

Terrestrial Animal Health Standards Commission
Report

September 2009

CHAPTER 8.1

ANTHRAX

Article 8.1.1.

General provisions

This chapter is intended to manage the human and animal health risks associated with the presence *Bacillus anthracis* in commodities and the environment.

There is no evidence that anthrax is transmitted by animals before the onset of clinical and pathological signs. Early detection of *outbreaks*, quarantine of affected premises, destruction of diseased animals and fomites, and implementation of appropriate sanitary procedures at *abattoirs* and dairy factories will ensure the safety of products of animal origin intended for human consumption.

For the purposes of the *Terrestrial Code*, the *incubation period* for anthrax shall be 20 days.

Anthrax should be notifiable in the whole country.

Standards for diagnostic tests and vaccines are described in the *Terrestrial Manual*.

When authorising import or transit of *commodities* listed in this chapter, *Veterinary Authorities* should require the conditions prescribed below.

Article 8.1.1.bis

Safe commodities

When authorising import or transit of the following *commodities*, *Veterinary Authorities* should not require any anthrax related conditions:

- a) semen and *in vivo* derived cattle embryos collected and handled in accordance with Chapters 4.5, 4.6., and 4.7., as relevant.

Article 8.1.2.

Recommendations for the importation of ruminants, equines and pigs

Veterinary Authorities of *importing countries* should require the presentation of an *international veterinary certificate* attesting that the animals:

1. showed no clinical sign of anthrax on the day of shipment;

AND

2. were kept for the 20 days prior to shipment in an *establishment* where no *case* of anthrax was officially declared during that period; or
3. were vaccinated, not less than 20 days and not more than 6 months prior to shipment in accordance with the *Terrestrial Manual*.

~~Article 8.1.3.~~

~~Recommendations for the importation of products of animal origin (from ruminants, equines and pigs) intended for agricultural or industrial use~~

~~*Veterinary Authorities of importing countries* should require the presentation of an *international veterinary certificate* attesting that the products:~~

- ~~1. originate from animals not showing clinical signs of anthrax; or~~
- ~~2. have been processed to ensure the destruction of both bacillary and spore forms of *Bacillus anthracis*, in conformity with one of the procedures referred to in Chapter X.X. (under study).~~

Article 8.1.4.

Recommendations for the importation of fresh meat and meat products destined for human consumption

Veterinary Authorities of importing countries should require the presentation of an *international veterinary certificate* attesting that the products originate from animals which:

1. have shown no sign of anthrax during ante-mortem and post-mortem inspections; and
2. were not immunised against anthrax using live vaccine during the 21 days prior to *slaughter*; and
- ~~23.~~ come from *establishments* which are not placed under quarantine on account of anthrax control and in which:
 - ~~a) there has been no *case* of anthrax during the 20 days prior to *slaughter*;~~
 - ~~b) no vaccination against anthrax has been carried out during the 42 days prior to *slaughter*.~~

Article 8.1.5.

Recommendations for the importation of hides, skins and hair (from ruminants, equines and pigs)

Veterinary Authorities of importing countries should require the presentation of an *international veterinary certificate* attesting that the products originate from animals which:

1. have shown no sign of anthrax during ante-mortem and post-mortem inspections; and
2. come from *establishments* which are not placed under quarantine on account of anthrax control.

Article 8.1.6.

Recommendations for the importation of wool

Veterinary Authorities of importing countries should require the presentation of an *international veterinary certificate* attesting that the products:

1. ~~originate from animals showing no clinical signs of anthrax at the time of shearing; and~~
21. originate from *establishments* where no *case* of anthrax has been reported since the previous shearing of all animals;

OR

32. have been treated in accordance with the recommendations in Article 8.1.11.

Article 8.1.7.

Recommendations for the importation of milk and milk products intended for human consumption

Veterinary Authorities of importing countries should require the presentation of an *international veterinary certificate* attesting that the products:

1. originate from animals showing no clinical signs of anthrax at the time of milking; or
2. were processed using a heat treatment of 120 °C for 106 seconds ~~at least equivalent to pasteurisation (under study).~~

Reference

Sa Xu, Theodore P. Labuza, and Francisco Diez-Gonzalez (2006). Thermal Inactivation of Bacillus anthracis Spores in Cow's Milk. Applied and Environmental Microbiology, June 2006, Vol. 72, No. 6: p. 4479–4483.

Article 8.1.8.

Recommendations for the importation of bristles (from pigs)

Veterinary Authorities of importing countries should require the presentation of an *international veterinary certificate* attesting that the products originate from animals which:

1. have shown no sign of anthrax during ante-mortem and post-mortem inspections; and
2. come from establishments which are not placed under quarantine on account of anthrax control;

OR

3. have been processed to ensure the destruction of *B. anthracis* by:
 - a) boiling for 60 minutes; and
 - b) drying in hot air.
 - ~~c) immersion for 24 hours in a 2% solution of formaldehyde at >20 °C.~~

References

- Böhm, Reinhard. Institut für Umwelt-und Tierhygiene Sowie Tiermedizin mit Tierklinik, Universität Hohenheim. Personal communication to Dr Wolf-Arno Valder, OIE Terrestrial Animal Health Standards Commission.
- Spotts Whitney, EA, Beatty, ME, Taylor, TH, Weyant, R, Sobel, J, Arduino, MJ, Ashford, DA. (2003) Inactivation of *Bacillus anthracis* spores. *Emerging Infectious Diseases* 9(6): 623-627.

Article 8.1.9.

Recommendations for importation of Procedures for the inactivation of *B. anthracis* spores in skins and trophies from wild animals

Veterinary Authorities should require the presentation of an international veterinary certificate attesting that these products have been processed to ensure the destruction of *B. anthracis* by one of the following methods:

In situations in which skins and trophies from wild animals may be contaminated with *B. anthracis* spores, the following disinfection procedure is recommended:

1. fumigation with ethylene oxide 500 mg/L, at relative humidity 20-40%, at 55 °C for 30 minutes; or
2. fumigation with formaldehyde 400 mg/m³, at relative humidity 30%, at >15 °C for 4 hours; or
3. fumigation with methylene bromide 3.4-3.9 g/L, in the presence of moisture, at room temperature for 24 hours; or
4. gamma irradiation with a dose of 40 kGy.

References

- Böhm, Reinhard. Institut für Umwelt-und Tierhygiene Sowie Tiermedizin mit Tierklinik, Universität Hohenheim. Personal communication to Dr Wolf-Arno Valder, OIE Terrestrial Animal Health Standards Commission.
- Turnbull P., Cosivi O. (2008) Anthrax in humans and animals, 4th Edition, WHO/FAO/OIE
- Spotts Whitney, EA, Beatty, ME, Taylor, TH, Weyant, R, Sobel, J, Arduino, MJ, Ashford, DA. (2003) Inactivation of *Bacillus anthracis* spores. *Emerging Infectious Diseases* 9(6): 623-627.

Article 8.1.10.

Procedures for the inactivation of *B. anthracis* spores in bone-meal and meat-and-bone meal

The following procedure should be used to inactivate any *B. anthracis* spores which may be present during the production of bone-meal or meat-and-bone meal from ruminants, equines and pigs:

1. the raw material should be reduced to a maximum particle size of 50 mm before heating; and
2. the raw material should be heated under saturated steam conditions to a temperature of not less than 133°C for a minimum of 20 minutes at an absolute pressure of 3 bar.

References

- Böhm, Reinhard. Institut für Umwelt-und Tierhygiene Sowie Tiermedizin mit Tierklinik, Universität Hohenheim. Personal communication to Dr Wolf-Arno Valder, OIE Terrestrial Animal Health Standards Commission.
- Turnbull P., Cosivi O. (2008) Anthrax in humans and animals, 4th Edition, WHO/FAO/OIE

Article 8.1.11.

Procedures for the inactivation of *B. anthracis* spores in wool and hair

In situations in which wool or hair may be contaminated with *B. anthracis* spores, the following five-step disinfection procedure is recommended:

1. immersion in 0.25-0.3% soda liquor for 10 minutes at 450.5 °C;
2. immersion in soap liquor for 10 minutes at 450.5 °C;
3. immersion in 2% formaldehyde solution for 10 minutes at 450.5 °C;
4. a second immersion in 2% formaldehyde solution for 10 minutes at 450.5 °C;
5. rinsing on cold water followed by drying in hot air.

References

- Böhm, Reinhard. Institut für Umwelt-und Tierhygiene Sowie Tiermedizin mit Tierklinik, Universität Hohenheim. Personal communication to Dr Wolf-Arno Valder, OIE Terrestrial Animal Health Standards Commission.
- Turnbull P., Cosivi O. (2008) Anthrax in humans and animals, 4th Edition, WHO/FAO/OIE

Article 8.1.12.

Procedures for the inactivation of *B. anthracis* spores in manure, dung and bedding

In situations in which manure, dung or bedding may be contaminated with *B. anthracis* spores, the following are recommended:

1. small volumes by incineration; or
2. chemothermal treatment by composting with quicklime as follows:
 - a) mix the manure with granulated quicklime at a rate of 100 kg quicklime per m³ and spray with water;
 - b) turn the material after 5 weeks;
 - c) leave for a further 5 weeks.

Note: spontaneous combustion of the composting pile is possible.

References

- Böhm, Reinhard. Institut für Umwelt-und Tierhygiene Sowie Tiermedizin mit Tierklinik, Universität Hohenheim. Personal communication to Dr Wolf-Arno Valder, OIE Terrestrial Animal Health Standards Commission.

Article 8.1.13.

Procedures for the inactivation of *B. anthracis* spores in liquid manure (slurry)

In situations in which liquid manure (slurry) may be contaminated with *B. anthracis* spores, the following is recommended:

1. disinfection with formalin (35% aqueous solution of formaldehyde) with stirring one hour stirring daily;
 - a) for slurry up to 5% dry matter, 50 kg formalin per m³ for 4 days;
 - b) for slurry >5% and <10% dry matter, 100 kg formalin per m³ for 4 days.

References

- Böhm Reinhard. Institut für Umwelt-und Tierhygiene Sowie Tiermedizin mit Tierklinik, Universität Hohenheim. Personal communication to Dr Wolf-Arno Valder, OIE Terrestrial Animal Health Standards Commission.
- Turnbull P., Cosivi O. (2008) Anthrax in humans and animals, 4th Edition, WHO/FAO/OIE

Article 8.1.14.

Procedures for the disinfection of surfaces in animal houses, buildings contaminated with *B. anthracis*

In situations in which surfaces in animal houses, stables, vehicles, etc. may be contaminated with *B. anthracis* spores, the following three-step approach is recommended:

1. a preliminary disinfection should be carried out using one of the following disinfectants at a rate of 1-1.5 L/m³ for 2 hours;
 - a) 10% formaldehyde (approximately 30% formalin); or
 - b) 4% glutaraldehyde (pH 8.0-8.5);
2. all surfaces should be washed and scrubbed using ample hot water and, when cleaned and waste water is free from dirt particles, dried;
3. a final disinfection step should be carried out using one of the following disinfectants applied at a rate of 0.4 L/m³ for 2 hours;
 - a) 10% formaldehyde (approximately 30% formalin), repeated after one hour; or
 - b) 4% glutaraldehyde (pH 8.0-8.5), repeated after one hour; or

- c) 3% hydrogen peroxide; or
- d) 1% peracetic acid, repeated after one hour.

Note: Formaldehyde and glutaraldehyde should not be used at temperatures below 10 °C. Hydrogen peroxide and peracetic acid are not suitable in the presence of blood.

References

- Turnbull P., Cosivi O. (2008) Anthrax in humans and animals, 4th Edition, WHO/FAO/OIE
- Spotts Whitney, EA, Beatty, ME, Taylor, TH, Weyant, R, Sobel, J, Arduino, MJ, Ashford, DA. (2003) Inactivation of *Bacillus anthracis* spores. *Emerging Infectious Diseases* 9(6): 623-627.

Article 8.1.15.

Procedures for the fumigation of rooms contaminated with *B. anthracis*

Contaminated rooms which cannot be cleared before cleaning and disinfection can be fumigated to eliminate *B. anthracis* spores. The following procedure is recommended:

1. all windows, doors and vents to the outside should be sealed with heavy adhesive tape; and
2. for rooms up to 30 m³, 4 L of water containing 400 ml of concentrated formalin (37% w/v formaldehyde) in an electric kettle (with a timing switch to turn it off) should be boiled away and the room left overnight. Room temperature should be >15 °C.

Note: Formaldehyde fumigation is hazardous and proper respirators should be on hand for operator safety. The effectiveness of the fumigation process should be verified by exposing dried discs of filter paper which have been dipped in a suspension of spores of *B. subtilis* var *globigii* or *B. cereus* or Sterne vaccine strain of *B. anthracis* and placed in the room before fumigation is started. At the end of fumigation, the discs should be placed on nutrient agar plates containing 0.1% histidine and incubated overnight at 37 °C. If fumigation has been effective, there will be no bacterial growth.

References

- Turnbull P., Cosivi O. (2008) Anthrax in humans and animals, 4th Edition, WHO/FAO/OIE