Draft Jamaican Code of Practice

for

Cultivation of Cannabis for medical, scientific and therapeutic use



**BUREAU OF STANDARDS JAMAICA**

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(CAP) Mark

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**for**

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Bureau of Standards Jamaica

6 Winchester Road

P.O. Box 113

Kingston 10

JAMAICA, W. I.

Tel: (876) 926 -3140-5/ 618 – 1534 / 632- 4275

Fax: (876) 929 -4736

Website: [www.bsj.org.jm](http://www.bsj.org.jm)

E-mail: [info@bsj.org.jm](mailto:info@bsj.org.jm)

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Jamaican Standards establish requirements in relation to commodities, processes and practices, but do not purport to include all the necessary provisions of a contract.

The attention of those using this standard specification is called to the necessity of complying with any relevant legislation.

Amendments

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**Foreword**

This code of practice was developed as a guide for cultivators of cannabis for medical, scientific and therapeutic use. This code outlines elements of good agricultural practices that will guide the sustainable cannabis to efficacy of it derived products. This code of practice is geared at protecting the health and safety of consumers.

This standard is voluntary

**Committee Representation**

The preparation of this standard for the Standards Council, established under the Standards Act 1969, was carried out under the supervision of the Cannabis Technical Committee, which at the comprised the following members

**Acknowledgement**

Acknowledgement is extended to the following organizations for permission to reproduce contents form their publications:

ASTM International

Foundation of Cannabis Unified Standards (FOCUS)

Ministry of Industry, Commerce, Agriculture and Fisheries (MICAF)

**Related Documents**

Ministry of Industry, Commerce, Agriculture and Fisheries (MICAF) - Good Agricultural Practices Manual

Foundation of Cannabis Unified Standards (FOCUS) Cultivation Standards

Safe Quality Foods (SQF) Code for Primary Production

CODEX Principles of Food Hygiene

**Jamaican Code of Practice for Cultivation of *Cannabis* for medical, scientific and therapeutic use**

1. **Scope**

This code of practice outlines recommended best practices for operations actively participating in the cultivation of *Cannabis* for the purpose of medical, scientific and therapeutic use. The requirement of this code seeks to assist cannabis cultivation operation to meet international safety and quality requirements. These best practices will ensure the quality and safety of medical *Cannabis* to protect public health and consumer safety.

1. **Definitions**
   1. **abiotic factors.** the non-living components of the environment that directly affect plant life, such as water, carbon dioxide, oxygen and light.

**NOTE 1** Abiotic factors include climatic, edaphic and physiographic factors.

* 1. Action threshold. the pest population level at which the pest is a nuisance, health hazard or economic threat.
  2. **asexual reproduction.** the process by which new individuals are produced from a single parent organism without the fusion of gametes.

**NOTE 2** Individuals so formed have a genetic constituent identical to that of the parent.

* 1. **batch.** a specific quantity of *Cannabis* harvested during a specified time period from a specified cultivation area.

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* 1. **biotic factors**. The living components of the environment that, by their activities, affect the life of an organism.
  2. **cannabinoid**. any of several compounds produced by *Cannabis* plants that have medical and psychotropic effects.
  3. **cannabinoid profile.** amounts, expressed as a dry-weight percentage, of ∆9-tetrahydrocannnabinol (∆9-THC), cannabidiol (CBD), tetrahydrocannabinolic acid (THCa) and cannabidiolic acid (CBDa) in a medical *Cannabis* product.

**NOTE 3** Amounts of other cannabinoids may be reported, but are not required.

* 1. **c*annabis.*** genus of plants in the family *Cannabaceae* which is divided into several subspecies (*C. sativa* subsp. *sativa*, subsp. *indica*, subsp. *ruderalis,* and possibly subsp. *spontanea* and subsp. *kafiristanca*). *Cannabis sativa* includes both cannabis (> 1.0% THC) and hemp (<1.0% THC) strains.
  2. **medical cannabis.**any strain of *Cannabis sativa* – cannabis or hemp - used for medical purposes.
  3. ***Cannabis* planting material**. *Cannabis sativa* seeds, seedlings, cuttings, plantlets, etc. used by a cultivation operation to grow cannabis plants.
  4. ***Cannabis sativa* Breeder licensee (CSBL)**. a specialist licensee with permission to grow and harvest varieties/strains not necessarily identified as medical cannabis strains for the purpose of conserving old strains and producing new ones. This also includes licensed farmers who maintain land races of *Cannabis sativa*.
  5. ***Cannabis* waste**. *Cannabis* vegetable waste to be discarded.
  6. **clone**. genetically identical individuals all traceable back to one individual plant. Cultivars that are produced asexually are genetically identical and known as clones. A clone can be a male or female line.
  7. **contaminant.** any biological or chemical agent, foreign matter, or other substances not intentionally added to a product which may compromise safety or suitability..
  8. **Contamination.** the introduction or occurrence of a contaminant in a product or it’s environment.
  9. **cultivation site (CS).** the premises specified in a cultivator’s licence as the premises on which *Cannabis* plants are authorised to be cultivated under licence. One cultivation site can have several cultivation areas.
  10. **good agricultural practices (GAP).** practices on farms which define the essential elements for the development of best practice for production, incorporating integrated crop management, integrated pest management, and integrated agricultural hygienic practices.
  11. **germplasm**. a living tissue from which new plants can be grown.

**NOTE 4** Germplasm can be a seed, seedling or another plant part such as a leaf, a piece of stem, node, pollen or even just a few cells from which a whole plant can be obtained.

* 1. **greenhouse.** a permanent structure located outdoors that is completely covered by a material that allows a controlled level of light transmission.
  2. **greenhouse cultivation**. the cultivation of *Cannabis* inside a greenhouse utilizing natural sun and possibly supplemental artificial lighting.
  3. **integrated pest management (IPM)**. an ecosystem approach to crop production and protection that combines different management strategies and practices to grow healthy crops and minimize the use of pesticides.

1. **Quality Management Systems** 
   1. **Management capability**
      1. Management of *Cannabis* cultivation operations shall be responsible for operating the business according to documented policies and procedures
      2. Managers shall possess the requisite qualifications (training, experience and credentials) required to effectively execute the quality, safety, procedural, workforce and compliance requirements assigned to them.
      3. Management shall:
         1. Provide evidence that all managers have completed management training in the organization’s standard operating procedures and record keeping . Training shall include worker/staff management, safety, sanitation, regulatory compliance and maintenance, and other defined topics critical to the organization’s efficient and safe operation.
         2. Implement and maintain robust programmes that will ensure business viability and continuity, and environmental sustainability.
         3. Engage all stakeholders to contribute to safe, quality products and services.
   2. **Personnel** 
      1. **Personnel Qualifications and Training**
         1. All personnel (including field workers) involved in the propagation, cultivation, harvest and post-harvest processing stages of medicinal plant production shall receive training regarding their hygienic responsibilities.
         2. Personnel applying agrochemicals shall be properly trained in the required methods of application.
         3. Growers and producers shall receive instructions on all issues relevant to the protection of the environment, conservation of medicinal plant species, and agricultural stewardship.
         4. Newly recruited personnel shall receive basic training as appropriate to their assigned duties
         5. All personnel shall receive training in harvesting, field and packing operations, and harvesting of medical *Cannabis.*
         6. Training records shall be maintained to include the content of the training provided and the names of the employees that received the training.
         7. Training shall be periodically assessed for effectiveness.
         8. Refresher training shall be conducted regularly by qualified individuals and shall cover, at a minimum the required training for employees to perform their daily functions.
      2. **Personnel Hygiene**
         1. All personnel (including field workers) involved in the propagation, cultivation, harvest and post-harvest processing stages of medicinal plant production shall maintain appropriate personal hygiene .
         2. Personnel suffering from, or carriers of, an infectious disease shall not engage in growing, product handling or field harvesting operations.
         3. Personnel with exposed cuts, sores or lesions shall not be engaged in handling product or materials. Minor cuts or abrasions on exposed parts of the body shall be covered with a suitable waterproof dressing.
         4. Smoking, chewing, eating, drinking (except for water) or spitting is not permitted in any growing areas including on field harvesting rigs and during harvesting and packing operations.
      3. **Sanitary Facilities and Hand Washing**
         1. Toilet facilities shall be provided, it shall be designed, constructed and located in a manner that minimizes the potential risk for product contamination.
         2. Toilets shall cater for the maximum number of employees (one toilet to 10 workers), shall be easily accessible during working hours and be constructed so that they can be easily cleaned and maintained.
         3. If portable toilets are used, they shall be serviced regularly, and the sewage disposed of by qualified service providers.
         4. Toilets shall be located so as to provide easy access for farm workers
         5. Staff doing field work shall be provided with facilities for showering and changing of clothes during fieldwork.
         6. Hand wash basins with clean, potable water, hand soap, disposable towels or effective hand drying device, waste bins and a tank that captures used hand wash water for disposal (if not connect to drains) shall be provided inside or adjacent to toilet facilities.
         7. Signage in appropriate languages shall be provided adjacent to hand wash basins instructing people to wash their hands after each toilet visit.
         8. Provsion shall be made to store employee personal belongings away from cultivation, harvesting, post- harvest processing equipment for medicinal plant production
         9. Racks for protective clothing used by farm employees shall be provided.
         10. Toilet and wash stations shall be maintained in a clean and sanitary condition. Cleaning schedules shall be in place for all toilets, handwash stations and showering facilities.
         11. Equipment/material used for sanitizing and cleaning shall be provided for use in these areas exclusively.
         12. Personnel shall have wash their hands:
2. Before handling product;
3. Before putting on gloves;
4. After each visit to a toilet;
5. After using a handkerchief, handling dirty or contaminated material; and
6. After smoking, eating or drinking.
   * 1. **Equipment and Machine Maintenance**
        1. All equipment should be maintained in good working condition.
        2. Equipment requiring calibration should be serviced and calibrated annually or as recommended by manufacturers.
        3. All equipment/machinery should be cleaned after use.
        4. Machinery/equipment with moving parts should have protective guards.
        5. Documentation must be kept of (equipment) maintenance schedules. A written preventative maintenance programme should be in place.
        6. Equipment should be set up to allow easy cleaning, sanitizing, maintenance and inspection.
        7. Machinery to be used as food-contact areas should have smooth surfaces to prevent damage to products and contamination.
        8. Machinery/equipment used for handling non-edible material should not be used for food.
     2. **Protective Clothing**
        1. Protective clothing (such as overalls, gloves, helmet, goggle, face mask) shall be effectively maintained, stored, laundered and worn so as to protect product from risk of contamination.
        2. Personnel applying agrochemicals shall wear appropriate protective clothing (such as overalls, gloves, helmet, goggles, face mask).
   1. **Product Quality**
      1. Management shall:
         1. Ensure all products manufactured, processed or sold by the operation meet the required product quality specifications and requirements ensure all food contact packaging and agricultural inputs shall comply with the standards and process requirements
         2. Implement a product quality programme that ensures all facilities, equipment, processes and people operate to produce safe, quality products.
         3. Conduct and document an annual assessment of the product quality programme; record updates to the programme and corrective action taken.
         4. Designate managers responsible for product quality programmes that have the skills, time allotment and defined job descriptions to perform the requirements of the positions.
   2. **Health and safety** 
      1. Management shall develop and maintain a safe and healthy work environment for all workers, contractors and visitors.
      2. The health and safety programme shall be documented and include annual training and periodic assessment for all workers.
   3. **Security** 
      1. Management shall:
         1. Implement measures to protect its employees, products, information, systems and assets associated with business operations from risks and threats.
         2. Remain current with evolving security risks, conduct periodic risk assessments and make appropriate improvements to the security programme.
         3. Ensure all workers receive ongoing security training and follow security procedures.
   4. **Procedures and Training**
      1. Management shall:
         1. Ensure that work processes are documented using standard operating procedures.
         2. Ensure workers receive appropriate training and refresher training to perform assigned responsibilities.
   5. **Visitors**
      1. All visitors (including contractors, management and maintenance employees) shall be required to remove jewelry and other loose objects and wear suitable protective clothing around propagation, cultivation, harvest and post-harvest processing stages of medicinal plant production**.**
      2. Visitors shall follow all personnel practices as designated by the site for employees within various areas of fields, sheds, packing facilities or storage locations.

1. **Site Selection and Soil Management** 
   1. **Site Selection**
      1. The farm and facilities shall be such that adjacent and adjoining buildings, operations and land use do not interfere with the safe and hygienic operations on the property.
      2. Information shall be ascertained about the adjacent land usage, history, topography, capability and suitability of the land to be utilized for cultivation.
      3. The land shall be test for contaminants in cases where the history of the land is unavailable.
      4. The site shall be check for the presence of biological, physical and chemical hazards.
      5. The site shall consider the risk associated with product quality and safety due to land history, adjacent land use and other environmental factors. This shall be re-evaluated in the event of any circumstance or change that may impact the quality and safety of the medical *Cannabis* during propagation, cultivation, harvest and post-harvest processing stages.
   2. **Climate** 
      1. climatic conditions shall be considered for cultivation of medical *Cannabis* including the duration of sunlight, average rainfall, average temperature, including daytime and night-time temperature differences, which can influence the physiological and biochemical activities of plants.
   3. **Soil and Growing Mediums**
      1. Soil analyses shall be carried out at the start of production prior to inspection or certification, and at regular intervals thereafter to show that the soil fertility (organic matter) is maintained or enhanced.
      2. The soil shall contain appropriate amounts of nutrients, organic matter and other elements to ensure optimal medicinal plant growth and quality. Optimal soil conditions, including soil type, drainage, moisture retention, fertility and pH will depend on the requirements of a specific medicinal plant.
      3. *Cannabis* for medicinal purposes shall be grown on soil that is not contaminated with sludge, heavy metals, pesticide residues or other chemicals.
      4. The chemicals and quantities used for production shall be justified.
      5. Monitoring of soil for contamination shall be performed and documented.
      6. Manure, if applied, shall be thoroughly composted and shall be devoid of human faeces.
      7. Open field cultivators shall define and implement specific soil conservation measures to prevent soil erosion. These measures shall be appropriate to local climatic conditions, soil, slope and land use. These shall include, as appropriate:
         1. minimizing the loss of topsoil through minimal tillage, contour ploughing and crop selection;
         2. maintaining soil plant cover and using other management practices that conserve soil;
         3. preventing the burning of organic matter, except when required to suppress the spread of disease or to stimulate seed germination. Burning shall require prior approval from the verification body and actions shall be documented;
         4. avoiding the cultivation of steep hills with annual crops, unless appropriate measures to prevent soil erosion are implemented; and
         5. avoiding the overgrazing of pastures.
2. **Propagation Material**
   1. **Sourcing of Planting Material (Seed/Clone)**
      1. **Seeds**
         1. Records shall be maintained for seed acquisitions including variety/strain, source, quantity of seeds obtained and date of purchase.
         2. Seeds and other propagation materials shall be specified, and suppliers of seeds and other propagation materials shall provide all necessary information relating to the identity, quality and performance of their products, as well as their breeding history, where possible.
      2. **Clones**
         1. The propagation or planting materials shall be of the appropriate quality and be as free as possible from contamination and diseases in order to promote healthy plant growth. Planting material shall preferably be resistant or tolerant to biotic or abiotic factors.
      3. **In Vitro Propagation**
         1. Motherstock for propagation shall be free of pest and diseases.
         2. The motherstock shall be kept in a protected environment with GAP.
         3. There shall be full documentation of all processing of motherstock through initiation, multiplication and hardening/acclimatization.
         4. The area utilized for in vitro propagation shall be sterile.
         5. Air quality and equipment maintenance records shall be maintained for this area.
         6. Water of recommended quality shall be used and maintained throughout the processes.
         7. All reagents used in the processes shall be of an acceptable grade for tissue culture propagation.
         8. Personnel conducting in vitro propagation shall be adequately trained in good aseptic techniques and utilize recommended protective gears.
         9. Established plant material shall be observed for evidence of contamination and somatic mutation.
         10. All contaminated in vitro plant material shall be autoclaved and disposed of in accordance with the guideline of the national authority.
         11. In the case of organic production all reagents shall be of the appropriate grade.
         12. Proper growth conditions shall be maintained to ensure optimal growth of in vitro plant material.
         13. The transfer of mature in vitro plant material to a hardening facility shall be done in accordance with best practice to minimize losses.
         14. Issue culture plants shall be maintained in hardening facility in accordance with recommended procedure.
         15. All security requirements shall be observed in accordance with recommended procedures.
   2. **Treatments to Propagation Material**
      1. Growing operations shall maintain detailed records on application and frequency of inputs (e.g., rooting hormones or fungicide) made from cuttings, micropropagated material, mother plants, seeds.
      2. Records shall indicate the name of materials used, quantity applied, date of application and the applicator (worker).
   3. **Genetically Modified Organisms**
      * 1. Cultivator shall maintain document or attest that all plant materials grown are not themselves Genetically Modified Organisms (GMOs) and have not been treated with organisms that are genetically modified using transgenic techniques such as transgenetically modified varieties of *Bacillus thuringensis* used as fungicide.
        2. Seeds and other propagation materials used for organic production shall be certified as being organically derived. The quality of propagation material, including any genetically modified germplasm, shall be appropriately labelled and documented, as required.
   4. **Germplasm Storage** 
      1. All propagation materials shall be stored under appropriate conditions to reduce contamination and maintain viability. Only approved substances shall be applied to germplasm prior to it being stored.
3. **Traceability and Strain Identity**
   1. The cultivator shall maintain records that detail all strains under cultivation. Information shall include:
      1. Strain identity, integrity and traceability, suppliers shall provide the strain name on a signed certificate of analysis, strain profile and a phytochemical profile (Cannabinoid, terpenoid and flavonoid).
      2. Methods to determine strain identity may include one or more of the following: DNA testing, chemical fingerprints (e.g., terpenes) using gas chromatography, other chromatography methods that can reliably distinguish among different strains, biological activity (e.g., enzyme activity), physical and morphological characteristics determined macroscopically or microscopically.
      3. In the case of sexual (seeds) production records shall be kept of the locally named line, including the geographic origin of the source seeds and parent material where possible.
      4. The cultivator shall implement a system to ensure the traceability and tracking of all propagated material throughout the lifecycle and post-harvest related activities of the *Cannabis* plant.
      5. The cultivator shall be able to trace finished products to the customer (one up) and provides traceability through the process to the agricultural input supplier and date of receipt of raw materials, food contact packaging and materials and other inputs (one back).
4. **GREENHOUSE, OPEN FIELD, INDOOR AND HYBRID CULTIVATION**
   1. Cultivation
      1. The cultivation of *Cannabis* for medical, scientific and therapeutic purposes shall be in accordance with best practices to ensure maintenance of medical efficacy, health and safety.
      2. The cultivator shall maintain consistency of abiotic and biotic factors to ensure phytochemical constituents can be replicated.
   2. **Agricultural Inputs** 
      1. **Fertilizers**
         1. The application method and frequency of fertilizer usage shall be conducted in a manner that minimizes any possibility of leaching.
         2. Nutrient resources shall be used in a sustainable and responsible manner for reduction of nutrient losses from the farm and the natural environment.
         3. Human excreta shall not be used as a fertilizer due to the potential presence of infectious microorganisms or parasites.
         4. Animal manure shall be thoroughly composted to meet safe sanitary standards of acceptable microbial limits and destroyed by the germination capacity of weeds.
         5. Any application of animal manure shall be documented. Chemical fertilizers that have been approved by the national authority for cultivation shall be used.
         6. Specifications of the fertilizer manufacturer associated with dilutions, quantities, frequency of applications and crop cycle shall be adhered to provide the plant with the requirements for sustainable development.
         7. All fertilizing agents shall be applied sparingly and in accordance with the needs of the particular medicinal plant species and supporting capacity of the soil.
         8. Compost teas shall be used bi-weekly to ensure there is a healthy microbial level within the growing medium. Each zone manager shall utilize the appropriate tea recipe for each phase of the *Cannabis* life cycle. Teas shall be applied on a two- week schedule.

**NOTE 5** Teas feed the microbial life in the soil and create healthy plants that resist disease, yield more, and produce consistent *Cannabis* with an excellent terpene profile.

* + 1. **Pest Control- Pesticides, Herbicides, Fungicides and Arachnicides**
       1. The usage of herbicides, pesticides, fungicides and arachnicides shall be avoided during the cropping cycle of *Cannabis.* If used, they shall be kept to a minimum and shall only be applied when no alternative measures are available.
       2. The use and storage of these synthetic and organic applications shall be in accordance with the recommendations of the manufacturer and the relevant national authority.
       3. Approved worker protection safety training is required for all workers mixing, handling or applying these applications or who works in the area where they have been applied. These applications shall not be used in the period preceding harvesting.
       4. Only approved herbicides, pesticides, fungicides and arachnicides shall be applied at the minimum effective level in accordance with the labelling and/or package insert instructions of the individual product
       5. All applications shall be documented. The minimum interval between such treatments and harvest shall be consistent with the labelling and/or package insert instructions of the plant protection product, and such treatments shall be carried out in consultation and with the by agreement of the buyer of the medicinal plants or medicinal plant materials.
       6. Growers and producers shall comply with maximum pesticide and herbicide residue limits requirements of both the growers’ and the end-user’s countries and/or regions.
       7. A current inventory of all pesticides, herbicides, fungicides and arachnicides storage and use shall be maintained.
    2. **IPM -Pest (and Disease) Management**
       1. The cultivation team shall implement standard prevention protocol at all times. This protocol shall include:

1. preventing pests from entering each growing space,
2. preventing cross-contamination from zone to zone,
3. following environmental protocol for growing area,
4. maintaining cleanliness at all times,
5. using preventative biological/microbial controls,
6. growing pest and disease resistant strains and;
7. growing with organic methods that produce maximum plant health thus remaining resistant to pests and disease.
   * + 1. The cultivator shall maintain a healthy cultivation environment by ensuring biosecurity measures are implemented and maintained at all times.
       2. Upon entering the cultivation areas, all persons shall step on a sanitation mat, change into clean uniforms or overalls and have the opportunity to shower where necessary.
       3. All employees shall remain within their designated working areas to reduce the risk of potential cross contamination.
       4. The cultivator shall keep a schedule of all pest and disease control prevention.
       5. The cultivator shall pre-determine an action threshold for each potential pest and disease. The action threshold shall be determine the pesticide and the rate of application.
       6. Plants shall be monitored daily for incidence of pest damage or disease symptoms. Incidence of infestation warrants immediate action to reduce the epidemic or complications within the growth cycle that will in turn reduce the quality, yield and consistency of dosage. Immediate action will also reduce the amount and frequency of the required applications.
       7. The use of all pesticides shall be applied during the stages of growth at minimum frequency. Pesticide applications shall be strictly prohibited during the flowering phase. When an actionable infestation level is determined during vegetative growth, it is the responsibility of the vegetative lead and trained vegetative staff to act immediately to prevent further contamination. All individuals applying pesticides shall adhere to the agricultural use requirements written on the label and shall employ all personal protective equipment recommended on the product label.
     1. **Hormones/ Growth substances and Growth Regulators**

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* + - 1. All hormones, growth substances and growth regulators shall be registered and approved for use by the national authority. They must be safe for the plant, its applicator and the environment as far as can be feasibly determined.

**NOTE 6** The application of plant hormones may depend on several factors such as their concentration, levels of other plant hormones, plant health, nutritional and water status, time of year, and climate. Plant hormones function by directly influencing plant metabolism, plant response can vary considerably depending on the variety and plant stress level. They shall be handled as production tools, like water and fertilizer

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* + - 1. A current inventory of all hormones/ growth substances and growth regulators storage and use shall be maintained.
  1. **Breeding**
     1. There shall be a designated breeding area once a cultivator decides to breed *Cannabis*.
     2. All breeding shall be separated by physical barriers and enclosed from the main cultivating areas to reduce the risk of unwanted fertilization.
     3. All personnel working within the breeding area shall change clothing and shower everything time they exit the area to minimize the risk of unwanted fertilization in the cultivation area.
     4. **Reuse of growing substrate**
        1. The chance of reusing exhausted substrates, without any crop damage, depends on the physical-chemical properties of the material as well as on the crop’s attitude, which is related to its tolerance to abiotic and/or biotic stresses due to such a reuse.
        2. Ideal media shall have the following features:

1. adequate mechanical properties to guarantee plant stability;
2. low bulk density to facilitate the installation of growing systems;
3. high porosity
4. consistent distribution of air (oxygen) and water in order to sustain root activity and;
5. pH that is slightly acidic

**NOTE 7** For instance, many types of peat are acid and therefore have to be neutralized with calcium carbonate

1. low soluble salts content;
2. chemical inertia, that is, the substrate shall not interfere with the nutrient solution by releasing inorganic ions and phytotoxic compounds, or by immobilizing nutrients (e.g., phosphorus and nitrogen in some substrates);
3. the ability to maintain the original characteristics during the cultivation, which may be quite long; and
4. the absence of pathogens and pests; however, the substrate shall not be necessarily sterile.
   1. **Agricultural Water**
      1. **Irrigation and drainage**
         1. Irrigation and drainage shall be controlled and carried out in accordance with the needs of the individual *Cannabis* plant during its various stages of growth.
         2. Water used for irrigation purposes shall shall be of recommended quality
         3. Care shall be exercised to ensure that the plants under cultivation are neither over-watered nor under-watered.
      2. **Sustainable Water Use Plan**
         1. Water-conservation methods (dams, tanks) shall be in place before planting.
         2. Records of water consumption shall be kept.
         3. Water-saving irrigation methods shall be used.

EXAMPLE drip and micro sprinkling are examples of water-saving irrigation methods.

* + - 1. Water source shall be identified before planting.
      2. The irrigation water source shall be protected from animals and other sources of contamination.
      3. Water used for fertigation/pesticide application shall be free of pathogens/contaminants.
      4. Water used for foliar treatments (fertilizers, pesticides, etc.) shall be of post-harvest quality.
      5. Water shall be tested twice per year for possible contaminants (microbial, chemical, heavy metals).
    1. **Water Source**
       1. Irrigation shall be controlled to ensure quality cultivation of the *Cannabis* plant.
       2. The quality of the irrigation water shall be controlled to ensure minimal contaminants, including faeces, heavy metals, herbicides, pesticides and toxicologically hazardous substances.
       3. All tillage operations shall be adapted to plant growth and other requirements.
       4. Water shall be free of waterborne bacteria.
       5. The water source shall be in compliance with current national regulations. Water shall be sourced from a location and in a manner that is compliant with current national regulations.
    2. **Water Quality Analysis**
       1. Water quality shall be analyzed at the frequency defined in the Water Use Plan Annual testing is recommended unless conditions require more frequent testing.
       2. Water quality testing shall include analysis for biological, physical and chemical contamination.
       3. Analysis shall be used to improve water quality as required.
       4. Records of testing shall be retained for at least two years.
    3. **pH Imbalance** 
       1. All of the nutrients provided to the *Cannabis* plant shall be water soluble in this range so they are readily available to the plants.
       2. Growers shall check the pH of the plant’s soil, as well as the water used, to maintain proper pH.
       3. Water shall be pH adjusted after nutrients are added, since the nutrients affect the pH level of the water.

**NOTE 8** *Cannabis* plants are best suited to a pH range between 6.0 - 6.5, a slightly acidic solution. Maintaining the correct pH range is the most important step in the growth cycle of a *Cannabis* plant.

* 1. **Transplanting Protocols**
     1. The cultivator shall ensure all the clones or seedlings are transplanted, labelled, tagged and that each transfer is logged and tracked.  
          
        **NOTE 9** Once a clone or seedling has been established and fully rooted, it is ready to be transplanted and moved into the vegetative area.
     2. The cultivator shall ensure all new transplants are given water and nutrients to encourage proper root development.

**NOTE 10** Post transplanting, plants require special attention in watering to ensure proper root development.

* 1. **Pre-Harvesting**
     1. During the late flowering stage, the flowering zone manager shall prepare the plant for harvest.
     2. Harvest, drying, and curing shall be handled with the utmost care to prevent contamination from mould and foreign substances.
     3. When a plant is harvested, it shall be carefully placed in a clean carrying vessel to be moved to the laboratory grade trimming and processing room.
     4. **Flushing**
        1. During the flushing phase, the flowering zone manager shall cease from giving plants all nutrients and instead seek to purge all remaining nutrients from the substrate by forcing fresh water through the plant's root system.
        2. The following process shall be used through each flowering zone to prepare plants for harvest and ensure the highest quality finished product:

1. Determine the plants to be flushed a minimum of 14 days prior to harvest;
2. Water each plant at its normal watering schedule with an abundance of fresh water; and
3. Sufficient run-off shall be attained during each flushing session in order to strip away all remaining sugars and salts.
   1. **Waste Management**
      1. *Cannabis* cultivation operations shall conduct assessments to ascertain risks associated with waste management including waste reduction, pollution control, recycling and reuse.
      2. The operation shall document and follow a Waste Management Plan that addresses risks and contains policies and procedures to control pollution and to safely handle, reduce, store and dispose of waste and recyclables.
      3. **Hazardous Materials Disposal** 
         1. The operation shall dispose of chemical, dangerous or hazardous waste in compliance with national laws and regulations.

**NOTE 11** Hazardous materials may include product waste, containers, piping and other contaminated equipment.

* + 1. ***Cannabis* Waste Disposal** 
       1. *Cannabis* and *Cannabis*-infused product waste shall be rendered unusable and unrecognizable prior to leaving the facility.

**NOTE 12** The operation can accomplish this by grinding and incorporating the *Cannabis* waste with non-consumable, solid wastes listed below so that the resulting mixture is at least 50 percent non-*Cannabis* waste:

1. Food waste
2. Cardboard waste
3. Paper waste
4. Compost activators
5. Soil or soil mix
   * + 1. *Cannabis* waste containing flammable solvents shall be dried safely and processed according to the waste management plan.

**NOTE** **13** Other waste processing methods are acceptable if justified and documented.

1. **HARVEST and POST-HARVEST PROTOCOLS**
   1. **Harvest Procedures**
      1. Individual ripened inflorescences/branches, or whole plants shall be harvested and hung upside down in a drying room. Drying of individual ripened inflorescences/branches shall be done in clean areas.
      2. Good harvesting practices with appropriate procedures shall be followed to ensure that the appropriate quality product is obtained for the intended use. The following measures shall be considered but are not limited to those described:
         1. Medicinal plants shall be harvested during the optimal season or time period to ensure the production of medicinal plant materials and finished herbal products of the best possible quality.
         2. The best time for harvest (quality peak season/time of day) shall be determined according to the quality and quantity of biologically active constituents rather than the total vegetative yield of the targeted medicinal plant parts.

**NOTE 14** The time of harvest depends on the plant part to be used.

* + - 1. Medicinal plants shall be harvested under the appropriate conditions, avoiding wet soil, dew, rain or exceptionally high air humidity. If harvesting occurs in wet conditions, additional care shall be taken to avoid the adverse effects of moisture and the harvested material shall be transported immediately to an indoor drying facility to expedite drying so as to prevent any possible deleterious effects due to increased moisture levels, which promote microbial fermentation and mould.
      2. During harvesting, procedures shall be in place to ensure that no other plant species or *Cannabis* variety gets mixed with the *Cannabis* crop. Care shall be taken to ensure that no foreign matter, weeds or toxic plants are mixed with the harvested medicinal plant materials.
      3. The harvested crop shall not come into direct contact with the soil.
      4. All containers used at harvest shall be kept clean and free from contamination by previously harvested medicinal plants and other foreign matter. If plastic containers are used, particular attention shall be paid to any possible retention of moisture that could lead to the growth of mould.
      5. When containers are not in use, they shall be kept in dry conditions, in an area that is protected from insects, rodents, birds and other pests, and inaccessible to livestock and domestic animals.
      6. Cutting devices, harvesters, and other machines shall be kept clean and adjusted to reduce damage and contamination from soil and other materials. They shall be stored in an uncontaminated, dry place or facility free from insects, rodents, birds and other pests, and inaccessible to livestock and domestic animals.
      7. Contact with soil shall be avoided to the extent possible so as to minimize the microbial load of harvested medicinal plant materials.
      8. Where necessary, large drop cloths, preferably made of clean muslin, may be used as an interface between the harvested plants and the soil. If the underground parts (such as the roots) are used, any adhering soil shall be removed from the medicinal plant materials as soon as they are harvested.
      9. The harvested crop shall be protected from pests and domestic animals.
      10. Directly after harvesting, the crop shall be prepared for transport in clean, dry conditions (e.g. sacks, baskets, boxes, trailers, hoppers or other well aerated containers). All containers shall be clean and free from any residues from previous harvests; containers that are not in use shall be kept in dry conditions, free of pests and inaccessible to domestic animals.
      11. Freshly harvested herbal material shall be delivered to the processing facility as quickly as possible in order to prevent thermal degradation and mould growth.
      12. Mechanical damage and compacting of the herbal drug that could result in undesirable quality changes shall be avoided. In this respect, care shall be taken to avoid:

1. overfilling sacks/containers; and
2. stacking sacks/containers too high.  
   * + 1. Directly after harvesting, plant material shall be processed in a manner that protects it from pests and contaminants, packaged in a manner that prevents damage, dried as soon as possible to prevent chemical degradation, and protected from excess exposure to light and humidity.
       2. Decomposed medicinal plant materials shall be identified and discarded during harvest, post-harvest inspections and processing, in order to avoid microbial contamination and loss of product quality. Male, damaged, and dead plants shall be removed during harvesting.
   1. **Manicuring (Trimming)**
      1. After harvesting the inflorescences, the leaves immediately subtending the buds as well as dead leaves or stems shall be trimmed and removed.

**NOTE 15** Manicuring is best accomplished when the inflorescences are fresh for maximum preservation of the trichomes, which are fresh, are pliable rather than brittle. Dry trichomes break off easily. Manicuring can be accomplished by hand trimming, machine trimming, or a combination of both.

* + 1. This post- harvest processing shall be conducted in cool temperatures with good air circulation to prevent mould.
  1. **Cross-Contamination Prevention**
     1. Drying shall be done in clean rooms to prevent microbial contamination.
     2. Each plant shall be tagged with the strain information and separated to prevent strain mixing.
     3. Plants with severe pest infestation or fungal pathogens shall be separated and appropriately disposed of.
  2. **Packing Facility Sanitation**
     1. The packing facility at a *Cannabis* cultivation operation shall:
        1. Provide adequate working space and storage room to allow for satisfactory performance of all operations;
        2. Facilitate efficient and hygienic operations by allowing a regulated flow in processing from the arrival of the raw medicinal plant materials at the premises to the dispatch of the processed medicinal plant materials;
        3. Permit appropriate control of temperature and humidity;
        4. Permit the separation by partition or other means of processes that may cause cross-contamination, especially to isolate dirty areas (drying and milling) from clean areas;
        5. Permit control of access to different sections, where appropriate;
        6. Permit easy and adequate cleaning and facilitate proper supervision of hygiene;
        7. Prevent the entry of environmental contaminants such as smoke, dust, etc.;
        8. Prevent the entrance and harbouring of pests, livestock and domesticated animals;
        9. Where appropriate, prevent direct sunlight from entering a particular section.
  3. **Inspection and Sorting**
     1. Raw medicinal plant materials shall be inspected and sorted prior to primary processing. The inspection shall include:
        1. visual inspection for cross-contamination by untargeted medicinal plants and/or plant parts; and
        2. visual inspection for foreign matter and organoleptic evaluation, such as appearance, damage, size, colour, odour, and possibly taste.
  4. **Primary Processing**
     1. On arrival at the processing facility, the harvested crop shall be directly unloaded and unpacked.

**NOTE 16** Primary processing includes washing, cutting before drying, decontamination, freezing, distillation, drying, etc.

* + 1. Prior to processing, the material shall not be exposed to direct sunlight (except in cases that specifically requires this) and shall be protected from rain and adverse environmental conditions.
    2. Standard operating procedures shall be followed and all modifications made shall be justified by adequate test data demonstrating that the quality of the medicinal plant material is not diminished.
    3. Harvested or collected raw medicinal plant materials shall be promptly unloaded and unpacked upon arrival at the processing facility.
    4. Prior to processing, the medicinal plant materials shall be protected from rain, moisture and any other conditions that might cause deterioration.
    5. Medicinal plant materials shall be exposed to direct sunlight only where there is a specific need for this mode of drying.
  1. **Drying**
     1. Drying conditions of crops shall not adversely affect the quality such as drying on unsuitable surfaces, i.e. directly on the ground or under direct sunlight. A uniform drying speed of the crops and the prevention of mould growth by appropriate measures shall be assured.
     2. During initial drying*,* in cases where plant material is dried in the open air, the material shall be spread in a thin layer, to ensure good air circulation of the drying racks placed at sufficient distance from the drying surface.
     3. Where plant material is not dried in the open air optimal drying conditions, (i.e. temperature and drying time) shall be followed, and recorded.
     4. The following shall be standardized during drying:

1. atmospheric humidity;
2. temperature;
3. ventilation; and
4. drying time.
   1. **Curing**
      1. During final drying, plants shall be protected from light and shall be minimally handled as the inflorescence bruise easily during handling.
      2. Plants shall be completely dried, with inflorescences containing approximately 10% moisture, to prevent formation of mould.

**NOTE 17** Final Drying. After the initial drying process, the inflorescences are often placed in plastic bags or glass containers, and initially closed and then opened ever 12-24 hrs for 1-2 weeks until the material is completely dried. Drying is sufficient when the small stem attached to the inflorescence snaps easily. When completely dried, the inflorescences contain approximately 10% moisture. If not properly dried, mould can form.

* 1. **Storage** 
     1. Storage and distribution procedures shall be developed and implemented. Dried, packaged products and extracts shall be stored in a dry, well ventilated building in which daily temperature fluctuations are limited and good ventilation is ensured.
     2. Fresh products shall be stored between 1 °C and 5 °C; frozen products shall be kept at temperatures below 18 °C (or below 20 °C for long-term storage). In the event of bulk transport, it is important to dry conditions shall be ensured.
     3. To prevent mould formation or fermentation, ventilated containers or transport vehicles with other ventilated facilities shall be used.
     4. Decontamination of the storage area to combat pests shall be carried out only where necessary and by authorised personnel.
     5. When frozen storage or saturated steam is used for pest control, the moisture content of the product shall be controlled after treatment.

**Standards Council**

The Standards Council is the controlling body of the Bureau of Standards Jamaica and is responsible for the policy and general administration of the Bureau.

The Council is appointed by the Minister in the manner provided for in the Standards Act, 1969. Using its powers in the Standards Act, the Council appoints committees for specified purposes.

The Standards Act, 1969 sets out the duties of the Council and the steps to be followed for the formulation of a standard.

**Preparation of standards documents**

The following is an outline of the procedure which must be followed in the preparation of documents:

1. The preparation of standards documents is undertaken upon the Standard Council’s authorisation. This may arise out of representation from national organisations or existing Bureau of Standards’ Committees of Bureau staff. If the project is approved it is referred to the appropriate sectional committee or if none exists a new committee is formed, or the project is allotted to the Bureau’s staff.

2. If necessary, when the final draft of a standard is ready, the Council authorises an approach to the Minister in order to obtain the formal concurrence of any other Minister who may be responsible for any area which the standard may affect.

3. The draft document is made available to the general public for comments. All interested parties, by means of a notice in the Press, are invited to comment. In addition, copies are forwarded to those known, interested in the subject.

4. The Committee considers all the comments received and recommends a final document to the Standards Council

5. The Standards Council recommends the document to the Minister for publication.

6. The Minister approves the recommendation of the Standards Council.

7. The declaration of the standard is gazetted and copies placed on sale.

8. On the recommendation of the Standards Council the Minister may declare a standard compulsory.

9. Amendments to and revisions of standards normally require the same procedure as is applied to the preparation of the

original standard.

**Overseas standards documents**

The Bureau of Standards Jamaica maintains a reference library which includes the standards of many overseas standards organisations. These standards can be inspected upon request.

The Bureau can supply on demand copies of standards produced by some national standards bodies and is the agency for the sale of standards produced by the International Organization for Standardization (ISO) members.

Application to use the reference library and to purchase Jamaican and other standards documents should be addressed to:

Bureau of Standards Jamaica

6 Winchester Road

P.O. Box 113,

Kingston 10

JAMAICA, W. I.