

College/Unit:	Plant Sciences
Procedure Title:	2020 Pulse Pathology Laboratory Operations, June 15, 2020 to June 15, 2021

Author:		
Research Officer	Jerlene Halliday	
Print Title	Print Name	Signature

Authorized By:		
Professor	Sabine Banniza	
Print Title	Print Name	Signature

Amendments:		
Name	Date	Amendment
Sabine Banniza	August 21, 2020	Compulsory mask use in indoor spaces

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Revision History

Revisions to this procedure are to be documented in Table 1, Revision History.

Table 1: Revision History

Document Section	Details of Amendments	Date	Author (Initials)

1 Purpose

The COVID-19 pandemic has led to significant disruptions in all aspects of life. To facilitate the continuation of critical laboratory work from June 15th to November 15th 2020, this SOP establishes safe work practices to minimize the risk of infection for Plant Sciences personnel.

2 Applicable To

This applies to all Plant Sciences employees, researchers, and students that have received permission to resume work activities by the University of Saskatchewan.

3 Scope

This SOP covers additional measures that must be taken in light of the COVID-19 pandemic; it does not cover how to perform the assigned tasks themselves (i.e.: PCR, gDNA/RNA extractions, inoculum preparation, etc.), and as such is to be used in addition to any previously existing SOPs.

4 Definitions

PPE – Personal Protective Equipment

SOP – Standard Operating Procedure

Infectious agents – Various viruses and bacteria that can lead to human disease or illness (ie: COVID-19, influenza, etc.)

COVID-19 – the disease caused by the SARS-CoV-2 virus

SDS – Safety Data Sheet

Biosafety Level 2 Lab – a lab that works with Risk Group 2 (RG2) biological/biohazardous materials. Risk Group 2 organisms pose a moderate risk to the health of individuals and a low risk to public health.

Multiuser Laboratory Spaces – any space where more than one user works regardless of the research group

Face covering – Any non-medical mask worn over the nose and mouth

Working Alone – working in a location or circumstances where assistance is not readily available

5 Training – Course Registration can be found on: <https://safetyresources.usask.ca/>

Safety Orientation for employees

WHMIS

COVID-19 Health and Safety

Biosafety

Biowaste Training

Laboratory Safety

6 Safety

Hazards may include:

- Infectious agents (COVID-19)
- Biological and Biohazardous Materials
 - Plant pathogenic organisms
 - Nonpathogenic bacterial strains used for recombinant DNA/protein expression
- Chemicals
 - Beta-mercaptoethanol
 - Sodium Dodecyl Sulfate
 - Agarose
 - GelRed
 - Amonium persulfate
 - Tetramethylethylenediamine
 - Glycine
 - Methanol
 - Glacial acetic acid
 - Sodium Hydroxide
 - Antibiotics (Ampicillin, Kanamycin, Chloramphenicol, etc)
- Household and commercial cleaning supplies:
 - Various soaps and detergents
 - Bleach
 - Ethanol
 - Hand sanitizer

PPE required:

- Nitrile gloves
- Lab coat
- Face coverings/cloth masks
- Closed toed/heelled footwear
- Long pants
- Safety glasses

Resources available:

- SDS are available online and in physical form in the Agriculture building rooms 3C01 and 3C17
- Guideline on selection and use of face coverings
 - <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/prevention-risks/about-non-medical-masks-face-coverings.html>
- Instruction on proper hand washing:
 - <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/reduce-spread-covid-19-wash-your-hands.html>

- Saskatchewan healthline:
 - <https://www.saskatchewan.ca/residents/health/accessing-health-care-services/healthline>
- On aerosol and surface stability of COVID-19
 - https://www.nejm.org/doi/full/10.1056/NEJMc2004973?query=featured_home
 - <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/assumptions.html#a5>
- Hard surface disinfection and hand sanitizers:
 - <https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19.html>
- List of hard surface disinfectants for use with COVID-19
 - <https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19/list.html#tbl1>

7 Equipment and Materials

Equipment:

- Thermocycler/PCR and qPCR machines
- Gel electrophoresis tanks and power supply
- Chemidoc Gel Imaging system
- Centrifuges
- Microscopes (light and dissecting)
- Biosafety cabinet
- Laminar flow hood
- Fume hood
- Nanodrop Spectrophotometer
- Qubit Fluorometer
- Temperature-controlled orbital shaker
- Micro bead sterilizer
- Autoclave
- -80°C and -20°C freezers
- Pipettes

Material that may be used include:

- Glass beakers, flasks and bottles
- Graduated cylinders and other measuring devices for media preparation
- Disposable plastic tubes (microfuge, PCR and falcon tubes)
- Petri plates
- Tweezers and scalpel blades
- Glass slides

8 Procedure

This section is divided into 5 sub-sections, the first two (General Guidelines and Waste Disposal) are to be followed for all work, and the other three include additional precautions that are required for specific tasks.

I. General Guidelines

- a) Only persons identified as critical workers are permitted to resume work as per approved activity schedule, and only after completing COVID19-Health and Safety Training (.)
- b) Read general guidelines at <https://updates.usask.ca/working-on-campus/index.php#USaskSafetyTraining> and the Agriculture Building Re-Occupancy Guidelines https://hopper.usask.ca/ReOccupancy_Guidelines/RTW%20Final%20May%202029.pdf .
- c) Workers are NOT permitted to enter the Agriculture building or other University buildings for any reason without prior express permission from the University
 - a. Use assigned stairwells, elevators and washrooms https://hopper.usask.ca/ReOccupancy_Guidelines/RTW%20Final%20May%202029.pdf .
- d) Everyone needs to continuously self-monitor for symptoms and **fill in the COVID Self Monitoring Checklist** available at <https://updates.usask.ca/documents/self-monitoring-checklist.pdf>.
- e) If feeling unwell, do NOT come to work and contact your direct supervisor as soon as possible.
 - a. Contact the provincial health line (see references) if COVID-19 is suspected
- f) Everybody needs to **keep a work location journal**, recording what rooms, offices, laboratories, and buildings they have visited each day (available at <https://updates.usask.ca/documents/usask-work-location-journal.pdf>).
- g) All work is to be assigned in advance of the workday to minimize the need for in person contact and group assemblies.
- h) Once group work is assigned, the members of that group cannot change until the task is complete.
- i) Equipment and tools cannot be shared without thorough disinfection. Clean and disinfect work surfaces with freshly prepared 10% bleach prior to and after work. Please fill out the Cleaning and Disinfectant Log Sheet (available at <https://updates.usask.ca/documents/usask-cleaning-disinfectant-log.pdf>) located in each lab. More information about cleaning and disinfecting multi-use laboratory

spaces is found in Laboratory Safety Manual: Covid-19 Pandemic Supplement document (<https://updates.usask.ca/documents/laboratory-safety-manual-pandemic-supplement.pdf>).

- j) Shared equipment and spaces include fume hoods, laminar flow hoods, biosafety cabinets, lab benches, sinks, etc.
- k) Maintain proper physical distancing (2 meters between people) whenever possible.
- l) Only one person per fume hood or biosafety cabinet is allowed.
- m) Always wash hands upon entry and before exiting the laboratory. Refer to link on “Instruction on proper hand washing” under “Resources above”.
- n) Upon entering any laboratory space, all personnel must put on and wear the following PPE: long pants, closed toed and heeled shoes (with socks), nitrile gloves, eye protection and a laboratory coat.
- o) Face coverings/masks are required in all common and shared indoor spaces as per University policy starting August 24, 2020. The use of cloth masks is acceptable but donning, doffing, and usage standards must be applied (see <https://updates.usask.ca/working-on-campus/ppes.php#UseofRespiratorsandMasks>).
- p) All personnel are encouraged to utilize disposable PPE (e.g. gloves, masks, respirators) sparingly and ensure valuable PPE resources are not unnecessarily diverted from the healthcare system. Please refer to the USASK Disposable PPE Reuse and Extended Use Guidelines for more information on extended use of disposable PPE (see <https://updates.usask.ca/working-on-campus/ppes.php#MandatoryUseinLaboratories>).
- q) Laboratory coats, protective clothing or gloves are not to be worn outside laboratory spaces.
- r) Lab coats and PPE should always be stored separately (e.g. individual hooks or hangers) in designated areas for each worker to avoid cross contamination of clothing surfaces. Launder when visibly soiled.
- s) Lunch in common eating areas should occur in staggered rotations to minimize the number of people in the room. Physical distancing must be practiced at all times. All common touch items such as fridges, microwaves, kettles and coffee pots should not be shared amongst individuals.
- t) All workers are expected to follow federal and provincial guidelines and practice physical distancing when not at work

II. Waste Disposal

- a) Sharps

- i. Sharps include, but are not limited to needles, syringes, scalpel blades, lancets, capillary tubes, microscope slides, cover slips, tubing with needles attached.
- ii. Carefully dispose sharps in the appropriate, labelled container and should only be filled to 3/4 capacity. Once the container is full it should be replaced with a new one and the old one should be disposed through the appropriate hazardous waste disposal method.
- b) Biohazardous Waste (see reference)
 - i. Pipette tips, petri dishes, gloves, paper towels, etc used in microbiological work must be disposed in the yellow biohazard bag inside the reusable grey bin.
 - ii. When autoclaving waste:
 - i. Use only and do not overfill approved autoclave bags
 - ii. Use autoclave tape and ensure there is space in opening to allow steam to penetrate the bag.

III. Microbial Work

- a) Culturing of microbial organisms and inoculum preparation
 - i. All microbial work connected to our research group are to be done in a Biosafety Level 2 lab.
 - ii. Clean and disinfect work surfaces with freshly prepared 10% bleach prior to and after use.
 - iii. Choose the appropriate containment device (laminar flow hood, biosafety cabinet or chemical fume hood):
 - 1. Laminar flow hoods are primarily designed to provide a sterile work environment. It does not provide any protection to personnel. This should only be used for work with non-infectious materials, such as media preparation.
 - 2. Biosafety cabinets are designed to protect against exposure to particulates and aerosols from biological agents. They provide product, personnel and environmental protection.
 - 3. Chemical fume hoods are ventilated, enclosed work space intended to capture, contain and exhaust harmful or dangerous chemical fumes, vapors and particulate matter outside the laboratory. Do not use if sterility is a concern.
- b) Autoclave use
 - i. Do not operate autoclave without prior training.
 - ii. Please record your autoclave use on the Autoclave Log Sheet.
 - iii. Do not press the large red emergency stop button during a cycle unless there is an actual emergency (such as media bottles exploding inside the chamber or smoke, fire, flood etc). **If a cycle fails, it should be aborted by selecting the "abort" button on the touchscreen.**
 - iv. Clearly label the media contained in bottles and other containers.
 - v. Wash and clean the materials used in making media as soon as possible. Do not leave them on the sink.

- c) If considering working alone, a job hazard analysis and Working Alone/After Hours Plan must be completed and adhered to (see references for template)

IV. Microscopy Work

- a) Do not operate the microscopes without training.
- b) Ensure that everything (power, lights, etc.) are turned off prior to wipe down.
- c) **Microscopes need to be wiped down with 70% Ethanol after use.** DO NOT use bleach, as this will degrade the equipment. Wipe the supporting tubes of the eyepieces lenses, knobs, switches, etc with either Kim wipes or tissue paper.
- d) Use absolute ethanol and **lens tissue** to wipe to clean and disinfect the lenses.
- e) If considering working alone, a job hazard analysis and Working Alone/After Hours Plan must be completed and adhered to (see references for template)
- f) If working in a group:
 - i. Limit group size to the minimum number of people necessary
 - ii. Divide work duties in a way that limits sharing of tools and allows for physical distancing (i.e.: one person measures and dictates, the other writes).

V. Molecular Work

- a) Use of Thermocyclers
 - i. Please plan your PCR and qPCR experiments and book the machines using the calendar sheet.
 - ii. Clean and disinfect the machines with 10% bleach prior to and after use.
- b) Running electrophoresis gels and imaging
 - i. Clean and disinfect the common-use microwave and pipettes with 10% bleach when making Agarose gels prior to and after use.
 - ii. Add the GelRed under a fume hood.
 - iii. Run the electrophoresis gels in the designated area.
 - iv. Wash and clean the materials used in making the gels and buffers as soon as possible and do not leave them on the sink.
 - v. Clean and disinfect the ChemiDoc machine and the computer keyboard with 10% bleach prior to and after use. Touch the buttons and screen with clean gloves.
- c) Nucleic acid and protein extractions
 - i. Nucleic acid extractions done with commercial kits can be performed on a lab bench (always check the kit instructions) except when using Beta-mercaptoethanol for RNA extractions.
 - ii. RNA extractions using Beta-mercaptoethanol is done under the fume hood.
 - iii. Clean and disinfect pipettes and pipette holders, centrifuges with 10% bleach.
 - iv. After use, wipe the upper and lower pedestals of the NanoDrop with a clean, lint-free lab wipe (Kim wipe) and 0.5% bleach to ensure that no biologically active material is present on the measurement pedestals. Follow with a final cleaning of both measurement surfaces with dH₂O. Do

not use a squirt or spray bottle to apply dH₂O or any other liquid to the surface of the instrument.

- d) If considering working alone, a job hazard analysis and Working Alone/After Hours Plan must be completed and adhered to (see references for template)
- e) If working in a group:
 - i. Limit group size to the minimum number of people necessary
 - ii. Divide work duties in a way that limits sharing of tools and allows for physical distancing

VI. Tasks not otherwise listed

- a) Any task not otherwise mentioned must adhere to the General Guidelines and Vehicle Use Guidelines
- b) If considering working alone, a job hazard analysis and Working Alone/After Hours Plan must be completed and adhered to (https://safetyresources.usask.ca/procedures_forms/documents/Working%20Alone%20or%20After%20Hours.pdf).

9 Procedure Review

This SOP is to be reviewed at periods not exceeding 3 years or if the University and/or government guidelines around COVID-19 change significantly.

10 Records

In accordance with physical distancing, records of receipt and sign off will only be kept digitally.

11 References

- Instruction on proper hand washing:
 - <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/reduce-spread-covid-19-wash-your-hands.html>
- Saskatchewan healthline:
 - <https://www.saskatchewan.ca/residents/health/accessing-health-care-services/healthline>
- Laboratory Safety Manual: Covid-19 Pandemic Supplement. For Donning and Doffing Cloth Masks, read Appendix B
 - <https://updates.usask.ca/documents/laboratory-safety-manual-pandemic-supplement.pdf>
- Disposable PPE Reuse and Extended Use Guideline
 - <https://updates.usask.ca/documents/usask-disposable-extended-use.pdf>
- Cleaning and Disinfectant Log Sheet
 - <https://updates.usask.ca/documents/usask-cleaning-disinfectant-log.pdf>
- Biohazardous Waste Disposal Guideline

- https://safetyresources.usask.ca/documents/biosafety_files/Biohazardous%20Waste%20Disposal%20Guidelines.pdf
- On aerosol and surface stability of COVID-19:
 - https://www.nejm.org/doi/full/10.1056/NEJMc2004973?query=featured_home
 - <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/assumptions.html#a5>
- Hard surface disinfection and hand sanitizers:
 - <https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19.html>
- List of hard surface disinfectants for use with COVID-19
 - <https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19/list.html#tbl1>
- Guideline on selection and use of face coverings
 - <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/prevention-risks/about-non-medical-masks-face-coverings.html>
- Provincial Self-Monitoring Guidelines
 - <https://www.saskatchewan.ca/government/health-care-administration-and-provider-resources/treatment-procedures-and-guidelines/emerging-public-health-issues/2019-novel-coronavirus/self-monitoring>
- Working Alone/After Hours Plan and Hazard Analyses Template
 - <https://safetyresources.usask.ca/research/work-alone.php>