeds

- Grains and oilseeds

- Forage, including grasses, hay and silage

Feeds and feed ingredients that can be problematic:

- Vitamins and minerals

- Animal by products
  (meat and bone meals)

- Veterinary drugs and growth promoters

Toxicants in water:

- Water from the main source of water (usually not problematic).
- Water stored in tanks – can be hazardous.

- Salts of heavy metals can be accumulated in the final product (meat) and can put in danger public health (cadmium, thallium, lead or mercury).

Toxicants in feeds: where can the feed be contaminated?

- Seeds and hay:
  - Field
  - Storage
  - Transportation
  - Farm

Toxicants in feeds:

- Feeds additives:
  - Introduction (by mistake or maliciously) of wrong element or wrong quantity of the element in the feed.
  - Changing labels of additives.
  - Wrong calculation in addition of the elements.
  - Usually the feed additives are visually similar (white powder) thus the addition of a wrong additive can be missed.

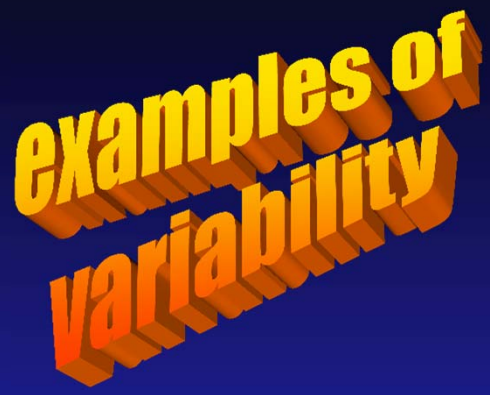
Agent toxicity:

- Acute poisoning - Clinical symptoms which can sometimes lead to death.
- Chronic intoxication manifested (in human) with changes that are difficult to lead to a diagnosis of the agent (psychological and behavioral changes, cancer, teratogenicity, etc).

Agent toxicity:

- The longer is the time from the ingestion of the poison to the appearance of the clinical symptoms, the harder is to find the source of the poisoning.

Agent characteristics:



- Methyl mercury can be accumulated in all the fatty tissues of the animals, targeted for human consumption.
- Insecticides such as organophosphates and carbamates, which are very poisonous, are decomposed very quickly, and it is hard to believe that they will appear in animal products without clinical symptoms in the animals.

Clinical susceptibility of the animal:

- Toxicants that will warn about the intoxication of the animal (organophosphates, carbamates).
- Toxicants that can put in danger animal products without appearance of clinical symptoms in the animals (aflatoxins in milk).

Ensuring safe feed is an important component of efforts to reduce and prevent food safety hazards

- Applying valid methods for decontamination, disinfection and cleaning.
- Developing rapid and economic analytical methods for screening feed and its components.

Ensuring safe feed is an important component of efforts to reduce and prevent food safety hazards

- Notification of the competent authorities in any case of suspicion or revelation.
- Training regulators, inspectors, feed and livestock industry personnel and farmers to produce and use safe feed.
- Meeting international standards and guidelines.

Laboratory diagnosis:

- No single laboratory examination for all the toxicants.

Because of the increasing threat of terror

The Veterinary Services decided to prepare themselves against bio-terror in human food, through farm animals in an effort to prevent bioterror in human food through farm animals.

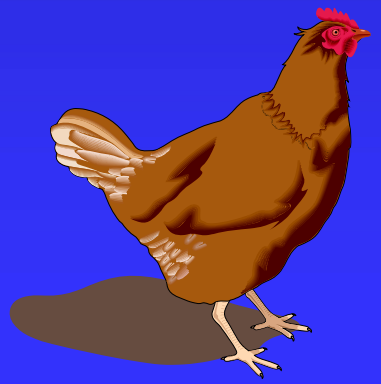
Preparations

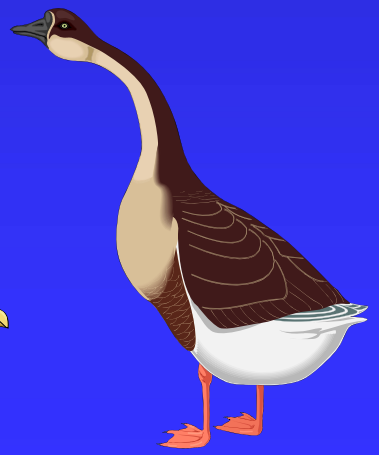
- Through 2002-2004
  - Meetings with experts from:
    - Veterinary Services
    - Kimron Veterinary Institute
    - Field
    - Poultry labs

Instructions to farmers

- **Mammals**

- **Poultry**



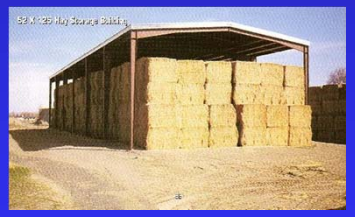


Instructions to farmers

- **Acquisition of animals**

- **Acquisition of feedstuff**

- **Storage of feedstuff**



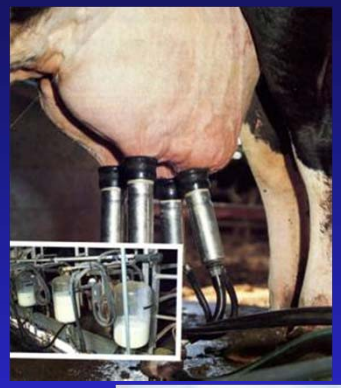
- **Preparation of feedstuff and its distribution**

Instructions to farmers – cont.

- **The feeders**
- **Drinking water**
- **Bedding, chemicals**
- **Ventilation apertures**

Instructions to farmers – cont.

- **Routine of milking**



- **Transportation of milk**

- **Collection of eggs**

Instructions to farmers – cont.

- **The farm area**

- **Transportation of animals to slaughter**

- **Personnel**

Acquisition of animals

Acquisition of animals

- Only from farms under veterinary inspection
- Possibility of animal identification
- Transfer of animals – only with state permit
- Qualified transporters only
- In time of early warning- the transfer of animals should be with a health certificate signed by a veterinarian

Acquisition of feeds

Acquisition of feeds

- Only from authorized traders
- Certificate with the feed's ingredients and their quantities
- The preparation of silage has to be under supervision.
- In case of early warning – feeds examination according to the Veterinary Services instructions.

Feeds’ storage area

Feeds' storage area

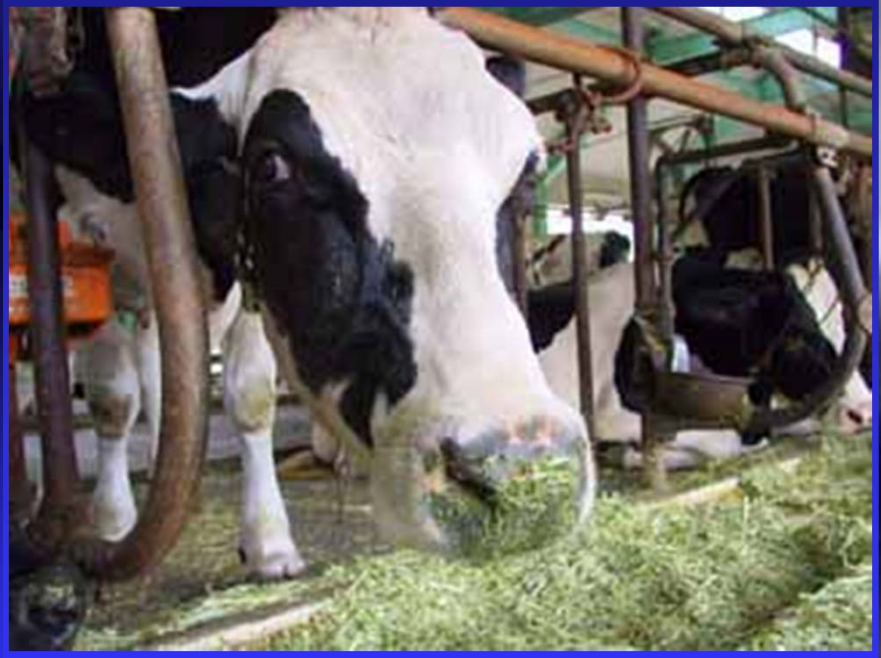
- Fencing of minimum 2 meters height and locking the feeds' storage area
- Locking of feed containers
- In case of early warning – lights, guarding and cameras in the area
- Access of strangers to the feeds should be avoided

Preparation of feedstuff and its distribution

Preparation of feedstuff and its distribution

- Examination of the feeds to suspected findings
- The preparation and distribution of feeds – only by a reliable worker
- Examination of the mixer to suspect findings before the feed mixing
- In case of early warning – constant supervising of the mixing machine during the mixing and distribution

The feeders



The feeders

- Examination of the feeders prior to the feed distribution
- In case of early warning – multiple distribution of small amounts of feeds

Drinking water

Drinking water

- Authorized supplier of water only in closed pipes
- Examination of the water through at least once daily
- Examination of water containers at least once a week. It is necessary to empty the water containers every two weeks and to ensure their locking
- In case of early warning – water tests according to Vet. Ser. instructions

The bedding

The bedding

- Authorized supplier only
- Examination of the wholeness of the packaging
- Awareness to suspected particles un the bedding such as lead or other metals

Disinfectants, cleaning products, pesticides and medications

Disinfectants, cleaning products, pesticides and medications

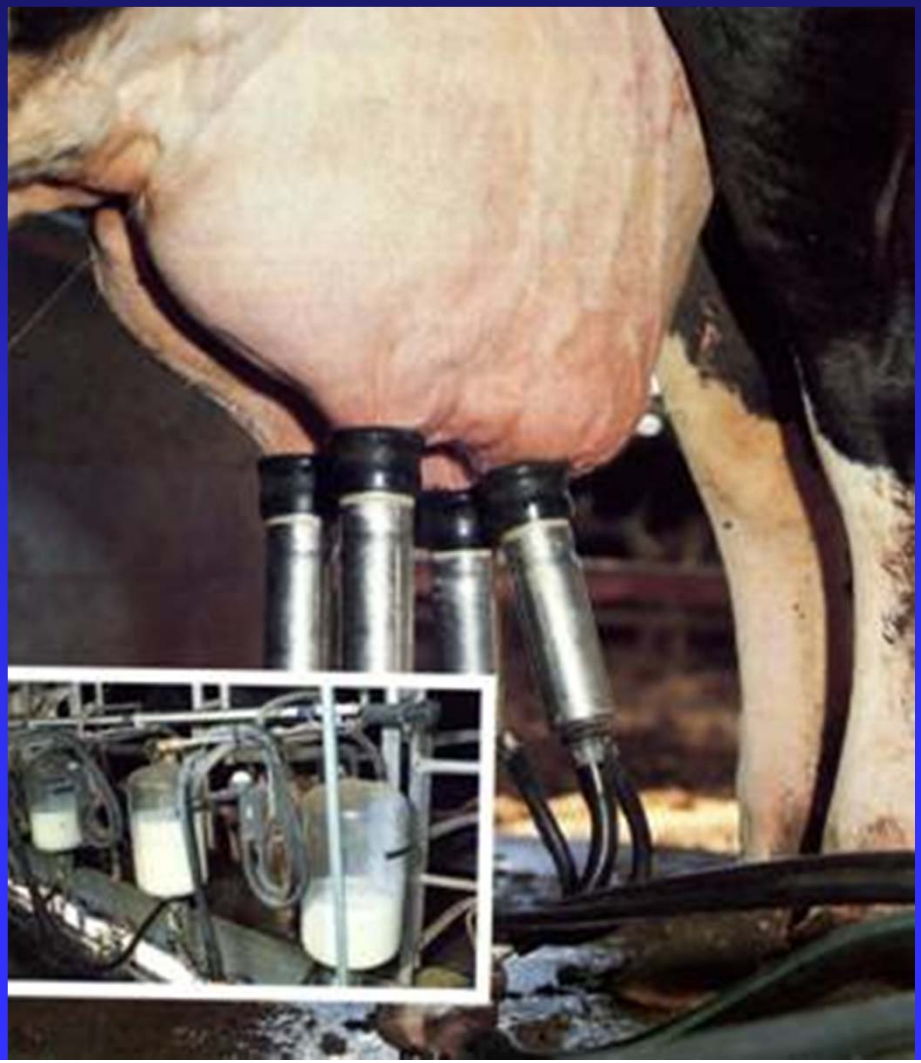
- Acquisition – only from authorized sources
- Examination of the wholeness of the packaging
- Only authorized personnel can use these products
- Label instructions must be followed
- These products have to be locked

Ventilation apertures (poultry)

Ventilation apertures (poultry)

- **Prevention of strangers access to the ventilation apertures**

Milking procedure



Milking procedure

- Hygienic milking and prevention of microbes entry into the udder
- Locking of the milk tank and prevention of access to unauthorized people
- Locking of the milking area when nobody is there. Cameras.
- The transfer of the milk from the tank to the milk-truck under reliable supervision
- Control of tank temperature and microorganisms count

Milk transport

Gary Morton Collection

Milk transport

- Locking of the tanker and avoiding access clock round
- Supervising of the tanker while stopping on the way
- Temperature control of the tanker

Eggs

Eggs

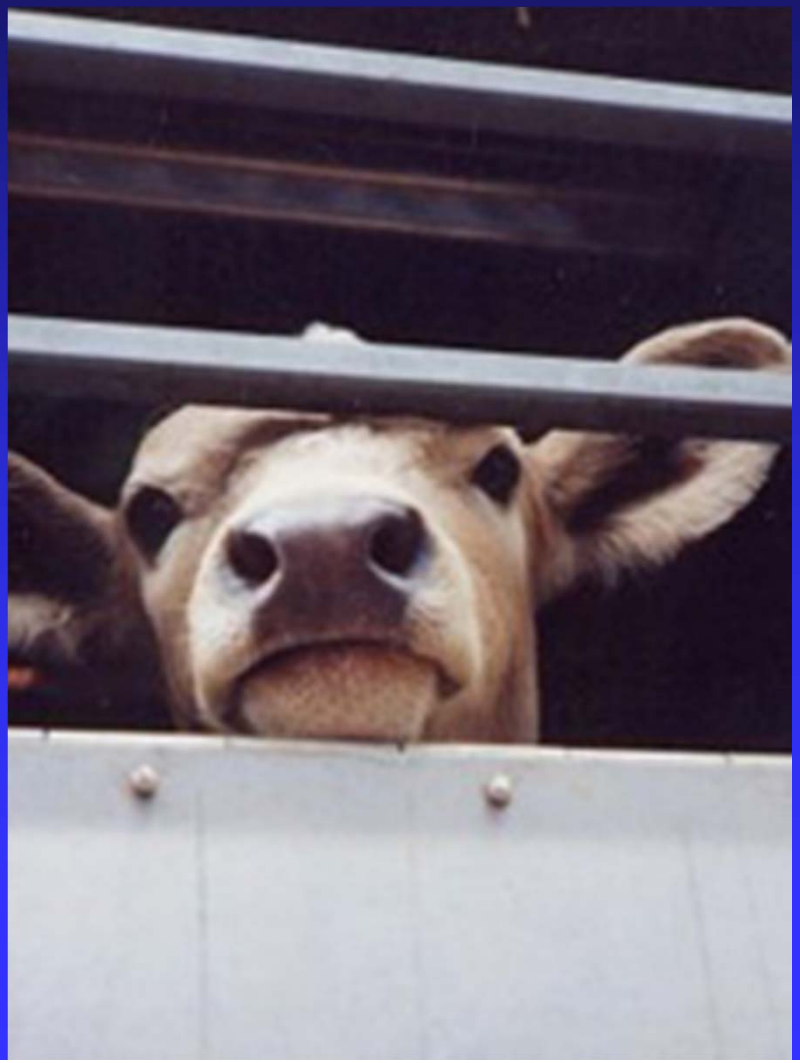
- **The collection of the eggs – by qualified personnel only**
- **Access of strangers to the egg storage location should be avoided.**

The farm area

The farm area

- Awareness to suspected findings in the farm area
- Awareness to stress or disease symptoms in animals
- Fencing of the farm area with a 2 meters fence
- Closing and locking of all the gates in the fence
- Prevention of strangers access into the farm. Cameras.

Transport of animals to slaughtering



Transport of animals to slaughtering

- By authorized people only
- State permit
- Veterinary check up before and after slaughtering

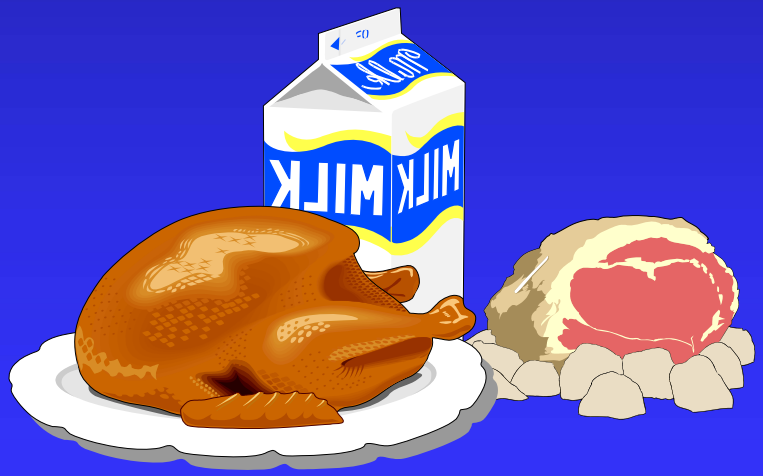
Personnel

Personnel

- Thorough investigation of new personnel with emphasizing the possibility of hostility
- Special activities in the farm such as feed preparing, drug administration etc. - only by qualified personnel
- Strange people should not have access to the farm

Instructions to farmers

- **Instructions at time of event**

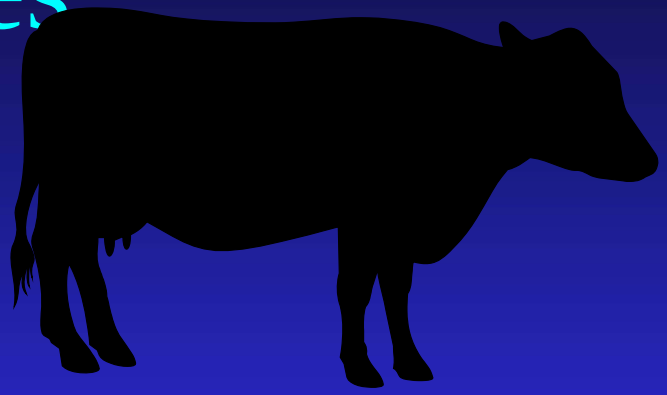


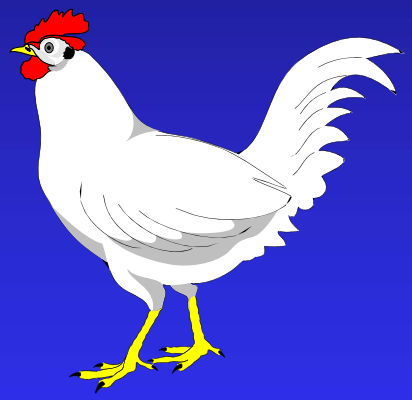
Instructions at time of event

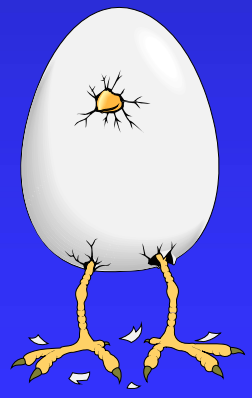
- Halting the marketing of animals and their products
- Halting the administration of the suspected feeds or water
- Immediate report to the state veterinarian and herd's veterinarian
- Following Vet. Serv. instructions
- Lab testing by instructions
- Immediate investigation of the incident

The dangers in the different animal branches

- **Ruminants**
- **Broilers**
- **Layers**







The dangers in the different stages of rearing and marketing

Chemical dangers

- **Op/carbamates**
- **OCl/PCB**
- **Mycotoxins**
- **FAA (1080)**
- **Heavy metals**
- **Cyanide**
- **Anticoagulants**
- **Strychnine**

The dangers in the different stages of rearing and marketing

Biological dangers

- **Salmonella (A)**
- **Salmonella (others)**
- **Shigella**
- **E. coli**
- **Enterotoxins bacteria**
- **Campylobacter**
- **Yersinia**
- **Cholera**
- **Brucella**
- **Listeria**
- **Botulinum toxin**
- **Coxiella burnetti (Q)**
- **Anthrax**
- **Erysipelothrix**
- **Leptospira**
- **Viruses (norwalk, hepatitis, polio)**

Example:

Aflatoxins in ruminants

The lines written in red are where the danger for public health is medium or higher

The dangers in the different stages of the rearing and the selling

	Danger	Arguments	Prevention	Correction
Animals				
Feedstuff				
Water				
Disinfectants & medicines				

Stages:

1. Reception
2. Rearing
3. Products marketing
4. Animals marketing

Aflatoxin in ruminants

Stage 1 - Reception

	Danger	Arguments	Prevention	Correction
Animals	low	No accumulation in meat		
Feedstuff	medium	Possible introduction in feedstuff	Approved suppliers Certificate Inspection of silage preparation Lab analysis VS instructions	Destroying of feedstuff
Water	negligible	Not dissolvable		
Disinfectants & medicines	negligible	Small amount		

Aflatoxin in ruminants

Stage 2 - Rearing

	Danger	Arguments	Prevention	Correction
Feedstuff	medium	Possible introduction in feedstuff **Appears in the milk**	Fence of 2 meters + locking Guarding (VS instructions) Loyal personnel Clean feeders Maximal distributions	Destroying of feedstuff
Water	low	Not dissolvable, powder can be seen in water		
Disinfectants & medicines	low	Small amount		

Aflatoxin in ruminants

Stage 3 - Milk marketing

	Danger	Arguments	Prevention	Correction
Collection and transport	high	Can be introduced to the tank High resistance **Can appear in the milk at home**	Locking of the tank Paying attention to the tank/er Guarding or video	Destroying of the milk

Aflatoxin in ruminants

Stage 4 – Animals marketing

	Danger	Arguments	Prevention	Correction
Veterinary examination			No clinical symptoms	
Gathering and transport	negligible	Aflatoxin has to be eaten to appear in the milk Does not appear in the meat		

Bio-security in farms

- In Israel the poultry branch is much more bio-secured than the cattle and small ruminant branches.
- The bio-security application in the farms helps to stop the spread of diseases even if it is not a bioterrorism event.


Thank you
for your
attention