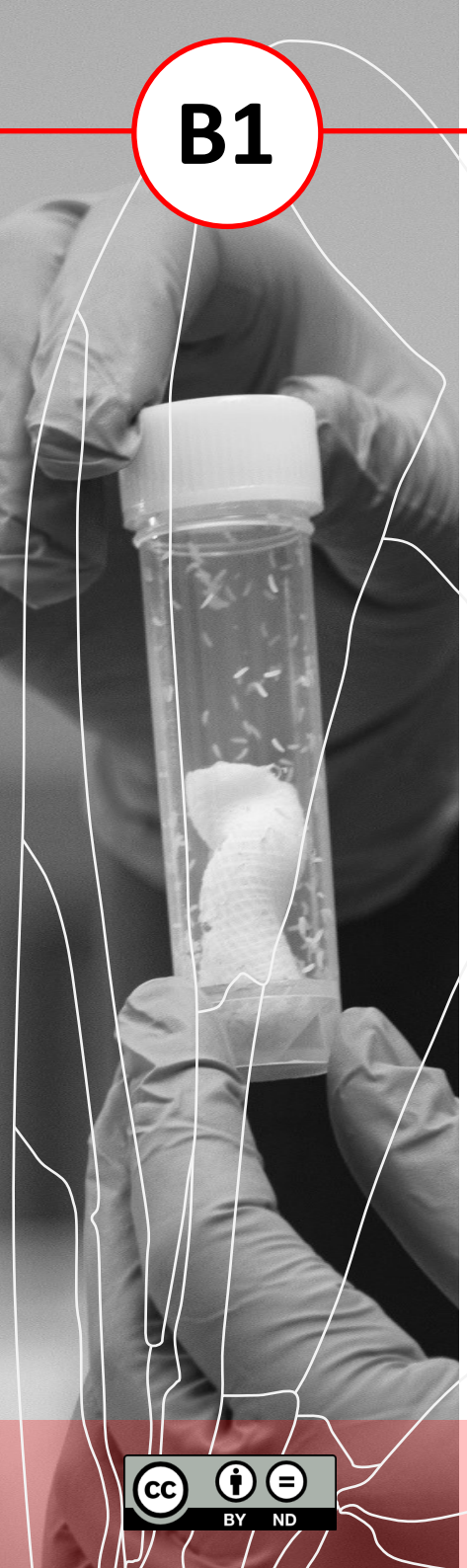


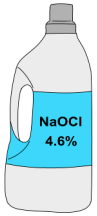
B1

How to disinfect objects with bleach

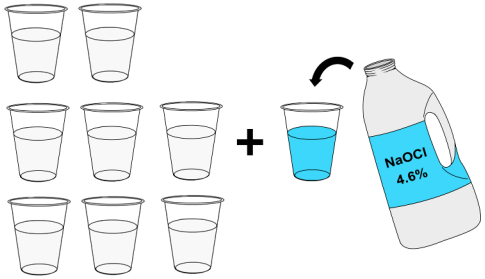
MedMagLabs
Medicinal
Maggot
Laboratories

There are several chemicals that can be used to disinfect equipment, some common such as ethanol and methanol and others not so common.

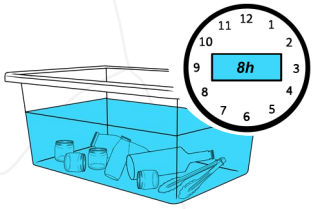
One of the most widely available disinfectants is sodium hypochlorite (NaOCl) also known as bleach.



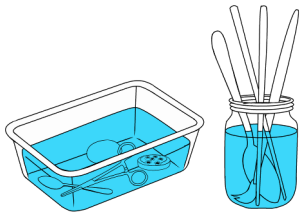
Most commercial bleach products contain 4.6% w/v of NaOCl.



Dilute this bleach with the right amount of clean water to make up a solution that contains 0.5% of NaOCl.

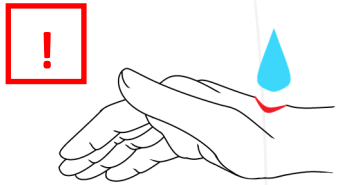


Soak materials that need to be sterile for 8 hours or overnight in 0.5% bleach.

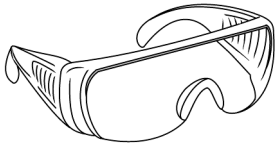


Use 0.5% NaOCl also during work in the clean bench to store required utensils.

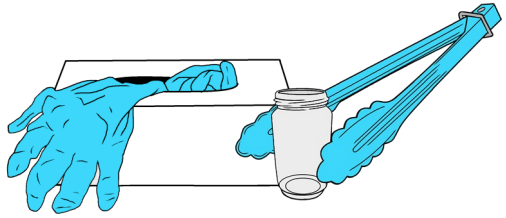
Drip-drying of disinfected containers is OK and won't harm eggs or maggots



Bleach is harmful to your skin and eyes. Avoid contact!



Protect your eyes with goggles or glasses if you can.



Wear gloves to protect your hands or use tongs to handle objects soaking in bleach solution.

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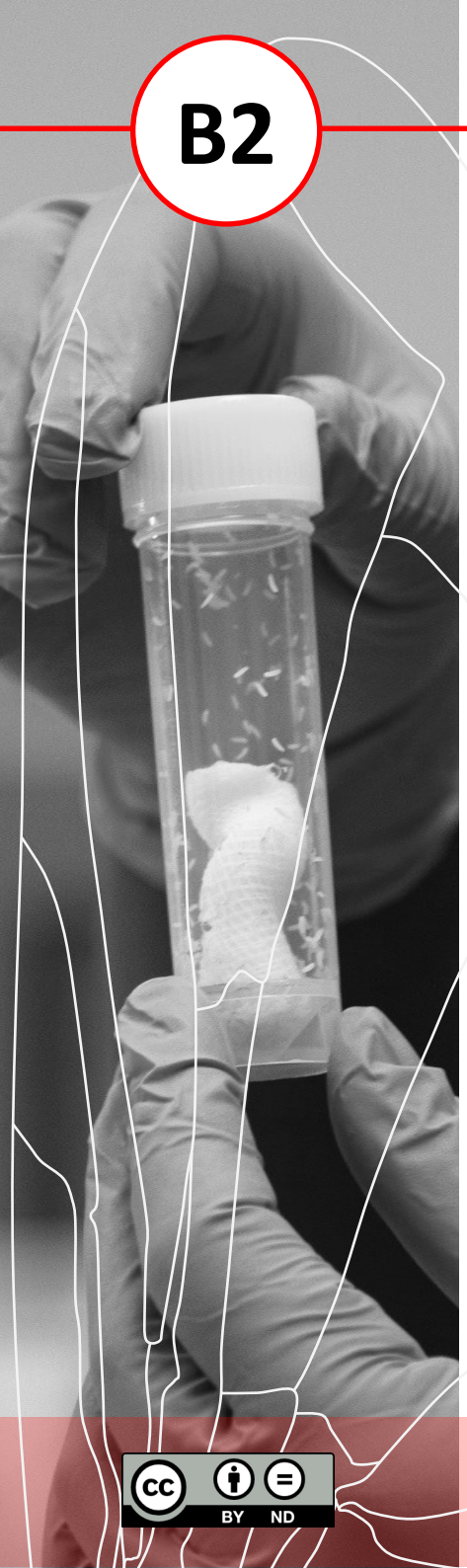
CREATING HOPE IN CONFLICT:
A HUMANITARIAN GRAND CHALLENGE

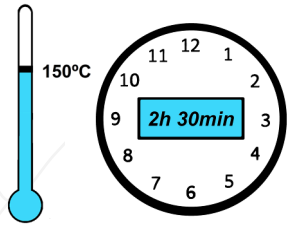


B2

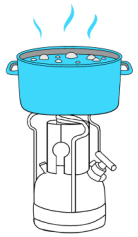
How to disinfect objects with heat

MedMagLabs
Medicinal
Maggot
Laboratories

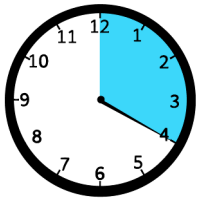
Disinfect glass and metal objects such as containers or cutlery in an oven.



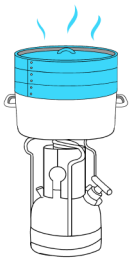
The speed of dry heat disinfection depends on the temperature.



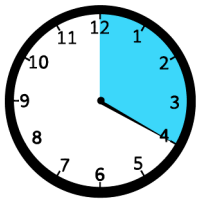
Boiling water and heat-proof objects kills most germs.



Boil the water and materials for at least 20 minutes.

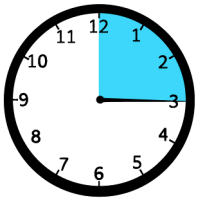


A food steamer also disinfects objects and heat-proof fabrics.

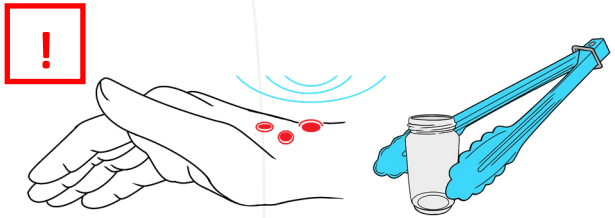


Steam the objects for at least 20 minutes under full steam.

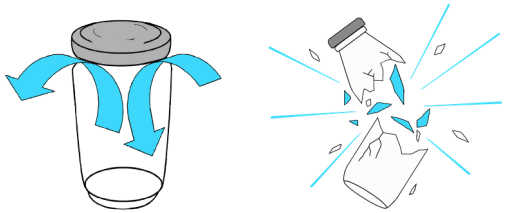
A pressure cooker can achieve high sterility like a lab autoclave.



Run the cooker on a high-pressure setting for at least 15 minutes.



Be careful not to burn yourself. Use oven mitts, heat-proof fabric, or tongs to pick up hot objects, or let them cool down first.



Never tighten lids on containers that you disinfect with heat. Hot air and steam must be able to escape, otherwise the container may explode.

CREATING HOPE IN CONFLICT: A HUMANITARIAN GRAND CHALLENGE

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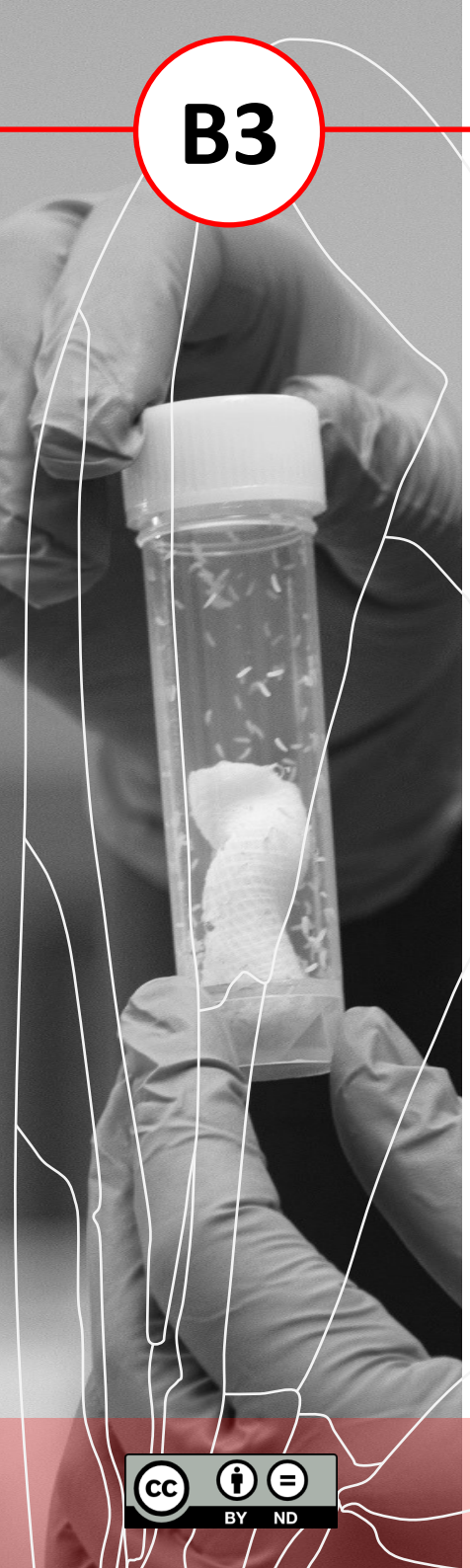
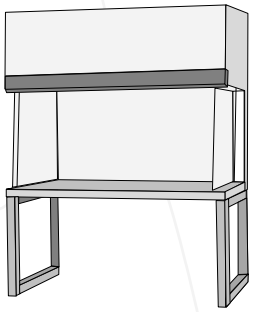


B3

How to construct a clean workbench

MedMagLabs
Medicinal
Maggot
Laboratories
MML

In modern laboratories scientists work in cabinets that remove germs from the air and keep their samples sterile. If you do not have access to such a laminar flow cabinet, you can build a simple clean workbench out of a cardboard box.



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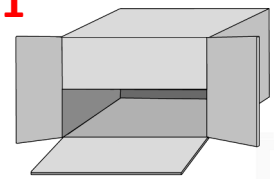
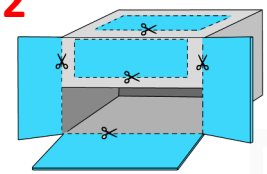


You need a large cardboard box, at least 60x45x45 cm.

2



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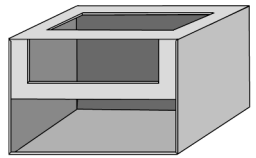
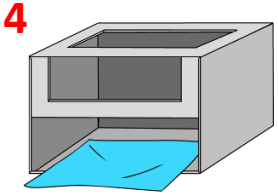


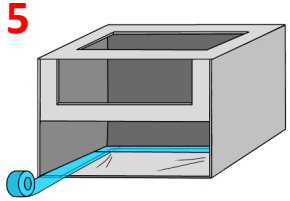
Remove unnecessary parts of the box and cut out two windows. The front window is to see through and the window in the top illuminates the work area.

4



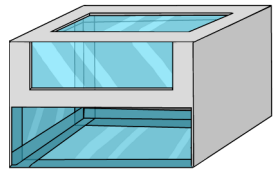
Line the floor and all other internal walls with new or reused plastic film.

5



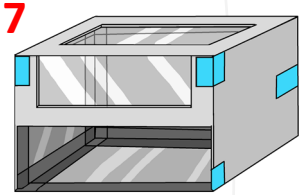
Tape the plastic to the box with non-woven plastic tape.

6

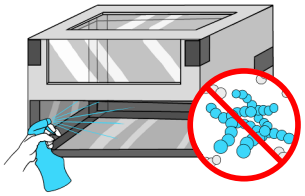


Cover windows with clear translucent plastic film to see through.

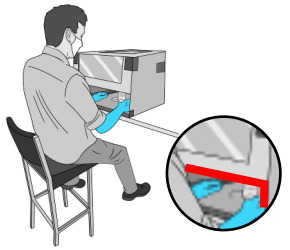
7



Secure the window flap to the box and strengthen the box with tape.



Before and after use, clean the internal surfaces with disinfectant.



Work well within the box but avoid touching the window with your arms.

CREATING HOPE IN CONFLICT:
A HUMANITARIAN GRAND CHALLENGE

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[U-B03-EN/2021-06] User Manual B3: How to construct a clean workbench.
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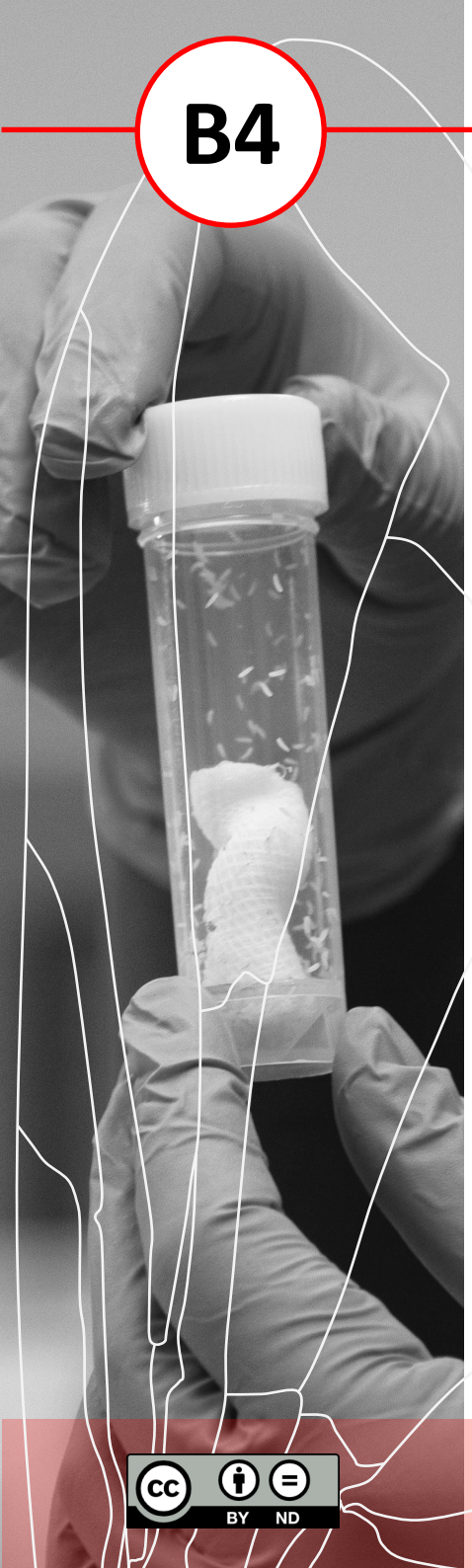
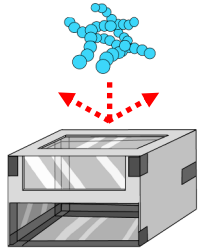


B4

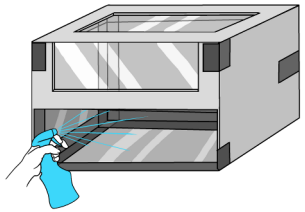
How to prevent contamination

MedMagLabs
Medicinal
Maggot
Laboratories

Use hygienic work practices that prevent contamination of materials and medicinal maggots during fly egg disinfection, incubation, and packaging of maggots for treatment.

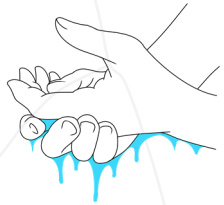


A laminar flow cabinet or a clean work bench prevent contamination.

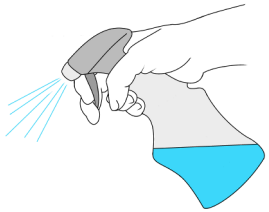


Disinfect the internal surfaces of the clean work bench before use.

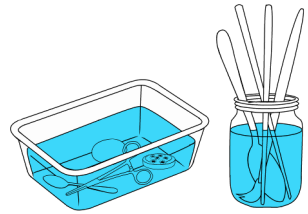
Wear a face mask during sterilisation, incubation, and packaging work.



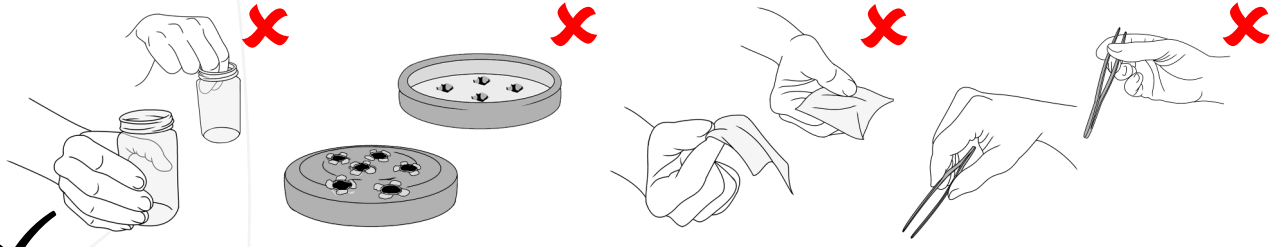
Wash your hands carefully with soap and clean water before and after lab work. Use hand sanitiser or 70-80% ethanol to disinfect your hands (and gloves if you use them).



Clean and disinfect your laboratory environment and work surfaces.



Use 0.5% NaOCl during work in the clean workbench to store required utensils.



✓ The way you handle materials and tools is important. Always hold disinfected objects in a way that protects the parts that need to stay germ-free from contamination. Only touch the outside of containers, keep container lids right-way up, hold fabric at the corners, and utensils at their back-end.

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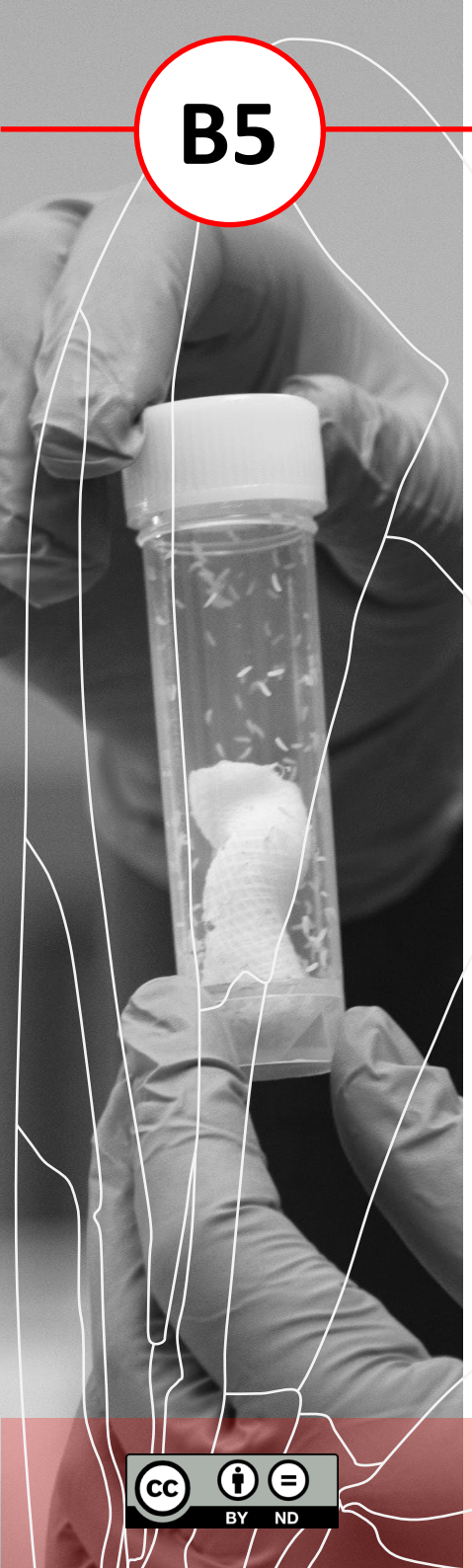
CREATING HOPE IN CONFLICT:
A HUMANITARIAN GRAND CHALLENGE

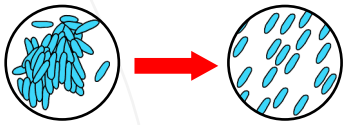


B5

How to harvest and separate eggs

MedMagLabs
Medicinal
Maggot
Laboratories
MML

Flies lay their eggs in clumps and eggs stick to each other. For proper disinfection to be possible, eggs must be first separated.



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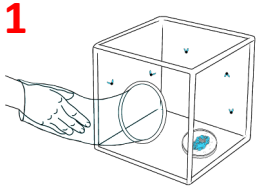
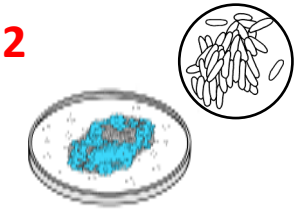


Place smelly old liver or other meat on a dish into the fly cage.

2-3 hrs

2



After two to three hours the flies will have laid many whitish eggs.

3

Steps 4-6 are optional

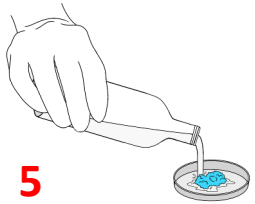
Remove the eggs from the meat. Make sure to collect only eggs and not meat.

Steps 7-11 are compulsory

4

Place the eggs into a shallow clean dish.

5

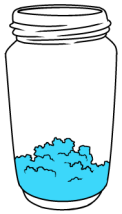


Pour clean water into the dish.

6

Carefully separate the eggs into smaller clumps or even individual eggs.

7

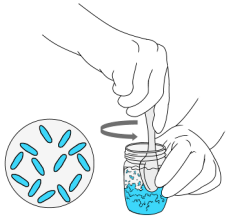


Place the separated or unseparated egg clumps into a container such as a food jar.

8

Add some more clean water.

9

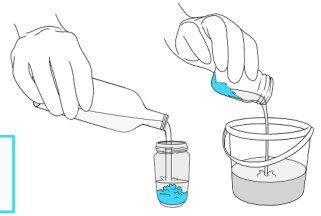


With a utensil such as a spoon or fork, stir the eggs vigorously.

10

Any eggs still stuck together float on the surface. Pour them and the water out but keep the eggs on the bottom.

11



2 x

Wash the separated eggs with clean water and let them sink to the bottom. Then pour the water out as before.

B6

CREATING HOPE IN CONFLICT: A HUMANITARIAN GRAND CHALLENGE

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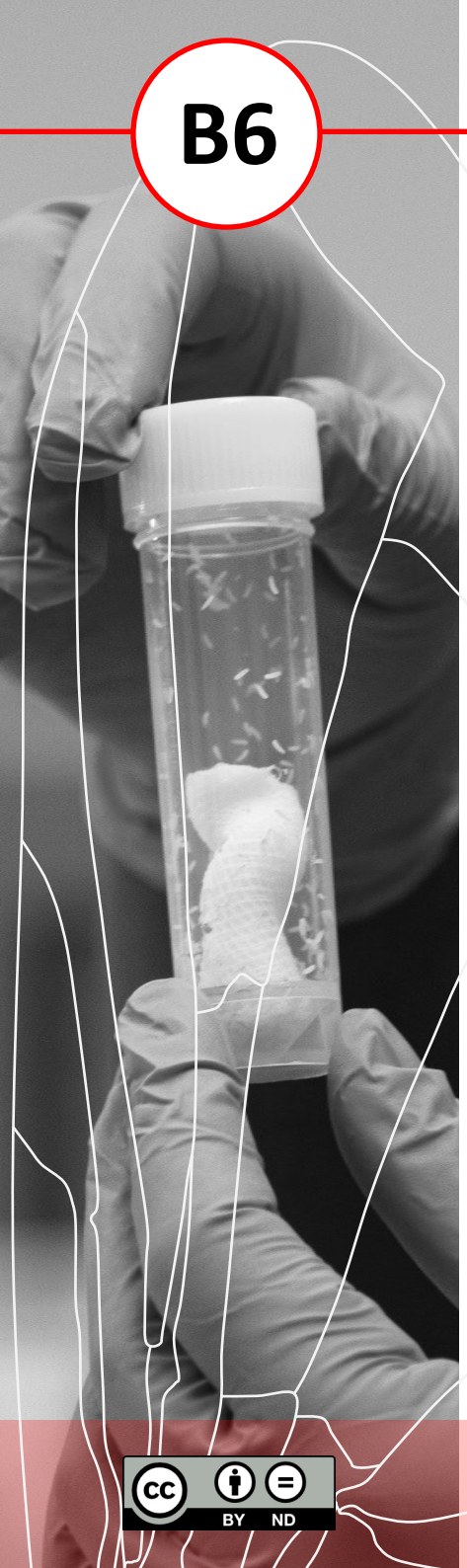


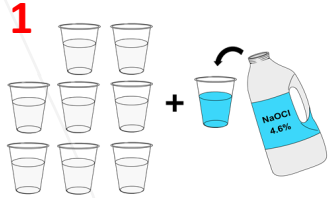
B6

How to disinfect fly eggs

MedMagLabs
Medicinal
Maggot
Laboratories

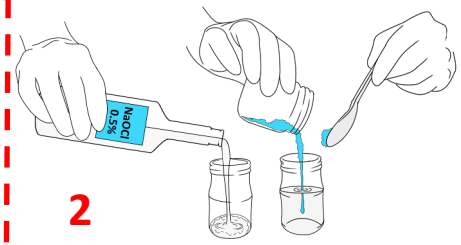
Sterile work procedure in clean workbench.
All materials must be disinfected before use.

1



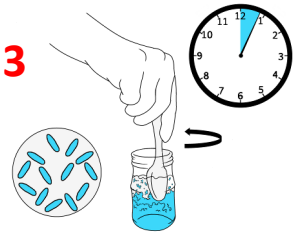
Dilute the NaOCl with the right amount of water to make a 0.5% solution.

2



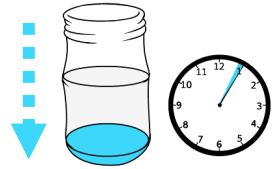
Fill a clean container with 0.5% bleach and add separated eggs.

3



Gently stir eggs for four minutes.

4



Let eggs settle to the bottom of the container for one minute.

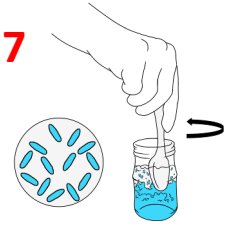
5

Pour out most of the bleach but keep the eggs in the bottom.

2 x

6

7



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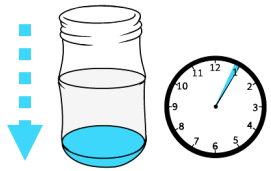
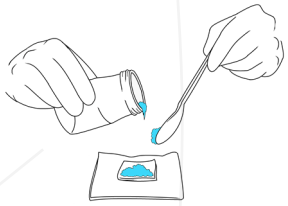


9

Add cold disinfected water (boiled for 20 minutes) and stir gently for a couple of minutes. Let the eggs settle again for a minute and pour the water out. Make sure to keep the eggs. Repeat this step at least once.

10



Get a piece of fabric that you have previously disinfected or sterile absorbent gauze from medical supplies. Place about 1/4 to 1/2 of a teaspoon of eggs onto the fabric pad.

→ B7 + B8

CREATING HOPE IN CONFLICT:
A HUMANITARIAN GRAND CHALLENGE

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[U-B06-EN/2021-06] User Manual B6: How to disinfect fly eggs.
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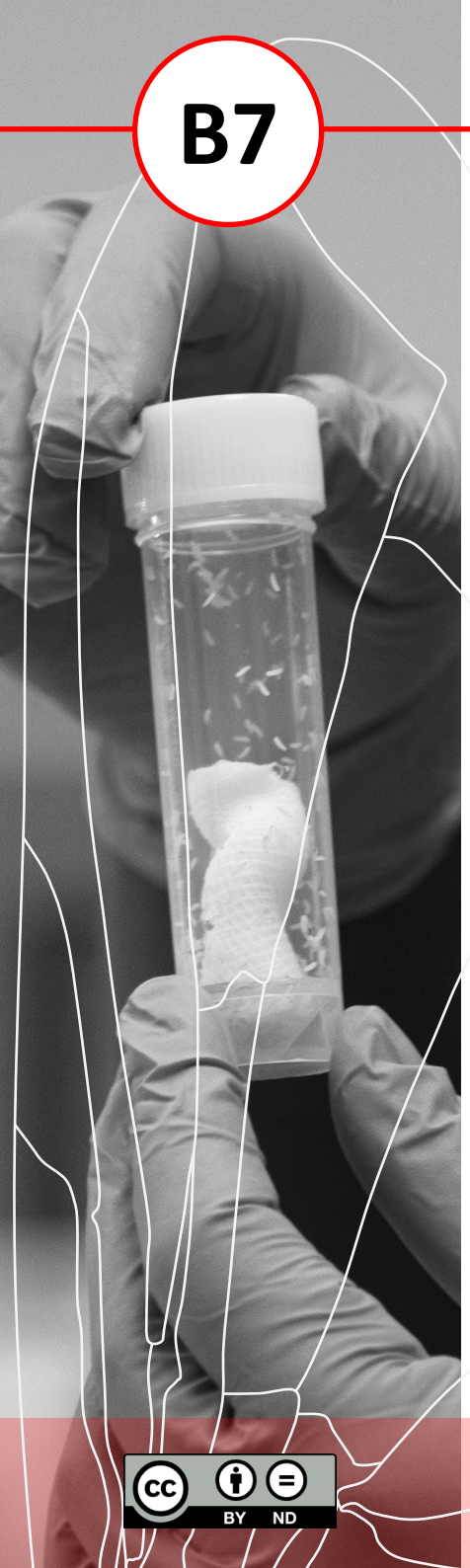

B7

How to construct incubation containers

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Medicinal
Maggot
Laboratories

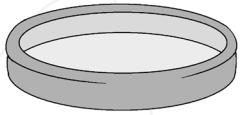
For maggot therapy, very young disinfected fly larvae are placed in the wound.

This means you must hatch the disinfected eggs first and grow the young maggots for 24-36 hours before they can be used to treat patients.

This is what you need:

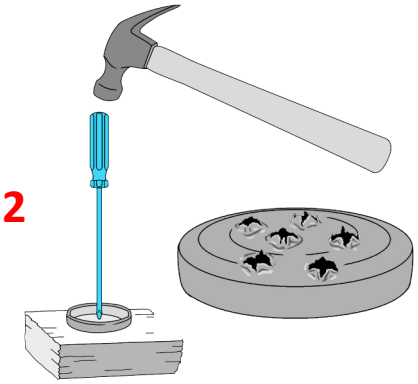
- a small food jar with two fitting lids
- a piece of finely woven fabric made from silk, polyester, or cotton
- a pair of scissors to cut the fabric
- a piece of wood
- a hammer
- screwdriver or other pointy metal instrument to punch holes into the lid

1



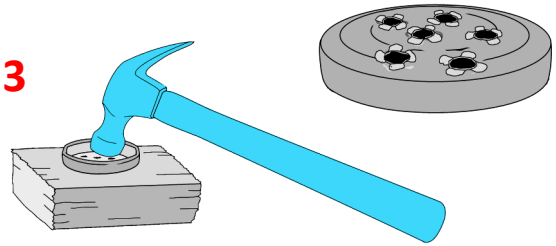
Place one of the lids upside-down on a piece of wood.

2



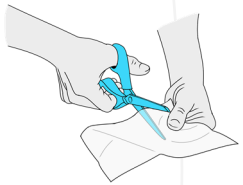
Use a hammer and a screwdriver or similar and punch holes into the lid.

3



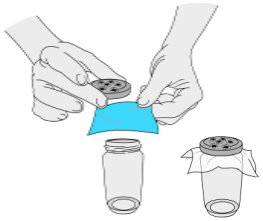
Then you need to flatten the sharp edges by punching the lid on a flat surface.

4



Cut a piece of fabric large enough so it can be sandwiched between the lid and the jar. Don't cut it too small because you want to be able to hold it later at the edges without contaminating it.

5



The incubation containers must be sterilised before they are used for medicinal maggots production.

→ B8

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[U-B07-EN/2021-06] User Manual B7: How to construct incubation containers.
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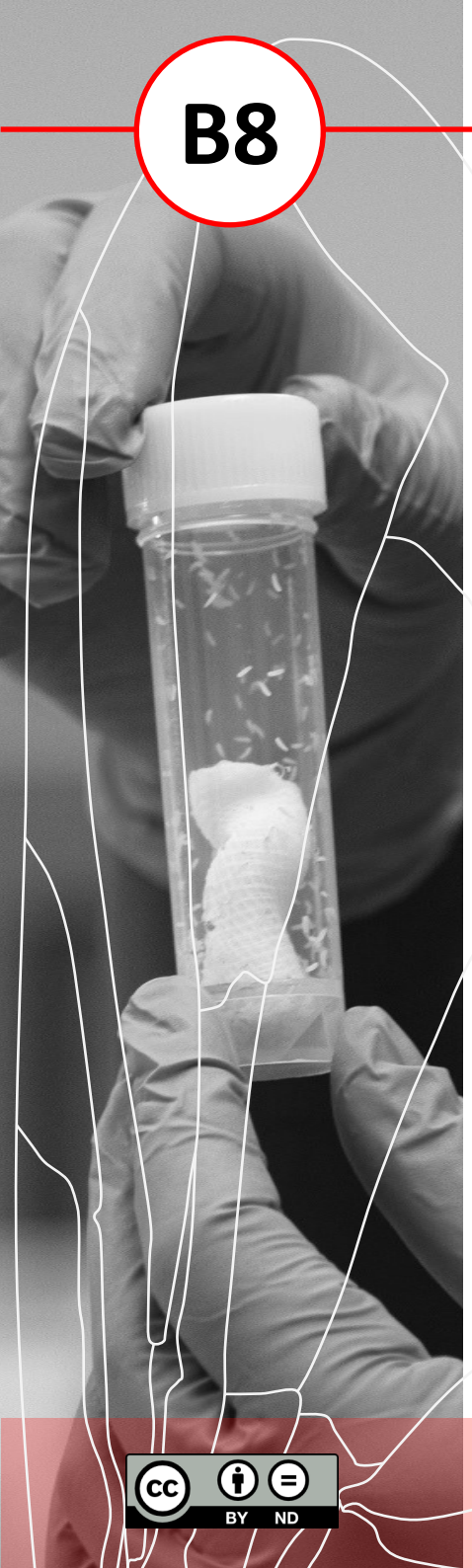
CREATING HOPE IN CONFLICT: A HUMANITARIAN GRAND CHALLENGE



B8

How to prepare the container for incubation

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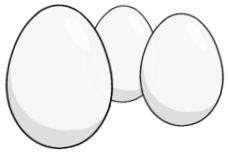
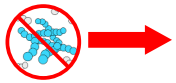
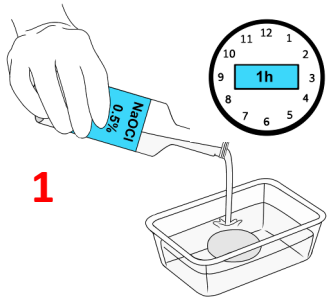
Medicinal
Maggot
Laboratories



The hatching maggots require protein food, and it must be germ-free. Fresh egg yolk is naturally germ-free and does not need to be sterilised.

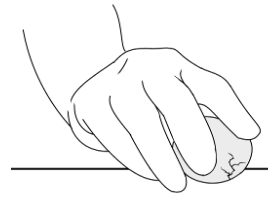


Sterile work procedure in clean workbench.
All materials must be disinfected before use.



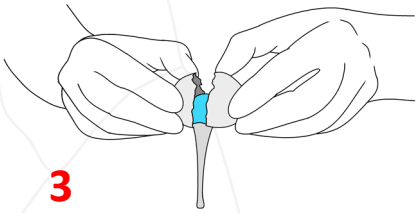
1

Submerse the chicken egg in 0.5% bleach for an hour or wipe it with alcohol.



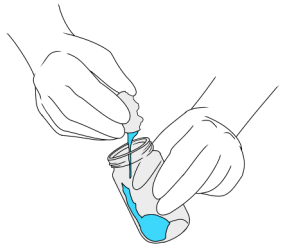
2

To collect the egg yolk, crack the egg on a disinfected surface.



3

Separate the yolk from the egg white.



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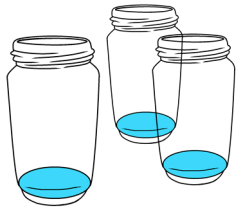


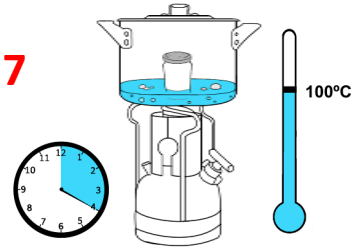
Discard the egg white but keep the egg yolk. You may spread a single egg yolk across two or three incubation jars.

5

Cover the jar loosely with the lid that has no holes (B7).

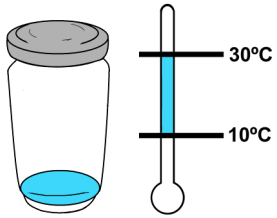
6

Do not tighten the lid. Air must be able to escape.



7

Place the jar for 20 min in a boiling water bath or oven at 100 °C.



8

Let the jar cool before you place fly eggs inside it.

Heating the yolk briefly will turn it into a solid food for young maggots and makes packaging of maggots for treatment easier.

→ B9

CREATING HOPE IN CONFLICT: A HUMANITARIAN GRAND CHALLENGE

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[U-B08-EN/2021-06] User Manual B8: How to prepare the container for incubation.
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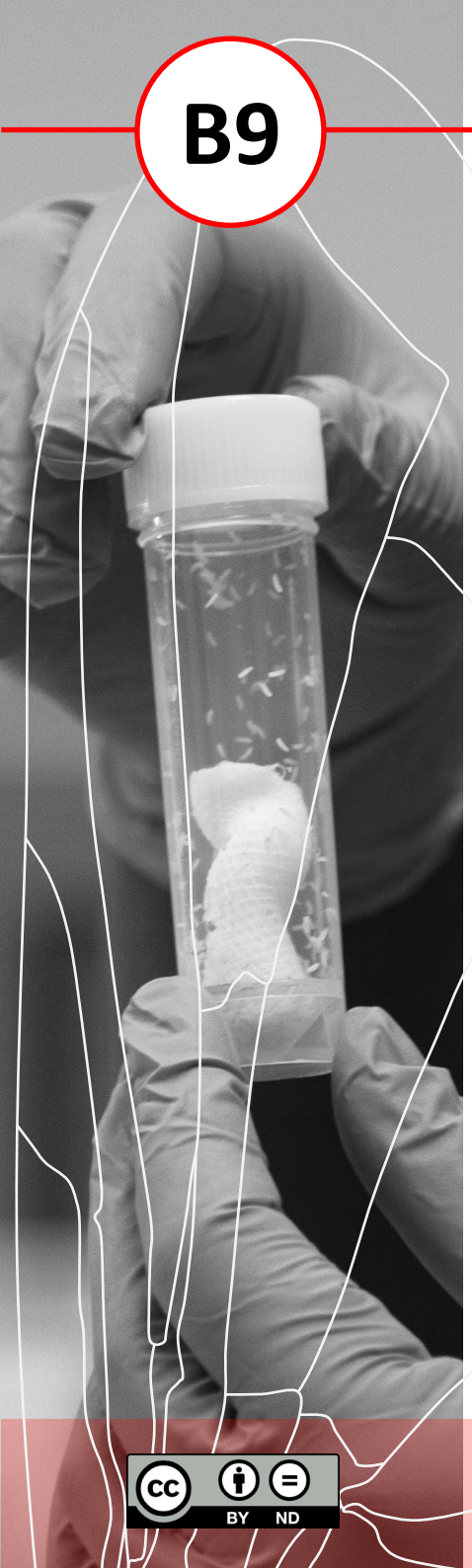
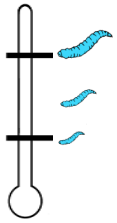


B9

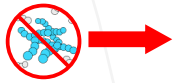
How to incubate disinfected fly eggs

MedMagLabs
Medicinal
Maggot
Laboratories
MML

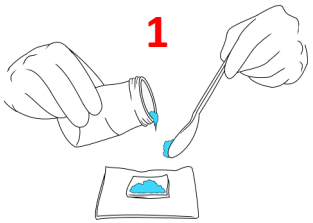
After you have disinfected the eggs, they are ready to be placed into the incubation containers you have prepared earlier.



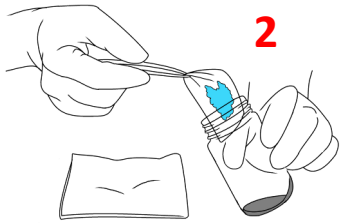
Eggs will hatch quicker and maggots develop faster the warmer it is.



Sterile work procedure in clean workbench.
All materials must be disinfected before use.

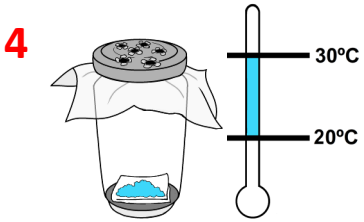


Transfer disinfected eggs to an absorbent sterile gauze pad.

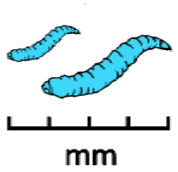


Place the fabric pad with eggs into a previously prepared incubation jar.

Close the incubation jar with a sterile fabric and a sterile lid with holes.



Incubate the eggs in a warm clean place for 24-36 hours.



When maggots are 2-5 mm long, they are ready for maggot therapy.

→ B10

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[U-B09-EN/2021-06] User Manual B9: How to incubate disinfected fly eggs.
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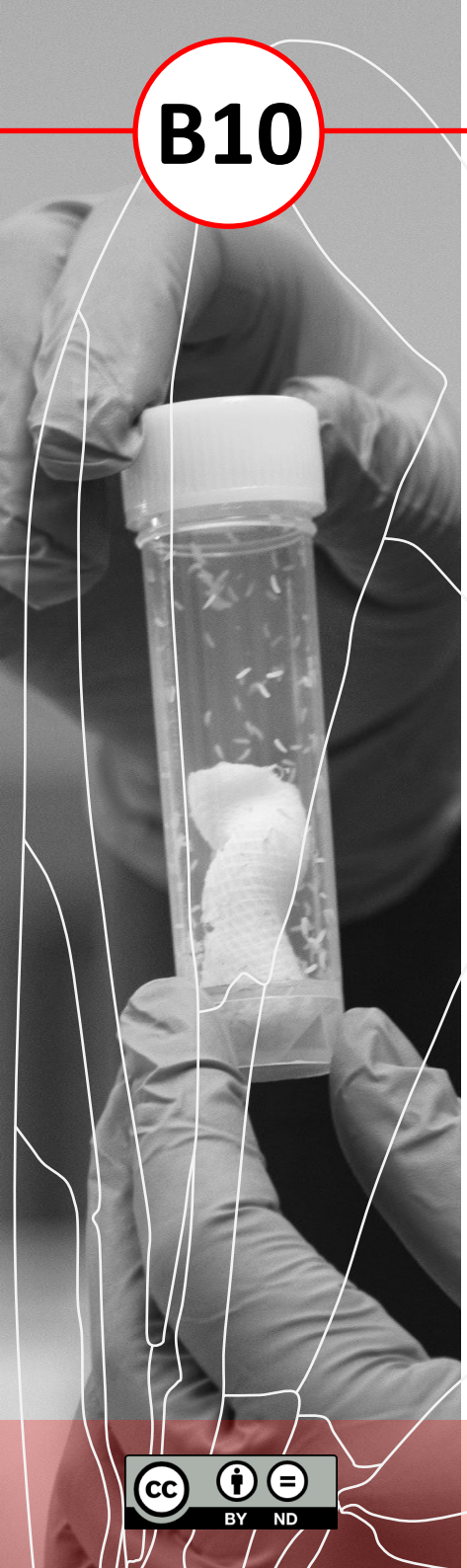
CREATING HOPE IN CONFLICT:
A HUMANITARIAN GRAND CHALLENGE

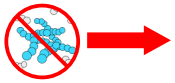


B10

How to package and transport medicinal maggots

MedMagLabs
Medicinal
Maggot
Laboratories

The recommended dose is 5-10 maggots per cm^2 of wound area. Keep this in mind when supplying maggots for treatment.



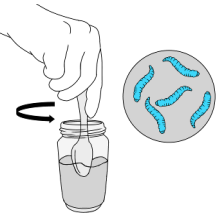
All materials must be disinfected before use.

The young maggots have grown for 24-36 hours on chicken egg and need to be separated from the food and packaged for transport.

1

Pour cool boiled water into the jar with young maggots.

2

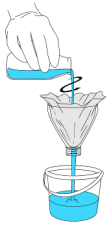


Stir the water to suspend the maggots in it. Remove the fabric pad.

3

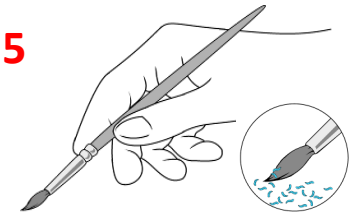
Pour the maggots into a funnel lined with finely woven fabric.

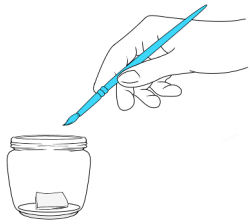
4



Wash the maggots with cool boiled water.

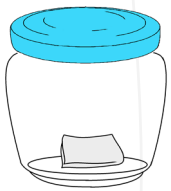
5



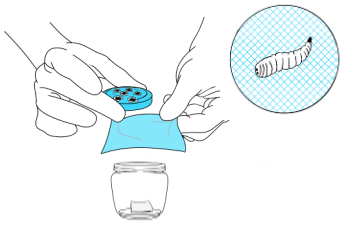


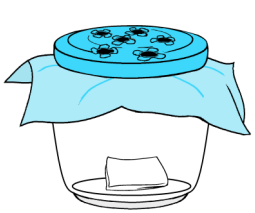
Use a brush to pick up a few maggots. A spoon can be used to pick up larger numbers of maggots at a time. Transfer them to a moist gauze pad or fabric in the transport container.

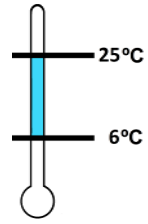
6



Close the container with an air-tight lid for storage or transport of less than an hour.







Close the transport container with a lid that allows air exchange if you transport or store the maggots for longer than an hour. Keep the maggots at between 6 and 25°C and use them within 24-48 hours.

CREATING HOPE IN CONFLICT:
A HUMANITARIAN GRAND CHALLENGE

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