

Standard operation procedure: Disinfection of rooms with H₂O₂ gas

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DISINFECTION OF ROOMS WITH H₂O₂ GAS

1.0 PURPOSE

- 1.1 To prevent the spread of microbial agents that may cause subclinical and clinical diseases that could jeopardize the validity and reproducibility of research data, complicate their interpretation or lead to zoonotic problems inside The Section of Comparative Medicine (KPM).
- 1.2 To describe the H₂O₂ (30% or 35%) decontamination procedure for disinfecting a room after a proven contamination or as a routine to prepare a room for new animals/new use.
- 1.3 To ensure that safety is maintained during the procedure.

2.0 DISTRIBUTION OF RESPONSIBILITY

- 2.1 The Head of KPM must ensure that disinfection with H₂O₂ is performed by properly trained personnel.
- 2.2 The person performing disinfection with H₂O₂ and the Room Manager must empty the room of disposable equipment or equipment that does not tolerate H₂O₂.
- 2.3 The person performing the disinfection with H₂O₂/the Operations Coordinator (driftskordinator) must arrange the cleaning of the room with Trygg Renhold and the Room Manager.
- 2.4 The Head of KPM must make sure that an email is sent out notifying all users when the specific area or room in question is going to be disinfected with H₂O₂, and informing them that all access to this area is forbidden until further notice.
- 2.5 The person performing disinfection with H₂O₂ must contact the UiO Security Center (Vaktentralen) to ensure that the doors are locked and must provide the Section of Internal Service with the identification number of each fire alarm sensor that might be affected by the decontamination process as well as the time period during which these sensors will have to be deactivated.
- 2.6 The person performing disinfection with H₂O₂ is responsible for performing all the steps in the procedure from 3.4.

3.0 PROCEDURE

Mandatory personal protective equipment (PPE) when handling H₂O₂: disposable coveralls/ laboratory coat, dual chemical resistant gloves, full/half facemask with ABEK2P3 filter, safety glasses with side protection (if not wearing a full facemask), solid shoes.




- 3.1 An email giving information about the decontamination process, including the room number and the duration of the process, must be sent out to "kpm-users@basalmed.uio.no" in good time before the process is due to take place.
- 3.2 The room must be emptied of all equipment and material that does not tolerate H₂O₂, such as cages and bottles, or items that will absorb H₂O₂, such as paper or cardboard. Place disposable items not planned for reuse in a plastic bag, spray the bag with Virkon and let Virkon work for 30 min. before taking it out of the room for disposal. Reusable items must be disinfected with Virkon or ethanol before being placed in a plastic bag. If items are not disinfected with Virkon or ethanol, they must be autoclaved. Cabinets and drawers must be emptied and opened and equipment remaining in the room must be placed on perforated/non-solid shelves.
- 3.3 Walls, benches, floors and all equipment remaining inside the room must be cleaned before the room is disinfected with H₂O₂. Trygg Renhold must be hired in to carry out the cleaning.
- 3.4 Provide the Section of Internal Service/Building Maintenance with the identification number of each fire alarm sensor that might be affected by the decontamination process as well as the time period during which these sensors will have to be deactivated.
- 3.5 Attach biological indicators for H₂O₂ to walls, cabinets, benches, ceiling, doors and floors.
- 3.6 Gather all equipment needed for the procedure and place it close to the main access door of the area that is due to be decontaminated. An H₂O₂ level sensor, a mask with ABEK2P3 filter, a disposable coverall and clean water must be made available close to the access door(s).
- 3.7 A warning sign (see attachment 1) must be hung on each door with access to the area.
- 3.8 Connect the catalyser and the H₂O₂ gas generator to the tri clamps on the walls before starting the preheating of the generator.
- 3.9 Install and turn on fans and humidity measuring equipment inside the room. Check that communication between the base and the wireless humidity sensor is working correctly before H₂O₂ is injected into the room.
- 3.10 The UiO Security Center (Vaktsentralen) must be instructed to lock the doors leading into the area being gassed.
- 3.11 Close the ventilation system to the room. Seal doors with Stokvis tape PN 411 so that no H₂O₂ leakage can occur. Check that the dampers are properly closed so that gas cannot leak through the ventilation pipes.
- 3.12 Start the injection of H₂O₂ and make sure the level of humidity inside the room is kept between 80% and 90% for at least 3 hours. The level of humidity must never become higher than 95% as this would result in unacceptable levels of condensation.
- 3.13 In order to check for any leakage, the person performing decontamination must use a portable sensor to measure the H₂O₂ concentration outside the doors and around the gas generator. This check must be repeated every 30 minutes.
- 3.14 If the wireless link between the humidity sensors and the base is interrupted, the whole process must be aborted. The concentration of H₂O₂ has to be reduced to below 1 ppm before a person can access the room to restart the humidity sensors. Turn off the H₂O₂ gas generator.
- 3.15 If the room is needed ASAP, open the ventilation system to reduce the level of H₂O₂ inside the room. When the concentration of H₂O₂ is no higher than 1 ppm, all measuring equipment, fans and biological indicators can be taken out.

- 3.16 Put all equipment back where it belongs. Wash hands thoroughly with soap and water after undressing.
- 3.17 Unwrap the biological indicators and place them inside sterile tubes containing a liquid culture of non-fastidious microorganisms. This action must be performed inside a safety cabinet class 2. The tubes must be placed inside an incubator at 55°C for a period of seven days and be checked every day to see if there is any sign of bacterial growth. After seven days, if there is no sign of bacterial growth, the room can be considered decontaminated. If any sign of bacterial growth is detected on the bacterial indicators, the whole sterilization process must be repeated.
- 3.18 Inform the UiO security Center that the doors can be unlocked.
- 3.19 Inform Building Maintenance that the process has been completed.
- 3.20 Re-equip and open the room for use.

4.0 HEALTH, SAFETY AND ENVIRONMENT (HSE)

- 4.1 Mandatory PPE: disposable coveralls/laboratory coat, dual chemical resistant gloves, full/half facemask with ABEK2P3 filter, safety glasses with side protection (if half facemask is worn), solid shoes.
- 4.2 Signs of exposure to H₂O₂: dizziness, unconsciousness, diarrhoea, nausea, vomiting, headache, convulsions, muscle twitching, insomnia, shock, conjunctivitis.
- 4.3 Accidental inhalation of H₂O₂: allow the victim to rest in a well-ventilated area. Seek medical attention.
- 4.4 Exposure of H₂O₂ to skin: remove the contaminated clothes ASAP and rinse with water. Rinse exposed skin thoroughly with running water and non-abrasive soap. If irritation persists, seek medical attention.
- 4.5 Exposure of H₂O₂ to eyes: remove any contact lenses. Rinse with eyewash/clean water for several minutes. Seek medical attention.
- 4.6 Accidental ingestion: do not induce vomiting. Have the victim drink (at most) two glasses of water. Loosen tight clothing such as collar, tie, belt, etc. Seek immediate medical attention.
- 4.7 Accidental spills: evacuate the spilt area. Wear dual chemical resistant gloves, a mask with ABEK2P3 filter, disposable coveralls and solid shoes. Clear up spills immediately and collect in closed and suitable containers for disposal as hazardous waste. Rinse the contaminated surfaces with fresh water until the concentration of H₂O₂ is lower than 1 ppm. If the concentration continues to be higher than that, close the area and deny access to everyone for a period of 24 hours.
- 4.8 Storage of H₂O₂: recommended storage temperature is 15-30°C. Keep the container tightly closed, but not gas tight (overpressure can occur in tightly sealed containers) and in a well-ventilated place. Keep/store away from combustible materials and chemicals that are easily oxidized.
- 4.9 Dispose of leftovers and empty containers as hazardous waste.

Hydrogen peroxide 30% AnalaR NORMAPUR® Hydrogen peroxide 35%	CAS no.	Pictogram	Hazard statements	Precautionary statements
Hydrogen Peroxide	7722-84-1		<p>H302 Harmful if swallowed.</p> <p>H315 Causes skin irritation.</p> <p>H318 Causes serious eye damage.</p> <p>H335 May cause respiratory irritation.</p> <p>H413 May cause long-lasting harmful effects to aquatic life.</p>	<p>P273 Avoid release to the environment.</p> <p>P280 Wear eye protection.</p> <p>P302 + P352 IF ON SKIN: Wash with plenty of soap and water.</p> <p>P305 + P351 + P338 IF IN EYES: Rinse carefully with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P313 Seek medical advice/attention.</p>

5.0 EQUIPMENT AND MAINTENANCE

- 5.1 PPE: Disposable coveralls/laboratory coat, chemical resistant gloves, full/half facemask with ABEK2P3 filter, safety glasses with side protection (if not wearing a full face mask), tight shoes.
- 5.2 Virkon (and 70 % ethanol)
- 5.3 Perforated/non-solid shelves
- 5.4 Fans
- 5.5 Stokvis tape PN 411
- 5.6 Liquid H₂O₂ (30-35 %)
- 5.7 H₂O₂ gas generator
- 5.8 Catalyser
- 5.9 Humidity measuring equipment for H₂O₂
- 5.10 Computer
- 5.11 Drager X-am 5100 measuring equipment for concentration of H₂O₂
- 5.12 Telephone
- 5.13 Clean water

6.0 HISTORY OF EDITING

6.1 Written 16.11.2014 (Jorge Rodas Foeller)

6.2 Edited 29.06.2021 (Frøydis Kilmer)

7.0 REFERENCES

7.1 <https://law.resource.org/pub/us/cfr/ibr/004/imo.imdg.1.2006.pdf>

7.2 Hydrogen peroxide 35%: [1 \(ecoonline.com\)](#)

7.3 Hydrogen peroxide 30% AnalaR NORMAPUR®:

[20672822_286_fb58c67cca135eda30ca6bc95fefe5fd.pdf \(ecoonline.com\)](#)

7.4 Facemask: [Vernemaske, helmaske, 6000 | VWR](#)

7.5 Filters for facemask: [Filter, bajonettfeste, for 6000-/7000-/7500-serien | VWR](#)

Attachment 1

**DISINFECTION
WITH H₂O₂ IN
PROCESS -
ALL ACCESS IS
FORBIDDEN!**