Cleaning & Disinfection of Poultry Farm

Yoni Segal
FAO Consultant
yoni.segal@fao.org
Objectives

By the end of this session, participants will be able to:

• Define farm decontamination - cleaning and disinfection and explain what each accomplishes
• Describe different groups of disinfectants
• Describe the safe use of disinfectants and explain the importance of PPE during cleaning and disinfection
• Review the information on a disinfectant by reading and interpretation of a products’ label
Cleaning and Disinfection = Decontamination

- Cleaning and disinfection are key components of routine biosecurity in poultry farming.

- Decontamination kills any disease organisms like:
  - virus
  - bacteria
  - parasite
  - mold

  that might be present on a farm at the end of a production cycle or after disease outbreak.

- Decontamination allows for safe re-population of a farm.
Exercise:

The questions!

1. What is a poultry farm cleaning and how is it done?
2. What is a poultry farm disinfection and how is it done?
3. How do you choose a disinfectant?
4. What are risks involved in using disinfectants and how to avoid them?

In your group discuss what do you know about the question
Record your key points on the flipchart
Be prepared to present your answer to the group
Take about 10 minutes to complete this task
## Survival of disease causing agents in the environment

<table>
<thead>
<tr>
<th>Disease agent</th>
<th>Survival time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avian influenza</td>
<td>Days to months</td>
</tr>
<tr>
<td>IBD (Gumboro)</td>
<td>Months</td>
</tr>
<tr>
<td>Coccidiosis</td>
<td>Months</td>
</tr>
<tr>
<td>Fowl Cholera</td>
<td>Weeks</td>
</tr>
<tr>
<td>Coryza</td>
<td>Hours to days</td>
</tr>
<tr>
<td>Marek's Disease</td>
<td>Months to years</td>
</tr>
<tr>
<td>Newcastle Disease</td>
<td>Days to months</td>
</tr>
<tr>
<td>Mycoplasma</td>
<td>Hours to days</td>
</tr>
<tr>
<td>Salmonellosis (Pullorum)</td>
<td>Weeks</td>
</tr>
</tbody>
</table>
What can kill disease agents?

- Detergents / soap
- Disinfectants
- Sunlight
- Heat (direct flame or steam)
Cleaning

The physical removal of foreign materials like:
- dust
- soil
- organic material such as: droppings, blood, secretions

which protect disease agents

Remember!
A good cleaning job will remove 80% of disease agents
Cleaning - is a two-step process

step 1. Dry cleaning

- Using a broom, brush, shovel, rag or compressed air to remove dust, soil and dry organic material

Remember!

Dry cleaning should not be used for cleaning poultry houses infected with air-born diseases such as: Avian Influenza or Newcastle it may cause aerosolization of the virus and increase the risk of spreading the disease.
step 2. Wet cleaning

- Using detergent/soap and water, soak the area and scrub to remove remaining organic material as well as dirt and grease.
- For washing, you can use common detergent powder sold for cloth laundering – it is cheap and effective.

Wet cleaning reduces the risk of aerosolization of virus.
Cleaning is improved with:

- Detergents / Soaps
- Warm water
- Scrubbing
- Brushing
- Power washers
- Steamers
Remember!

- Disinfectants lose effectiveness during contact with disease agents.
- Organic materials such as manure, blood, dust or dirt absorb disinfectants and makes them less effective.
- Organic materials protect disease agents.

You must CLEAN properly before you disinfect!
Disinfection

• Disinfection might kill the remaining disease agents left after cleaning

• Disinfection is the least reliable step of biosecurity, depends on many factors such as:
  • the quality of cleaning
  • the hardness of water
  • quality and suitability of disinfectant
  • correct dilution and application
What are Disinfectants?

Disinfectants are chemicals that
- Slow disease agents activity, multiplication and their growth or
- Kill disease agents
Common types of disinfectants

- Disinfectants are divided into several groups based on their chemical structure

  Like:
  - Halogens (iodophors and chlorines, halamid®, dettol®)
  - Alcohols
  - Oxidizing agents (hydrogen-peroxide, hyperox®, virkon®)
  - Phenols (fenix®, Prophyl 75®)
  - Aldehydes (glutheraldehyde – TH4®, formalin)
  - Quaternary ammonium compound (Timsen® Medisep®)
Choosing the Right Disinfectant

The choice of disinfectant will depend on the following:

- Cost
- Type of disease agent/s to be destroyed
- Amount of contamination by organic matters such as: droppings, blood and manure left in the poultry house
- Active ingredient
  the chemical compound and concentration that its contained
### Dilution and Application rate

Dilution and application rate will determine the proper concentration and application rate of the mixed solution (the correct quantity of disinfectant to be used).

### Contact time

Contact time is the minimum contact time of the disinfectant with the surface, to allow for killing of the disease agents.

### Safety

Safety concerns for people, animals, equipment, and the environment must be considered.

---

### Characteristics of Selected Disinfectants

<table>
<thead>
<tr>
<th>Disinfectant Category</th>
<th>Alcohols</th>
<th>Aldehydes</th>
<th>Biguanides</th>
<th>Halogens: Hypochlorites</th>
<th>Halogens: Iodine Compounds</th>
<th>Oxidizing Agents</th>
<th>Phenols</th>
<th>Quaternary Ammonium Compounds (QAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Trade Names</td>
<td>Ethyl alcohol</td>
<td>Isopropyl alcohol</td>
<td>Formaldehyde</td>
<td>Glutaraldehyde</td>
<td>Chlorhexidine Novasan® Virosan®</td>
<td>Bleach</td>
<td>Betadine® Providone®</td>
<td>Hydrogen peroxide Peracetic acid Virkon S® Oxy-Sept 333®</td>
</tr>
<tr>
<td>Mechanism of Action</td>
<td>Precipitates proteins</td>
<td>Denatures proteins</td>
<td>Alkylates nucleic acids</td>
<td>Denatures proteins</td>
<td>Alters membrane permeability</td>
<td>Denatures proteins</td>
<td>Denatures proteins</td>
<td>Alters cell wall permeability</td>
</tr>
<tr>
<td>Advantages</td>
<td>Fast acting</td>
<td>Leaves no residue</td>
<td>Broad spectrum</td>
<td>Broad spectrum</td>
<td>Stable in storage</td>
<td>Broad spectrum</td>
<td>Good efficacy with organic material</td>
<td>Stable in storage</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>Rapid evaporation</td>
<td>Flammable</td>
<td>Carcinogenic</td>
<td>Only functions in limited pH range (5-7)</td>
<td>Toxic to fish (environmental concern)</td>
<td>Inactivated by sunlight</td>
<td>Requires frequent application</td>
<td>Corrodes metals</td>
</tr>
<tr>
<td>Precautions</td>
<td>Flammable</td>
<td>Carcinogenic</td>
<td>Never mix with acids: toxic chlorine gas will be released</td>
<td>May be toxic to animals, especially cats and pigs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetative Bacteria</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>YES—Gram Positive Limited—Gram Negative</td>
</tr>
<tr>
<td>Mycobacteria</td>
<td>Effective</td>
<td>Effective</td>
<td>Variable</td>
<td>Effective</td>
<td>Limited</td>
<td>Effective</td>
<td>Variable</td>
<td></td>
</tr>
<tr>
<td>Enveloped Viruses</td>
<td>Effective</td>
<td>Effective</td>
<td>Limited</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td></td>
</tr>
<tr>
<td>Non-enveloped Viruses</td>
<td>Variable</td>
<td>Effective</td>
<td>Limited</td>
<td>Effective</td>
<td>Limited</td>
<td>Effective</td>
<td>Variable</td>
<td>Not Effective</td>
</tr>
<tr>
<td>Spores</td>
<td>Not Effective</td>
<td>Effective</td>
<td>Not Effective</td>
<td>Variable</td>
<td>Limited</td>
<td>Variable</td>
<td>Not Effective</td>
<td>Not Effective</td>
</tr>
<tr>
<td>Fungi</td>
<td>Effective</td>
<td>Effective</td>
<td>Limited</td>
<td>Effective</td>
<td>Effective</td>
<td>Variable</td>
<td>Variable</td>
<td></td>
</tr>
<tr>
<td>Efficacy with Organic Matter</td>
<td>Reduced</td>
<td>Reduced</td>
<td>?</td>
<td>Rapidly reduced</td>
<td>Rapidly reduced</td>
<td>Variable</td>
<td>Effective</td>
<td>Inactivated</td>
</tr>
<tr>
<td>Efficacy with Soap/ Detergents</td>
<td>?</td>
<td>Reduced</td>
<td>Inactivated</td>
<td>Inactivated</td>
<td>Effective</td>
<td>?</td>
<td>Effective</td>
<td>Inactivated</td>
</tr>
</tbody>
</table>
Reading the label of disinfectants

- Before using any disinfectant the label MUST be red and understood.

- The label gives you valuable information.
CAUTION or WARNING

POISON

DANGEROUS POISON

- Slightly toxic = S5
- Highly toxic = S6
- Extremely toxic = S7
Active Ingredient
Directions for Use

POISON
KEEP OUT OF REACH OF CHILDREN
READ SAFETY DIRECTIONS BEFORE OPENING OR USING

CHEMETALL PARAFORMALDEHYDE
DISINFECTANT
ACTIVE CONSTITUENT: 900 g/kg FORMALDEHYDE
For disinfecting poultry houses.

<table>
<thead>
<tr>
<th>SITUATION</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disinfection of incubators at hatcheries, on-farm egg fumigation, setters, when eggs placed in hatcher or when eggs transferred, Trickle fumigation in hatchers</td>
<td>Heat Paraformaldehyde sprays. Incubators: use 10g Paraformaldehyde / m² air space. Buildings: use 360g Paraformaldehyde / 100m² air space.</td>
</tr>
<tr>
<td>Terminal Disinfection of poultry housing including broilers, rearing and breeder sheds</td>
<td>Paraformaldehyde sprays: apply 10gms per nest box every 1-3 weeks.</td>
</tr>
</tbody>
</table>

CRITICAL USE COMMENTS: Use only heat resistant polyethylene pans.
In the fumigation of egg hatcheries the technician must calculate the correct dose of the product to achieve a concentration within the range of 10-15g formaldehyde/m³.

STORAGE AND DISPOSAL
Store below 30°C (room temperature). Keep containers well sealed when not in use. Store in well ventilated areas out of direct sunlight where temperatures do not fluctuate. Preferably store between 20 - 25°C. DO NOT store below 5°C.

SAFETY DIRECTIONS
Poisonous if absorbed by skin contact, inhaled or swallowed. Attacks the eyes. The fumes first cause smarting, then watering of the eyes. This should be taken as a warning sign. Will irritate the nose and throat and skin. Repeated exposure may cause allergic disorders. Sensitive workers should use protective clothing. Avoid contact with the eyes and skin and clothing. Do not inhale vapour or spray mist. When opening the container and using the product wear cotton overalls buttoned to the neck and wrist and a washable hat, elbow-length PVC gloves, gogoggles and half facepiece respirator with canister specified for formaldehyde. If product on skin, immediately wash area with soap and water. If product in eyes, wash it out immediately with water. Wash hands after use. After each day's use, wash gloves, goggles, contaminated clothing and respirator and if rubber, wash with detergent and warm water.

FIRST AID
If poisoning occurs, contact a doctor or Poisons Information Centre (phone 13 1126). If swallowed, do NOT induce vomiting. Give water or milk, then raw egg. If skin contact occurs remove contaminated clothing and wash skin thoroughly. If in eyes, hold eyes open, flush with water for at least 15 minutes and see a doctor.

SHIPPING NAME: PARAFORMALDEHYDE
CLASS: 4.1 UN No. 2213 PG III HAZCHEM 1Z
In a Transport Emergency contact Police or Fire Brigade DIAL 000
For Specialist advice telephone 03 9625 0722 (24 Hours)

Chemetall (Australasia) Pty Ltd
17 Turbo Drive, Bayswater North, VIC 3153 Australia
Telephone: 03 9729 6253 Fax: 03 9720 1711

Contents 25 Kg
BATCH No.
D.O.M., Expiry
APVMA APPROVAL NUMBER: 61655/29kg/0307
# Safety Directions

**POISON**

Keep out of reach of children.

Read safety directions before opening or using.

## CHEMETALL PARAFORMALDEHYDE

Disinfectant

**Active Constituent:** 900 g/kg Formaldehyde

**For disinfecting poultry houses.**

### Directions for Use:

This product should only be used by licensed Pest Control Operators (PCO), technicians or other persons who are appropriately trained or experienced in the use and handling of formaldehyde based preparations for fumigation purposes within the poultry and egg industries. All users must be aware of, and fully understand the Australian Chicken Meat Federation, Formaldehyde Guidelines for Safe Working Practices (1995).

<table>
<thead>
<tr>
<th>Situation</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disinfection of incubators at hatcheries, on-farm egg fumigation. Setters, when eggs placed in hatchers or when eggs transferred, Trickle fumigation in hatchers</td>
<td>Heat Paraformaldehyde sprays. Incubators: use 10g Paraformaldehyde / m³ air space. Buildings: use 360g Paraformaldehyde / 100m³ air space.</td>
</tr>
<tr>
<td>Terminal Disinfection of poultry housing including broiler, rearing and breeder sheds</td>
<td>Paraformaldehyde sprays: apply 10 grams per nest box every 1-3 weeks.</td>
</tr>
</tbody>
</table>

### Critical Use Comments:

In the fumigation of egg hatcheries the technician must calculate the correct dose of the product to achieve a concentration within the range of 10-15g formaldehyde/m³.

**NOT TO BE USED FOR ANY PURPOSE, OR IN ANY MANNER, CONTRARY TO THIS LABEL UNLESS AUTHORISED UNDER APPROPRIATE LEGISLATION.**

### Re-entry:

Wear cotton overalls buttoned to the neck and wrist, elbow length PVC gloves, goggles and a half facepiece respirator with canister specified for formaldehyde when entering the fumigated sheds prior to and during ventilation.

### Precaution:

Close shed doors and ventilation shutters during fumigation. Sheds should be ventilated only when formaldehyde concentration in the air (in sheds) falls below 1 ppm, as measured with a suitable detector tube.

### Protection of Livestock:

Before use: Remove animals, remove or cover all feed troughs, and any other equipment. After use: Wait until formaldehyde concentration falls below 1 ppm, then thoroughly ventilate treated area. Clean up thoroughly before allowing re-entry of animals.

---

**Chemetall (Australasia) Pty Ltd**

17 Turbo Drive, Bayswater North, VIC 3153 Australia

Telephone: 03 9729 6253 Fax: 03 9720 1711

**Contents 25 Kg**

**BATCH No.**

**D.O.M.**

**APVMA APPROVAL NUMBER:** a6555/265kg/0307

**PARAFORMALDEHYDE CLASS: 4.1 UN No. 2213 PG III HAZCHEM 1Z**

In a Transport Emergency contact Police or Fire Brigade DIAL 000

For Specialist advice telephone 03 9625 0722 (24 Hours)
Food and Agriculture Organization of the United Nations

First Aid
For additional information look at – www.MSDS.com
Reading the Label

- Look at the labels provided
  Complete the questions

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Active ingredient</th>
<th>Rate of Mixing</th>
<th>Toxicity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Disinfectants are Dangerous!

- Disinfectants are dangerous chemicals = poisons
- We have to be careful when we use disinfectants

Disinfectants might cause poisoning:

- **Acute** (fast) toxicity with certain disinfectants may cause: dizziness, nausea and itchy eyes or skin

- **Chronic** (slow) toxicity may occur gradually over many years, may cause: permanent disability because the body has become very sensitive
How dangerous a disinfectant is?

Depends on:

- The type of substance and what it is made of
- The speed and the way it enters the body
- The amount of substance that enters the body
## Absorption Rate

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scalp</td>
<td>3.7</td>
</tr>
<tr>
<td>Forehead</td>
<td>4.2</td>
</tr>
<tr>
<td>Ear</td>
<td>5.4</td>
</tr>
<tr>
<td>Eyes</td>
<td>12</td>
</tr>
<tr>
<td>Palm</td>
<td>1.3</td>
</tr>
<tr>
<td>Nose</td>
<td>6</td>
</tr>
<tr>
<td>Abdomen</td>
<td>2</td>
</tr>
<tr>
<td>Arm</td>
<td>1</td>
</tr>
<tr>
<td>Feet</td>
<td>2</td>
</tr>
<tr>
<td>Groin</td>
<td>11</td>
</tr>
</tbody>
</table>

A splash in the eyes is absorbed **12 times** faster than a splash on the arm.
Poisoning

Chemicals can enter your body through 3 ways:

1. through the lungs when breathing or smoking
2. through the mouth when eating and drinking
3. through the skin and eyes

Remember!

When handling chemicals you need to make sure you wear the right clothes and equipment for your protection
Protect your Mouth and Lungs

Breathing in disinfectant vapors or spray particles
• The main danger exist when:
  – Mixing chemicals
  – Spraying in confined spaces
  – Using fumigants such as formaldehyde or chlorine

• Accidental drinking of chemical by drinking (by children)
Wear respirators

• If the label states a respirator to be worn then **TOXIC** vapors will be released.

• You must use a full face or half face respirator fitted with appropriate filters

Remember!
Dust or biological masks are not designed to filter chemical’s spray droplets and vapors
Eye Protection

- Contamination of the eyes can result from:
  - drift, splash or spill of chemicals
  - rubbing eyes with contaminated hands or clothing

- Chemical absorbed through the eye very rapidly

- Always wear eye protection when handling or spraying chemicals

Use: goggles or face shield
Skin Absorption

• Absorption is highest when temperature is hot and skin is perspiring (hot season)

• Longer chemicals are in contact with skin, the more chemical is absorbed

Don’t wait! wash your skin with soap and plenty of water immediately

• Clothing which has been sprayed must be removed as soon as possible and washed with soap and water
Protect Hands and Arms

- Gloves that cover the forearms are the best
- Make sure they are resistant to chemicals - PVC
- Turn base of glove over when spraying overhead
Body Protection

- Overalls and gloves
- Wide brim hat
- Rubber boots
Aprons for Extra Protection

• PVC or neoprene aprons extending from neck to ground give excellent front protection from spills and splashes

• Easy to put on and wash

• Use when mixing chemicals
Remember!
- Always wash your hands and face with soap after spraying disinfectant
- Never eat or smoke when spraying disinfectant
Exercise

Identifying safety breaches

In a moment, we will show you pictures of disinfection process

• List any chemical handling problems you can see

• How many problems have you identified?
Quiz

1. Organic matter increases the effect of disinfectants
   true or false

2. How would you define Decontamination?

3. Name 3 essential pieces of protective clothing to be used when spraying disinfectant.

4. Under what (3) conditions can chemical vapors, dusts or spray particles be inhaled to cause poisoning?
What do you think?

1. What are the 3 key points you want to remember from this module?

2. What additional information do you need on this module?

Acknowledgment:
This presentation was developed in collaboration with Mr. A. Almond