



Canadian Swine
Health Board

Conseil canadien
de la santé porcine

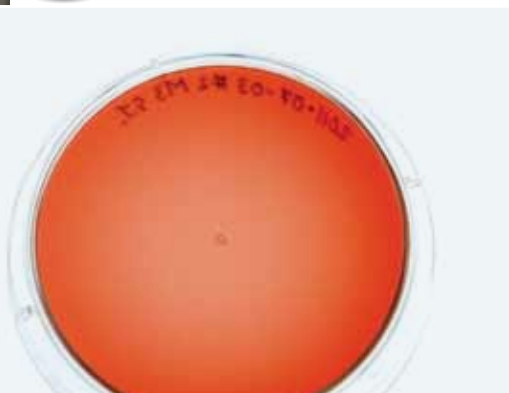
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QUALITY CONTROL OF WASH/DISINFECT/DRY PROTOCOLS FOR LIVE-HOG TRANSPORT VEHICLES



VISUAL INSPECTION



MICROBIOLOGICAL CONTROL



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QUALITY CONTROL

Objective

It is important to ensure that hog transport vehicle wash/disinfect/dry protocols effectively eliminate disease-causing pathogens. Sound quality-control protocols will clearly indicate whether diseases have been transmitted via transport vehicles.

Quality control

1 Visual inspection

Verifies the efficiency of the wash/disinfect/dry method.



2 Microbiological controls

Confirms whether the wash/disinfect/dry method eliminates pathogens by identifying indicative bacteria*.

* Specific bacteria that should not be present.





VISUAL INSPECTION

Objective: No Remaining Visible Matter

When must the inspection be carried out?

- After each wash/disinfect/dry.
- As soon as the vehicle is dry.

Who must carry out the inspection?

- A person who has not carried out the wash/disinfect/dry.
- On occasion, a person external to the operations.

What are the materials required?



CAUTION!

Do not contaminate clean vehicles during the inspection.

- Wash hands with soap.
- Put on clean plastic boots immediately prior to entering the vehicle.



QUALITY CONTROL AREAS

Every corner, everywhere!



Vehicle Exterior

- Exterior panels
- Wheels
- Mud flaps
- Fenders
- Running boards
- Chassis
- Electrical cables
- Winter panels
- Areas beneath winter panels
- Interior and exterior storage areas and containers
- Loading ramps



SUCCESSFUL :
Clean, dry surfaces



Vehicle Interior

- Access ramps
- Ceiling
- Floor
- Every corner
- Holes and wall cavities
- Around cables and pipes
- Animal partitions (both sides)
- Door and partition joints and hinges
- Rear of roll-up doors
- Tools



SUCCESSFUL :
Clean, dry



Cab

- Pedals
- Floor mats
- Door handles
- Steering wheel
- Gear selector
- Seat
- Radio
- Cellular telephone





UNSUCCESSFUL: **Dirt or water on surfaces**

Where there's dirt, there's disease.

Water harbours microbes and encourages their survival and multiplication.



→ Re-wash vehicle.

Wash more thoroughly with detergent.

- Brush to dislodge soil and organic material.
- High-pressure rinse.

Dry vehicle more thoroughly.

→ Assess techniques and re-train staff.



MICROBIOLOGICAL CONTROL

Objective: Ensure elimination of microbes

A visual inspection alone cannot confirm the presence or absence of pathogens. Only a microbiological control can ascertain that an area is microbe-free.

What are we **looking for**?

Surviving enterobacteria

Enterobacteria (*E. Coli*):

- These microbes (bacteria) are present in mammals' intestines.
- The presence of enterobacteria is a specific agri-food sector indicator of the presence of remaining pathogens on a cleansed surface.

How → Contact agar

Contact agar is a microorganism culture medium. MacConkey agar supports only enteric pathogens.



Frequency of microbiological trains

Twice per year, to verify the efficiency of the method used.



January (cold weather)



July (warm weather)



Whenever there are changes in the wash, disinfection and drying methods.



Whenever new staff is taken on.

SAMPLING PROTOCOLS



CAUTION!

A visual inspection must have been passed prior to the microbiological control.

Boots and hands should not come into contact with agar-contact test surfaces during the visual inspection.

→ Preparation

Which contact agar plates should be used?

- **25 cm² MacConkey** agar plates.
- An appropriate **neutralizer** for the disinfectant used.

References

- Microbiological laboratory analysis.
- Veterinarian.

Materials

Clean clothing



Agar
contact
plates



Disinfectant
(e.g.: 70% alcohol)



Permanent
marker



Adhesive
tape



→ Test Areas

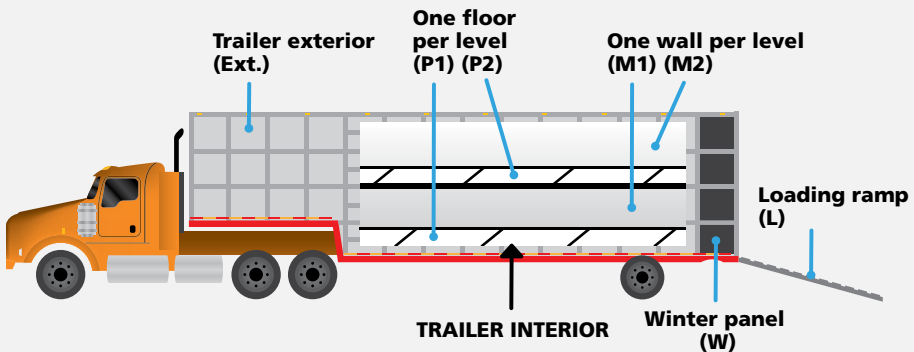
How many agar plates will be required?

- It is not necessary to check each vehicle.
Two vehicles per washer are sufficient.
- One agar contact plates will be required per test area.

Determine an identification code to clearly identify the agar-sampled areas.

For instance:

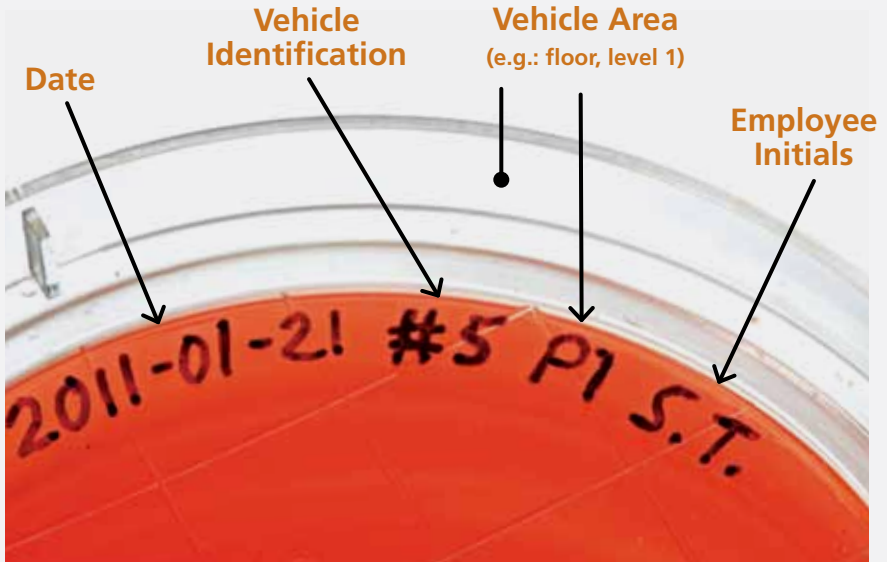
- 1 wall per level, animal height (W1 to W2).
- 1 floor per level (F1 to F2).
- 1 loading ramp (L).
- 1 trailer exterior (Ext.).
- winter: 1 winter panel (W).
- 2 control agar plates.



Ten agar plates (11 during the winter) will be required for a three-level truck.

→ Procedure

- 1 Wash hands thoroughly with soap.
- 2 Clearly identify each plate.
 - Write only on the base of the plate, never on the lid.
 - Use a permanent marker.



- 3 Use clean, disposable boots and plastic gloves.





CAUTION!

Do not talk or cough when the lid is open.

- 4 Holding the base of the box upwards and the lid downwards with the fingertips, remove the lid.**



Avoid touching **agar with fingers.**

- 5 Apply the agar to the **dry** surface. Apply **firm pressure** during 10 seconds.**



Avoid sliding agar on the surface, which should be smooth and full of agar.

- 6 Return agar to lid immediately (lid downwards).

Do not touch **agar with fingers nor with the lid.**

- 7 Disinfect the surface to remove traces of agar.



- 8 Secure lid with adhesive tape.

Always leave agar upside down (lid downwards).

- 9 Keep boxes refrigerated (far from food) until shipping and incubation.



AGAR ANALYSES IN LABORATORY

Place used contact plates (lid downwards) in a cooler with ice packs.

Ship to laboratory, with ice packs, as soon as possible (maximum 24 h).



Cost of analysis: Approximately \$6 per agar plate (2011)

Contact plates will be placed, lid downwards, in an incubator at exactly **37 °C**.

1 bacterium → 1 colony

Colonies will be counted after exactly **24 hours of incubation**.

If you choose to carry out analyses yourself, you should anticipate:

- Purchase of a microbiological incubator.
- Secure storage of used agars before elimination.
- Disinfection of used agars (autoclave or incineration).



Some companies offer this service.

Conduct frequent external verifications (cross-checks).

CONTROL AGAR PLATES

Prepare two extra agar plates exactly according to the method outlined below:

Contaminated control

Apply agar plate in a soiled vehicle, directly in contact with soiled area.



Anticipated result



Over 100 colonies

Clean control

Open lid for 10 seconds and close again, avoiding agar contact with any surface.



Anticipated result



0 colonies



If controls yield the anticipated results, the microbiological control has been properly carried out.



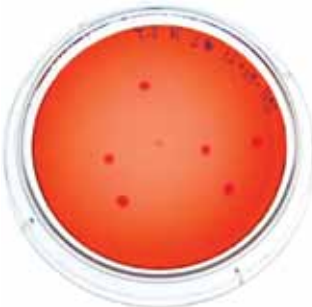
If the controls do not yield the anticipated results, a problem has occurred during sampling, transport or agar analysis.

Request advice from the analysis laboratory or from a veterinarian.

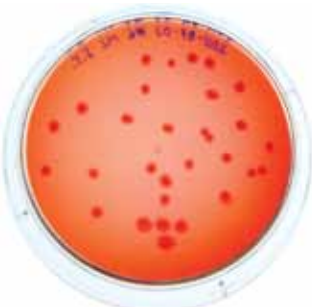
RESULTS



Excellent
No colony
Ideal situation



Good
1 to 10 colonies



Critical
10 to 50 colonies
Risk of disease propagation



Fail
Excessive contamination;
high risk of disease propagation

If all results are “excellent” or “good,” maintain wash, disinfection and drying protocols.

Keep up the good work!

Room for improvement.

Fail: identify and correct the problem.

Correct the wash disinfect and drying protocol or its application.

COST ESTIMATES

→ Anticipated costs:

- Agar plate purchase .
- Agar plate analysis.
- Agar plate transport.

Total cost estimate for three-story vehicle: \$120 to \$150 (current 2011 fees).

IMPROVEMENTS

→ Define objectives.

→ Ensure follow-up and monitoring. How?

Maintain a quality-control register (for both visual inspection and microbiological controls).

- Dates (wash and control).
- Staff names (wash and control).
- Products used and contact period (detergent and disinfectant).
- Vehicle identification.
- Detailed results and corrective measures if applicable.

Check the hog transport best practices guide or the CSHB website for a sample register.



WASH/DISINFECT/DRY IMPROVEMENTS

→ For further information:

- Live Hog Transport Vehicle Wash/Disinfect/Dry Protocols (2011). Canadian Swine Health Board.



- Programme des bonnes pratiques de transport des porcs, Manuel du transporteur (2007). Fédération des producteurs de porcs du Québec.
- **Canadian Swine Health Board** (www.swinehealth.ca).
- **IFIP – French Pork and Pig Institute** (www.itp.asso.fr/home.html).

Other resources:

- **PRRSV Biosecurity Manual**, American Association of Swine Veterinarians.
- **Disinfection 101, 2005**. Center for Food Security and Public Health.

→ Steps



Cleaning



Prewash



Wash: detergent



Wash: rinse



Disinfect



Dry



Cab

Every step is important!

→ Critical points:

- Appropriate use of detergent and disinfectant (concentration, temperature, contact period).
- Vehicle drying (best results with heat and ventilation).
- Protection of disinfected vehicles against recontamination.
- Water quality.
- Detergent and disinfectant selection.
- Staff training.

Follow up on the modifications and complete another microbiological check to ensure that changes have been effective.





ALTERNATIVES

There are other microbiological control methodologies.

It is preferable to consult a veterinarian or an analysis laboratory to know how to proceed.

→ Other enterobacterial detectors

- Petrifilms.
- Dipslides.
- Swabbing with rag, sponge or cotton swab.

→ Other indicators, such as total flora, can also be detected with contact boxes or other materials.



VIRUS DETECTION

Viruses, such as Porcine Reproductive and Respiratory Syndrome Virus (PRRSV), are not detected by agar contact.

However, if no enteric pathogens (enterobacteria) remain, most viruses should also have been eliminated.

→ Virus detection

- Different protocols exist: swabbing and PCR.
- Consult a veterinarian.
- Several methods currently in development.





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