



Plandaí Biotechnologies South Africa (Pty) Limited

APPROVED STANDARD OPERATING PROCEDURES

June 30, 2017

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General

All employees working in direct contact with cannabis plants shall observe the following general practices:

- No jewelry apart from a wristwatch shall be worn during work hours.
- Employees shall wash their hands with soap and hot water at the beginning of every shift and prior to handling and plants or equipment.
- Employees shall don approved coveralls and rubber boots prior to working in any restricted area.
- Hair nets shall be worn inside of all areas where plant material is present.
- Sterile gloves shall be worn when handling plants.
- Face masks shall be worn inside of all areas where plant material is present.

SOPs for each job function are to be posted within the designated work space. Employees are to sign a copy of the SOP for their work area indicating that they have been trained on the procedures. A copy of the signed SOP will be maintained in the employee files.

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Propagation Strategy

The first plants stock will come from seeds. The company has selected White Widow as the appropriate initial seed stock as it is genetically stable and has high cannabinoid levels. The chief agronomist will determine the number of seeds required. Any male plants will be discarded so that only female plants remain. Once viable female plants are established, the company's agronomist will select the healthiest plant with the most buds. This plant will be used as the "mother" for the initial cloning efforts.

All plants used in production will be clones to ensure chemical profile stability. In order to prevent genetic drift, the company will rotate the cloning donor plants every three cycles, meaning that a "mother plant" will only be cloned three times before being discarded. It is expected that each mother plant will contribute 5 cuttings per clone cycle, which then mandates that 10 "mother" plants be maintained in the propagation room so that a total of 50 plants are in created per cycle. These plants will be segregated from the clones by curtains so that light to the mothers and clones can be managed separately.

Seed and Clone Room:

The room will be maintained at a stable temperature of 23/25 degrees Celsius (74-77 deg.F).

- Room to have interior and exterior gauges that relay internal room temperature. In addition, room temperature will be fed to the computer in the equipment room for monitoring.
- Agronomist is to verify external temp gauge at the commencement and conclusion of their shift. Internal room temperature to be confirmed every time agronomist enters the room.
- Alarm to notify if temperature falls outside the designed parameters. Agronomist to adjust the heating or cooling accordingly and monitor every 30 minutes until stable, in-range, temperature is achieved.
- Deviations in temperature outside of the set range are to be noted in the batch log, stating date, time, variance, and when temperature returned to range.

The soil shall have a pH-value of ± 5.5 .

- Agronomist to test soil at the beginning of the shift and log the results
- Deviations outside of the optimal are to be noted in the log
- Agronomist shall apply the necessary PH stabilizer, then re-test every hour until the desired level is achieved.

Lights shall be fluorescent and remain on 24-hours a day when there are plants within.

- Agronomist shall visibly confirm lighting at the beginning and end of every shift.
- Burned out or defective lighting shall be logged and replaced.

Seed propagation

- the soil should not be too dry or too wet.
- sow the seeds in a soil-filled, individual container about 5 mm deep.
- after sowing press the earth lightly to stimulate even sprouting.
- spray the soil lightly with water.
- cover the container with thin transparent plastic wrap to achieve an optimal greenhouse effect.
- Seeds shall be inspected at the beginning and end of every shift until sprouted
- Once seeds sprout (5-10 days), remove the plastic covering.
- sprinkle the soil regularly with water, wait till the upper layer has dried out, and sprinkle again with water. Plants shall be inspected every 4 hours.
- after 1 - 2 weeks the seedlings will be strong enough to put them in a larger container.
- Seedlings shall be transplanted into 1 liter growing pots and moved to the Vegetation Room.

Cloning

Preparation –

- Add a half-gallon of distilled water to a 1-gallon container.
- Adjust the pH of the distilled water to 5.5 using pH stabilizer.
- Add 10-12 rockwool cubes and allow to soak overnight. Pour out water solution, leaving cubes in the container.
- Add half-gallon of distilled water into the container with the cubes.
- Following the recommended dosage on the product label, add cloning solution to the 1-gallon container and stir it around gently with the rockwool cubes.
- Adjust the pH to 5.5
- When cloning, room humidity shall be increased to 75-95%. Agronomist shall verify humidity levels at the beginning and end of every shift. Humidifier shall be checked for water levels at the beginning and end of every shift.
- Scissors, razor blades, or other tools for cutting clones shall be cleaned with rubbing alcohol or bleach wipes prior to use.
- Trays, root zone media and other materials shall be cleaned and wiped with bleach wipes prior to use.
- Cloning cubes, cloning powders and gels shall not be reused.
- Agronomist shall use sterile rubber gloves and a particulate face mask during cloning procedures and when handling clones.

Cloning Procedures -

Step 1 - Select a cutting from a mother plant.



- They are healthy and vibrant.
- The veins in the leaves are clean and translucent.
- They have a structure consisting of at least six nodes.
- The diameter of their stems is equal to or greater than the diameter of the holes in the rockwool cubes.

Once a suitable branch is chosen, remove it by making a single cut as close to the main stem as possible using a sterile scalpel. This is the first or primary cut of the two you'll make to create the clone. Place the severed end of the branch into the solution-filled glass dish immediately after the primary cut is made. Exposure to air during this time will cause the cells within the cut part of the branch to oxidize and die.

Step 2 - Remove the leaves and small side branches leaving a nice cluster on the top of the cut. A minimum of three inches of stem shall be left below the leaves.



Step 3 – Make the final cut while the stem is submerged in the solution. The final cut should be made through the center of the fifth node from the tip of the branch. The cut should be made at approximately a 45-degree angle to increase the surface area of the wound from which the roots will grow. Once the cut is made, quickly remove the cutting from the water, gently shake off the excess water, and place the cut end into the cloning gel. Let the cutting sit in the gel for about 15 seconds.



Step 4 - Transfer the cutting into a rockwool cube. Resist the urge to push the cut end of the clone down beyond the bottom of the hole in the cube. If the diameter of the cutting's stem is equal to or greater than the diameter of the hole, it will fit securely enough. Pushing it down into the rockwool can harm the stem and stress out the clone.

Step 5 – Add solution to the cloning tray arrange rockwool cubes one by one and space them equally in rows of two along the inside of the tray. Give them plenty of space, as you don't want the cuttings to touch each other while they're in the dome. Overlapping leaves will form condensation between them, which could lead to mold and mildew problems.

Step 6 - Just clones alone until you see roots emerge from the bottom of the cubes. Once the roots are between a half-inch and 1 inch long, the cuttings are ready to transplant.

Watering – Clones are to be watered frequently to ensure that the soil remains moist but not soaked. Agronomist shall check the soil periodically during their shift.

Transplanting -

It is crucially important to transplant your cuttings before their root tips dry out or they become root-bound. The health of the roots during the clone stage will determine the strength and vigor with which the plant will continue to grow. Either you transplant a cutting on time and the plant continues to thrive, or you miss it and the plant spends the next couple of weeks with hindered growth while trying to recover.

Each plant will require one clear and one red plastic cup.

Cut drainage slits around the bottom edges of both the clear and red plastic cups.

Label the red cups with the permanent marker. Include the name of the strain and the date of the transplant. Each plant shall be given a unique identifying number that shall be catalogued.

Fill the clear cups halfway with organic soil.

Sprinkle a small scoop of mycorrhizal fungi over the soil in the clear cups to help the roots quickly acclimate to their new surroundings.

Place the rooted clone in the center of the clear cup and, gently but tightly, pack the soil to just above the top of the rockwool cube.

Place the clear cup containing the newly transplanted clone directly into the corresponding pre-labeled red cup, where they will be ready to be watered.



Vegetation Room –

Once clones have been transplanted, they are transferred to the vegetation room.

Vegetation room shall be maintained at a temperature between 68-78 deg F. Humidity shall be maintained at 50-75%. Agronomist shall inspect temperature and humidity at the beginning end of every shift, noting the observed numbers in the daily log, indicating time of inspection and results.

The Vegetation room shall have fluorescent lighting that shall be maintained on 24 hours of day. Agronomist shall observe the lighting and note any issues such as non-working lights, etc.

Watering and fertilizer shall be controlled automatically from the equipment room. Agronomist shall inspect the plants once every shift to ensure the soil is moist. Specific pH and water requirements shall be set by the Agronomist and posted in the equipment room.

As plants grow, the Agronomist shall inspect for any male plants. Male plants are to be removed and mulched for fertilizer in the equipment room. Agronomist shall note the following:

- Plant identifying number.
- Date of inspection.
- Date of plant destruction.

Agronomist shall inspect the root system of plants by lifting the clear plastic cup from the red cup. Once root system is fully developed, plants shall be transplanted to 5 gallon pots.

Transplanting procedures –

Prepare 5 gallon pots by mixing soil and perlite to facilitate drainage. Fill the bottom third with the mixture.

Carefully remove the plant from the clear plastic cup. If it does not easily come out of cup, roll the cup between your hands to loosen the soil.

Place the root ball into the pot and cover with additional soil so that roots are fully covered. Pat down the soil to secure the plant in place.

Water the plant until water drips from the draining holes on the bottom on the pot.

The pot shall be labeled using a permanent marker indicating:

- Unique plant ID number
- Date of cloning/germination
- Date of transplantation

The transplanting information shall be updated on the electronic record.

Growing/Flowering Room -

Once the lead agronomist determines that plants are ready for the flowering stage, such plants will be relocated to one of the flowering room. The agronomist shall record the date of transfer on the pot in permanent marker and shall update the electronic record.

The flowering room shall have fluorescent lighting that shall be cycled on/off in 12 hour shifts.

All watering and fertilization shall be automatically adjusted and maintained. The lead agronomist shall set the watering and fertilization schedules and post them in the equipment room.

In order to maintain optimal and consistent chemical profiles, plants shall be maintained in the flowering state not more than 18 months. After 18 months, the plants shall be discarded in accordance with procedure:

- The electronic record shall be update to note date and time of destruction.
- Two persons shall be present and witness the destruction of all female plants. The names of each witness shall be noted in the electronic record.
- The plant shall be mulched and placed in the compost bin.
- The pot shall be discarded. Pots may not be reused as they are labeled with the plant information and reuse could cause confusion.

The agronomist shall inspect all flowering plants on a daily basis. Inspection shall consist of:

- Examining leaves and soil for signs of under or over watering.
- Examining leaves for signs of under or over fertilization
- Examining leaves and buds for parasitic or insect infestation or other disease

Any plant contaminated with disease or infestation shall be removed from the flowering room and placed in an empty flowering for observation and treatment. The electronic record shall be annotated to disclose any variances or corrective action taken.

If the plant cannot be saved, it shall be discarded in accordance with the established destruction protocol.

Harvesting –

Specific harvesting guidelines will be established between the lead agronomist and the chief scientist so that consistent chemical profiles are maintained. The harvest dates and times will be determined based on physical examination of the plants.

Only the agronomist is permitted to harvest plants. The following procedures shall be maintained:

- The date and time of the harvest shall be notated in the electronic files.
- The weight of each harvest shall be notated in the electronic files.
- The plants harvested shall be identified in the electronic files.
- For example: 3 buds harvested from plant #1029 on June 1, 2018, total weight 100grams.
- Two persons shall be present for all harvesting activities. The names of the individuals shall be notated in the electronic files.

Harvested product shall be delivered placed in sterilized trays and delivered to the laboratory room for extraction.

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Extraction –

Specific extraction procedures are proprietary shall be posted inside the extraction room. Changes to extraction procedures shall be redlined and all laboratory personnel shall be trained in the revised procedures. Each laboratory employee shall sign an education form acknowledging having read and understood the new procedures.

Prior to commencing extraction, all equipment will be wiped down with disposable bleach towels to disinfect.

All extraction personnel shall be appropriately clothed, including wearing face masks, sterile gloves, hair nets, and protective outer clothing.

Any water or other refuse on the floor shall be swept up so that the floors are maintained clean and dry.

Unused plant material shall be disposed of using the authorized protocol.

Residual plant solids that remain following the extraction and filtration process shall be collected and composted for fertilization.

A detailed log shall be electronically maintained that indicates the following:

- Date of extraction
- Quantity and amount of plant material used
- Amount of water and temperature used
- Processing time
- Quantity of finished extract (yield)

Finished extract shall be immediately packaged as follows:

- Extract shall be placed in 1 kg metallic bags
- Bags shall be vacuum sealed
- Bags shall be labeled with batch number and date of extraction
- A sample from every batch shall be separated and packaged separately into 5 individual bags or vials of not more than 100grams. These bags shall be labeled with the batch number and shall be reserved for profiling and testing.

Once the extract is bagged and sealed, all bags and samples shall be placed in a locked safe kept in the extraction room. The safe shall be accessible only by the chief scientist. A log shall be maintained electronically that tracks the safe inventory:

- Batch number
- Quantity deposited
- Quantity removed

Equipment Room

Equipment shall be maintained and operated within manufacturer specifications unless otherwise indicated and approved by the chief agronomist.

All equipment shall be wiped down with bleach wipes at the beginning of each shift.

Water tanks are to be checked at the beginning and end of each shift and are to be filled to the indicated levels using filtered water only.

Fertilizer tanks are to be checked at the beginning and end of each shift and are to be filled to the indicated levels. Only approved fertilizer is to be applied. Specific mixing instructions are to be posted on the fertilizer tanks. Fertilizer shall be stored apart and away from the equipment in a clean, ventilated area.

The air temperature in the equipment room is to be maintained between 65-78 degrees F. The room shall be well ventilated.

The equipment room operator shall monitor all outputs throughout the shift. Specifically, the following are to be noted and recorded every hour:

- Temperature, humidity and airflow in each flowering room
- Temperature, humidity and airflow in the vegetation room
- Temperature, humidity and airflow in the propagation room

Variances from set parameters are to be immediately notified to the production manager or chief agronomist. Adjustments to equipment settings are to be approved by the production manager or chief agronomist and noted in the records.

Maintenance shall be scheduled in advance and approved by the Chief Executive Officer. Where possible, equipment shall be removed from the premises for maintenance and repair to prevent third party access to the facility. The production manager shall be familiar with all equipment and trained on routine maintenance and repair. All maintenance and repair work is to be noted in the records.

Transportation

Only Phytofare® extract is to be removed from the facility. While such extract will have no psychoactive properties, care must still be taken to prevent theft, loss or damage to the product.

Product shall be released from the facility only upon the written instruction of the Chief Executive Officer. Such instructions shall include:

- Quantity of product being shipped
- Date of shipment and estimated delivery date
- Method of shipment
- Identity, address and telephone number of recipient
- Any other transportation instructions required
- Intended use of the product (research purpose, etc.)

Shipments inside of South Africa –

- Shipments to locations within South Africa are to be made by vehicular transport only.
- The vehicle used shall be fitted with a secure vault or safe to be located in a locked trunk.
- The driver shall pick up the delivery from Security and note the time of receipt and estimated time of delivery.
- Driver shall sign the log indicating receipt of the product, noting quantity received.
- The vehicle shall have a full tank of petrol prior to pick up.
- Driver shall have a working cell phone and contact security in the event of any vehicle or other problems.
- Security shall remain on alert and be available to render assistance in the event of a vehicle emergency.
- At delivery, driver shall obtain the signature of the recipient and pertinent recipient information including name, address, time and date of delivery. Driver shall verify this information by inspecting government-issued identification.
- Recipient shall note and initial the quantity received on the transportation paperwork.

Shipments outside of South Africa –

- Shipments must have proper exportation and importation documentation.
- Product is to be placed in an unmarked box and sealed with packing tape.
- Recipient name and address are to be noted on the box and in the records.
- The following information is to be noted in the records:
 - Date of shipment
 - Courier name
 - Estimated time of delivery
 - Quantity shipped
 - Name and address of recipient
- Only a qualified and bonded courier company may be used (DHL or other similar).
- If the parcel is to be delivered to the courier, the same protocol for delivery of product inside of South Africa is to be followed until the product arrives at the courier.
- Company shall verify in writing from the recipient that product has been received noting date of receipt, condition of package, and quantity received.

Variance between quantity of product that ships and quantity received are to be noted and the MCC and law enforcement notified immediately.

Records

The company shall have a secure records room that contains both a written and electronic record of all data collected including:

- Production reports
- Variance reports
- Product destruction reports
- Transportation logs
- Security reports
- Personnel files and background checks

All electronic records are to be backed up to a secure drive every 48 hours and stored offsite at a secure location.

The computer that stores the electronic records shall not be connected to the Internet. Any computers that are linked to the records computer shall likewise not have Internet access.

The computer and the associated files shall be password protected. All passwords shall be changed every thirty days or in the event of employee termination.

Physical records shall be stored in locked, fire-resistant cabinets.

Access to the records room shall be via biometric code lock to prevent unauthorized access.

Security

The facility shall employ 24-hour, independent security.

All security personnel shall be required to complete full background checks and a drug screen before being assigned to the company. The company will obtain the results of these screenings.

All personnel working inside the facility will be required to complete full background checks and a drug screen before commencing work. The company will obtain the results of these screenings and store them in the personnel files.

All personnel and security shall be subjected to random and periodic drug screening at least once per quarter. Testing positive for cannabis or any other illegal drug shall be cause for immediate dismissal and the results shall be forwarded to the MCC.

Video cameras shall be installed in all rooms of the facility and outside the building covering all potential access points. Video recordings shall be retained as follows:

- External footage – 7 days
- Records room – 7 days
- Propagation and vegetation rooms – 14 days
- Flowering rooms – 30 days
- Equipment room – 7 days
- Extraction room – 7 days

In the event of lost or stolen plant material, all video records shall be immediately archived in the records room pending notification of law enforcement personnel and the MCC.

All visitors shall be required to check in at the security/reception area. Visitors shall provide identification and security shall note the following:

- Visitor name and permanent address
- Date of time of arrival
- Purpose of visit
- Name of escort
- Time of departure

Visitors shall not be permitted to take cell phones, cameras, or personal effects, including purses or briefcases, in to the production areas.

The facility shall be equipped with an alarm system to notify of any unauthorized access.

Internal doors, apart from the main security entrance, are to be locked from the inside at all times, with alarmed access only in the event of emergency.

Outside of business hours, the facility shall have two guards stationed outside the building at all times.

Employees shall be subject the physical search at any time. All personal effects shall be inspected upon leaving the facility.

Any breach of security shall be notified to law enforcement immediately. The MCC shall be advised of all security breaches.

Disposal Protocol

The following plant material shall be disposed of:

- Unwanted male plants
- Flowering plants after 18 months of production
- Sick or otherwise infected or diseased plants
- Cuttings and trimmings not used in the cloning operations
- Plant solids remaining after extraction

To dispose of plant material, the following shall be noted:

- If a whole plant, the plant identifying number
- The date and time of destruction
- Description of plant matter including approximate weight (ie. – cuttings, extraction solids, etc.)
- Name of individual performing the disposal
- Name of witness to the disposal

After noting the above information, plant material shall be passed through a mulching machine and deposited into the compost receptacle stored in the equipment room. Two people must be involved in the process, one to witness the destruction, and both shall sign the disposal record.