

GM PLANTS SAFETY CERTIFICATION - QUESTIONNAIRE

Questionnaire minimal score to obtain the certificate: 92/100

1- The following actions are Good Laboratory Practices:

- ☐ A: Work with own clothes, use of automatic pipettes, separate trash and residues, post of safety and hazard signs and store reagents accordingly with incompatibility recommendations.
- ☐ B: Wear lab protection (lab coat, gloves, safety glasses, etc.), use of automatic pipettes, separate trash and residues, post of safety and hazard signs and store reagents accordingly with incompatibility recommendations.
- ☐ C: Wear lab protection (lab coat, gloves, safety glasses, etc.), mouth pipetting, separate trash and residues, post of safety and hazard signs and store reagents accordingly to lab space.
- ☐ D: Wear lab coat and gloves, use of automatic pipettes, separate trash and residues and store reagents accordingly with incompatibility recommendations.

2- Match safety signs

Answer:



1. Biological hazard



2. Low temperature hazard



3. Laser beam hazard



4. Ionizing radiation hazard

3- By recommendation of the World Health Organization the biological agents had been grouped in 4 risk groups based on their characteristics to cause illnesses, hosts type and transmission routes. Group characteristics are:

- | | |
|---------|--|
| Group 1 | A. Biological agent that can cause human disease, rarely serious, and might be a hazard to workers; it is unlikely to spread to the community; there is usually effective prophylaxis or treatment available. |
| Group 2 | B. Biological agent unlikely to cause human disease in healthy adult (no or low individual and community risk). |
| Group 3 | C. Biological agent that cause severe human disease and is a serious hazard to workers; it may present a high risk of spreading to the community; there is usually no effective prophylaxis or treatment available. |
| Group 4 | D. Biological agent that can cause severe human disease and present a serious hazard to workers; it may present a risk of spreading to the community, but there is usually effective prophylaxis or treatment available. |

4- ITQB has official permission to carry out research with microorganisms and genetically modified organisms ...

- ☐ A: ... of any biohazard level
- ☐ B: ... of biohazard level 1 and 2
- ☐ C: ... of biohazard level 1, 2 and 3
- ☐ D: ... of biohazard level 1 and 2 including GM plants because they do not pose any threaten to the environment

5- To avoid environmental contamination by GM material, ITQB's facility has:

- ☐ A: A plant greenhouse equipped with an anteroom, tight lock doors, no drains or sewer, sealed infrastructural support, and filters in the ventilation openings.
- ☐ B: A plant greenhouse equipped with an anteroom, with running water and regular sewer, and ventilation openings.
- ☐ C: A free access plant greenhouse equipped with an anteroom, no drains or sewer, sealed infrastructural support, and filters in the ventilation openings.
- ☐ D: A free access plant greenhouse equipped with an anteroom, with running water and regular sewer, and ventilation openings.

6- Candidates to gain access to containment greenhouse must:

- ☐ A: Be authorized by the PI.
- ☐ B: Be authorized by the Safety Officer.
- ☐ C: Solely sign the "**Access logbook**" at the Safety Office.
- ☐ D: Own an ITQB ID card and internal training certification on GM plants manipulation.
- ☐ E: Solely obtain internal training certification on GM plants manipulation.

7- At the facility, how and where personnel and activities registration is done?

- ☐ A: Anteroom and greenhouse keys will be delivered after signing the "**Access logbook**", at the Safety Office (1st floor), and must be returned immediately after exiting the facility. All samples (plants or seeds) must be labeled with a unique tag and registered in the "**Sample logbook**"; containing information about sample type, ID, amount (if applicable), activity to be performed (storage at fridge or freezer, to grow, to be analyzed at the lab, waste for autoclave or incineration, etc.) and the researcher signature. Research activity must be registered in "researchers' **Lab-book**".
- ☐ B: Access by authorized personnel is gained after signing their name, date and time in "**Access logbook**" kept at the Safety Office (1st floor). All activities in the facility, including sample registration and research description are done in "researchers' **Lab-book**".

- ☐ C: All samples (plants or seeds) must be labeled with a unique tag and registered in the “researchers’ **Lab-book**”; containing information about sample type, ID, amount (if applicable), activity to be performed (storage at fridge or freezer, to grow, to be analyzed at the lab, waste for autoclave or incineration, etc.) and the researcher signature.
- ☐ D: Access, samples and research activity can be registered in the “researchers’ **Lab-book**” and later copied for “**Access logbook**” and “**Sample logbook**”.

8- Sample logbook should contain:

- ☐ A: All the information bellow.
- ☐ B: Sample ID in the form of “project acronym”-“gene name”-“plant line” (e.g. SDS-SCE1a-1).
- ☐ C: Information about sample type, ID, amount (if applicable), activity to be performed (storage at fridge or freezer, to grow, to be analyzed at the lab, waste for autoclave or incineration, etc.) and the researcher signature.
- ☐ D: PI certification.

9- Access to GM plants greenhouse is allowable to:

- ☐ A: Special visitors, auditors, maintenance and service personnel whenever needed.
- ☐ B: Special visitors, auditors, maintenance and service personnel with safety precautions and under PI surveillance.
- ☐ C: Just to maintenance and service personnel for maintenance and equipment repair.
- ☐ D: Just to auditors because they must evaluate the facility.

10- All researchers and support staff working at the GM plants greenhouse are required to:

- ☐ A: Transport all materials in open boxes.
- ☐ B: Keep doors open when working in the greenhouse to help ventilation.
- ☐ C: Not change clothing before start working.
- ☐ D: Take precautions in order to prevent any transfer of GM material to the environment or introduction of contaminants in the greenhouse.

11- Small amount of stock materials can be stored inside ...

- ☐ A: ... the anteroom in the original boxes.
- ☐ B: ... the greenhouse in the original boxes.
- ☐ C: the anteroom within tight closed plastic boxes.
- ☐ D: ... the greenhouse within tight closed plastic boxes.
- ☐ E: ... in both places within tight closed plastic boxes

12- Entering the GM plants facility with your own lab coat is ...

- ☐ A: ... not allowed and you need to change clothing.
- ☐ B: ... not allowed and you must remove it.
- ☐ C: ... OK because you are picking a sample and it takes less than 1 min.
- ☐ D: ... OK because the decontaminated lab coats box is empty.

13- After entering the anteroom, all personnel are requested to dress up by the following order:

- ☐ A: 1. Over-shoes; 2. Gloves; 3. Lab Coat; 4. Hair Cap.
- ☐ B: 1. Lab Coat; 2. Hair Cap; 3. Over-shoes; 4. Gloves.
- ☐ C: 1. Hair Cap; 2. Gloves; 3. Over-shoes; 4. Lab Coat.
- ☐ D: 1. Gloves; Lab Coat; 3. Hair Cap; 4. Over-shoes.

14- Stepping in and out of the greenhouse should be minimized. If some work must be done in the anteroom...

- ☐ A: ... hair cap and lab coat have to be changed before re-entering the greenhouse.
- ☐ B: ... gloves and lab coat have to be changed before re-entering the greenhouse.
- ☐ C: ... lab coat and over-shoes have to be changed before re-entering the greenhouse.
- ☐ D: ... over-shoes and gloves have to be changed before re-entering the greenhouse.
- ☐ E: There is no need to change any part of the personnel protection equipment.

15- Anteroom and greenhouse doors must be kept closed as long as possible and, when more than one person has to work inside, doors can never be opened at the same time.

- ☐ A: True
- ☐ B: False

16- To keep greenhouse clean and avoid contamination of facility and personnel:

- ☐ A: Only seed-related work must be done inside secondary containment trays.
- ☐ B: Only trays including seeded soil must be kept inside secondary containment trays.
- ☐ C: All work must be conducted and kept inside secondary containment trays, including seeded soil trays.
- ☐ D: None of the above.

17- If an accidental spill occurs:

- ☐ A: All spills should be cleaned immediately by sweeping or using absorbing paper and sanitized with the appropriate disinfectant solutions (bleach, 70% ethanol, commercial solutions, etc.).
- ☐ B: All spills should be left to evaporate and then cleaned by sweeping or using absorbing paper and sanitized with the appropriate disinfectant solutions (bleach, 70% ethanol, commercial solutions, etc.).
- ☐ C: All spills should be cleaned immediately by sweeping or using absorbing paper, but sanitation of contaminated area is not necessary.
- ☐ D: None of the above.

18- To prevent the survival of organisms unintentionally transported outside the greenhouse environment:

- ☐ A: Experimental materials must be trashed and facility environment should be kept clean and as decontaminated as possible.
- ☐ B: Facility environment should be sterilized.
- ☐ C: Experimental materials must be rendered biologically inactive (devitalized) before disposal and facility environment should be kept clean and as decontaminated as possible.
- ☐ D: Experimental materials must be rendered biologically inactive (devitalized) before disposal and facility will be cleaned by authorized Cleaning Company.

19- Liquid residues to decontaminate by autoclave should not include organic solvents or chemical able to produce toxic vapors when heated.

- ☐ A. True
- ☐ B. False

20- After chemical decontamination of aqueous solutions, they must be autoclaved and disposed in the sewer.

- ☐ A. True
- ☐ B. False

21- Containers with liquid residues to decontaminate by autoclave must ...

- ☐ A. ... be completely full, closed with a loose cap or permeable material and stay in the autoclave for 20 min, at 121°C and 1.2 bar vapor pressure.
- ☐ B: ... contain 80% of nominal volume the most, closed with a loose cap or permeable material and stay in the autoclave for 20 min, at 121°C and 1.2 bar vapor pressure.
- ☐ C: ... be completely full, closed with a loose cap or permeable material and stay in the autoclave for 15-180 min (depending on volume), at 121°C and 1.2 bar vapor pressure.
- ☐ D: ... contain 80% of nominal volume the most, closed with a loose cap or permeable material and stay in the autoclave for 15-180 min (depending on volume), at 121°C and 1.2 bar vapor pressure.

22- To decontaminate solid dry residues by autoclave you must ...

- ☐ A: ... pack the residues as much as possible, close the bag and send to autoclave.
- ☐ B: ... pack the residues, close the bag and send to autoclave.
- ☐ C: ... pack the residues with sharp edges to the outside, close the bag and send to autoclave.
- ☐ D: ... pack the residues, add 0.5L of water to help vapor generation, close the bag and send to autoclave.

23- To avoid pollen dissemination, if plants are intended to grow till full mature state:

- ☐ A: A glaze or fine mesh bag must be secured around the entire plant.
- ☐ B: A glaze or fine mesh bag must be secured around the flowering stems.
- ☐ C: A glaze or fine mesh bag must be secured around the entire tray containing the plants.
- ☐ D: All flowering stems must be cut and trashed.

24- In case of emergency, take the following actions: (choose the correct order)

1. PI should be readily informed about any incidents or accidents either with human or environmental impact. If possible, try to limit the damages and/or injuries as well as accidental release of GM material.

2. Reported any facility occurrence in the “Access logbook”.

3. Immediately call for help and assistance. Unless the situation is life threatening, do not leave the facility before complete cloth changing and decontamination.

- ☐ A: 1; 2; and 3
- ☐ B: 2; 1; and 3
- ☐ C: 3; 2; and 1
- ☐ D: 3; 1; and 2

25- A first aid box, with material to treat small accidents, is available and located...

- ☐ A: ... outside the facility.
- ☐ B: ... inside the protection clothing cabinet.
- ☐ C: ... upon request to the Safety Officer.
- ☐ D: ... next to the plant trays.