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Stages of the bioeconomy of the production process sitotroga cerealella

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ABSTRACT

The protocol describes the production process of *Sitotroga* Cerealella's bioeconomy. This process has 5 stages:

1. STAGE OF STERILIZATION OF WHEAT SUBSTRATE

a) WASHING PHASE
b) STERILIZATION PHASE

2. STERILIZATION STAGE OF *SITOTROGA CEREALELLA* EGGS

a) WASHING PHASE OF *SITOTROGA CEREALELLA* EGGS
b) DRYING PHASE OF *SITOTROGA CEREALELLA* EGGS
c) INCUBATION PHASE OF *SITOTROGA CEREALELLA* EGGS

3. SEEDING STAGE AND INFESTATION OF LARVAE OF *SITOTROGA CEREALELLA*.

a) FRAMES DISINFECTION PHASE.
b) SEEDING PHASE AND INFESTATION OF LARVAE AND EGGS OF *SITOTROGA CEREALELLA*

4. ADULT EMERSION STAGE OF *SITOTROGA CEREALELLA*

a) CABINET WASHING, DISINFECTION, AND PREPARATION PHASE.
b) PHASE OF WASHING, DISINFECTION, AND PREPARATION OF PORRONES.
c) SEEDING PHASE AND INFESTATION OF LARVAE OF SITOTROGA CEREALELLA

5. EXTRACTION STAGE OF SITOTROGA CEREALELLA EGGS.

a) WASHING, DISINFECTION, AND PREPARATION PHASE OF OVIPOSITION FRAMES AND TRAYS.
b) CLEANING PHASE OF ADULTS AND EGGS SITOTROGA CEREALELLA.
c) PHASE OF OVIPOSITION AND EXTRACTION OF SITOTROGA CEREALELLA EGGS.

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Sitotroga, Trichogramma, Chrysopa, Bioeconomy

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GUIDELINES

This protocol considers the productivity bioeconomic analysis for the production processes of Sitotroga cerealella facing the production process of Sitotroga has two sub-products to obtain the OUTPUTS Trichogramma and Chrysoperla Externa.

MATERIALS TEXT

Wheat
Pans
Waters
Gabacha
Oven
Fan ventilates
Pantry
Frames
Detergents
Alcohol
Chlorine
Rubber boots
Cap mask
Earplugs
Rubber gloves

1 *SITOTROGA* SUBSTRATE STERILIZATION STAGE

a) WASHING PHASE The duly certified raw material (wheat) of free varieties of grains other than the required is received. An inspection is carried out to verify its content and to be free of possible other varieties of grains. The bags are moved from the warehouse area in a hand truck to the washing area, using the force belts for handling the bags, weighing the content of each bag of wheat before washing (registering it in control), then emptying the bag into the plastic container that has a capacity of more than 45.36 kilos). Water (25 liters) is poured into the tub with the wheat

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until it is completely covered, leaving it to get wet for three minutes (3). Then the water is emptied, leaving the wet wheat in the vat to pass it to the pans, depositing an average of (6.577089 Kg) per pan, reaching 7 pans (average) for every 45.36 kilos. The pans are moved to the Sterilization room and placed in the oven. In handling wheat washing, the spillage of grains must be collected to avoid waste and contamination by particles foreign to the process. The waste collected without contamination should be placed in the last pan. This process must be carried out in the remaining quintals that are needed. At the end of the wash, the work area must be left clean. All the pans must be taken to the Sterilization area, and placed in the oven, in a well-distributed manner that receives uniform temperature reception. This phase ends with the pans properly placed in the oven and the laundry room cleaned. The registration sheet: Date, Start Time, Number of Technicians, Quantity of Wheat (Kilos), Number of Pans, Water Consumption (liters), EPP, End Time.
b) SUBSTRATE STERILIZATION Once the pans are placed, the wheat pans are placed on the oven shelves, at a rate of five pans per shelf (average). The oven and the fan are turned on to reach an optimum temperature of 90 degrees, spending an average time of two hours, starting at this moment the sterilization time for a period of 8 hours (approximately). Subsequently, the cooling time begins, ventilating the oven, in such a way that it facilitates the manipulator to be able to transfer the pans to the planting room, where they will remain for approximately time of two and a half hours (2 ½ hrs.) and ending at the moment, when the pans are deposited in a barrel, ending the cooling time. The following information must be filled out on the registration sheet: Date, Oven Start Time, Number of Pans, and Time Temp. Optimum, Furnace End Time, Cooling Start Time, EPP, Cooling End Time.

2 STAGE OF STERILIZATION OF *SITOTROGA CEREALELLA* EGGS This stage is carried out in parallel with the Wheat Substrate Sterilization Stage, combining at the end of its phases to start Stage three (3), the sowing of larvae or infestation of Sitotroga Cerealella.
(a) DRYING PHASE OF *SITOTROGA CEREALELLA* EGGS. This phase begins with the washed eggs that were transferred to this sowing room in a tray containing an organza blanket with the eggs, the tray is placed in the pantry and a fan ventilates the eggs for drying, for a period of time. approximately two and a half hours (2 ½ hrs.) and inspecting this drying every 20 minutes to determine the degree of drying and at the same time shake for a uniform drying of all the eggs. Once the drying phase has been verified, this phase is terminated. In the registration sheet, the following information must be filled in: Date, Drying Start Time, PPE, Number of Technicians, Inspection Time (Start Time, End Time), and Drying End Time.
(b) INCUBATION PHASE OF *SITOTROGA CEREALELLA* EGGS. The disinfection of the plastic cups with alcohol is carried out, and then the Sitotroga Cerealella eggs are deposited in them, at 4 grams per cup. This incubation takes an average duration of 24 hours for the emergence of larvae from the eggs, subsequently carrying out inspections every 12 hours to determine the degree of the emergence of larvae. This stage ends with the emergence of the larvae. The following information must be filled out on the registration sheet: Date, Incubation Time, and Number of cups, Inspections carried out, Alcohol Consumption, Egg Weight/grams-cup, and Harvest Time. EPP, number of larvae.

3 SEEDING STAGE / INFECTING LARVAE OF *SITOTROGA CEREALELLA*
a) FRAMES DISINFECTION PHASE. The frames (three cells in each frame) are disinfected for sowing Sitotroga Cerealella larvae and eggs. The disinfection of the frames begins with the washing process with water and detergent, then they are immersed in chlorine and left to dry in the

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environment. Before being used in sowing larvae and eggs, they must be disinfected with alcohol. Subsequently moving the frames to the planting room. In the record sheet of this process, the following information must be filled in: Date, Disinfection Start Time, Number of disinfected frames, amount of detergent (gm), amount of water (liters.), Amount of chlorine (ml), and amount of alcohol (ml), EPP, disinfection end time.

b) SEEDING PHASE AND INFESTATION OF LARVAE AND EGGS OF *SITOTROGA CEREALELLA* As a start, the frames of sterilized wheat are filled in the three cells of each frame, depositing in each cell the amount of 2 kilos of wheat, for a total of 6 kilos of wheat per frame. Once the emersion of larvae in the incubation cups has been verified by means of inspections every 12 hours, the larvae and eggs are planted in the frames. Subsequently, 4 grams of eggs (incubation cup) are placed in each cell, for a total of 12 grams of Sitotroga Cerealella eggs per frame. Once the frames are filled, they are dated on a masking tape, placing the batch number, frame number, shelf number, for sequence identification in this phase, and then they are transferred to the incubation room, placing them in the shelves numbered and sorted by batches according to the date of infection. These frames will remain for an average period of 20-25 days, to pass from a larval stage to a pupa. The abiotic state must be maintained, optimizing the parameters 25 degrees of temperature and, relative humidity 75 to 86%. For this, it is necessary to carry out periodic inspections on the air conditioners (a/c) and the humidifier, regulating the aforementioned parameters. This process is finished at this stage. In the security measures in this room, the PPE that must be used: rubber boots, cap mask, earplugs, gabacha, and, rubber gloves for washing the room. The following information must be filled out on the registration sheet in this room: Date, Initial Planting Time, Number of infected frames, Number of lots, Number of Shelves, and Weight of wheat/kg. , Number of incubation cups, Weight Eggs/gm. Number of Inspections, EPP, and Final Planting Time.

4 EMERSION STAGE OF ADULTS OF *SITOTROGA CEREALELLA*.

a) CABINET WASHING, DISINFECTION, AND PREPARATION PHASE.

I. In this phase it depends on the way in which the cabinet is built, first if it is lined with organza fabric (its assembly is permanent), its washing is done using water and detergent, then after drying, the cabinets are disinfected done with chlorine and alcohol before use. Later I know an inspection of its state will be carried out, to make the respective repairs and place the plastic that would serve as a funnel towards the porrón that is in the lower part and that is placed with masking tape, for future captures of the adults after their emersion.

II. If the cabinet is not lined with organza, but with bridal fabric, its procedure is to wash the cabinets with water and detergent, place the bridal fabric on the walls of the cabinet, sealing any opening that may cause adults to escape, it is disinfected with chlorine on the edges of the cabinet and then with alcohol before use, plastic is placed in the lower part of the cabinet, to place the pochard with masking tape at the end of the plastic funnel, to capture the adults after their emergence.

III. When the cabinets come to be used from the emersion room, the frames that come with the wheat must be removed, the wheat emptied into bags, and the weight of each of them made, this wheat will be marketed for animal feed, etc. The frames are washed as established in the frame washing and disinfection phase. The frames (three cells in each frame) are disinfected for sowing Sitotroga Cerealella larvae and eggs. The disinfection of the frames begins with the washing process with water and detergent, then they are immersed in chlorine and left to dry in the environment. Before being used in sowing larvae and eggs, they must be disinfected with alcohol. Subsequently moving the frames to the planting room. In the record sheet of this process, the following information must be filled in: Date, Disinfection Start Time, Number of disinfected frames,

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amount of detergent (gm), amount of water (liters.), Amount of chlorine (ml), amount of alcohol (ml), EPP, disinfection end time.
b) PHASE OF WASHING, DISINFECTION, AND PREPARATION OF PORRONES. The beginning of this phase is when the porrones (batons) that come from the extraction area are collected, the information of the cabinet number, porrón number, and date of capture, and transfers to the washing area must be taken, where water, detergent, and chlorine are used, to then be transferred to the warehouse area for storage. Then, when used, it goes to the phase of disinfection of the porrones where chlorine and alcohol are used, to be transferred to the adult emersion room, previously, identify the porrones by cabinets. The identification of the porrones will be with the following information: cabinet number, porrón number, and date of placement in the cabinet. The following information must be filled in the registration sheet: Date, Start Time, Number of porrones, number of porrón, cabinet number, amount of detergent (gm), amount of water (liters), amount of chlorine (ml), Quantity of alcohol (ml), and amount of masking tape (roll), EPP, End time.
c) EMERSION PHASE OF ADULTS OF *SITOTROGA CEREALELLA*. This phase begins with the placement of the frames in the pupae state in the cabinets, which should be located in the cabinet according to the batch order, number of frames, and date of infestation. Each cabinet has a capacity of 10 frames. The emersion period is 30 to 35 days maximum, but during this period adults emerge, which are deposited in the capture pochard, which is located in the lower part of the funnel, replacing them with another pochard to continue the capture. To then be transferred to the extraction room. Finish this stage. The following information must be filled in the registration sheet: date, start time (placement of frames in cabinets), Cabinet Number, Lot Number, Number of frames, EPP, End Time (Placement, Start Time (Porrón Capture), Number of catches, number of catches, cabinet number, EPP, End Time (Captures).

5 EXTRACTION STAGE OF ADULT *SITOTROGA CEREALELLA*.
a) WASHING, DISINFECTION, AND PREPARATION PHASE OF OVIPOSITION FRAMES AND TRAYS. This phase begins with the collection of oviposition frames and egg deposit sheets, to be washed with detergent, water, and chlorine, to be stored in the cellar. The information of these frames is obtained, washing date, start time, number of frames, amount of water (liters), amount of detergent (gm), amount of chlorine (ml), and amount of alcohol (ml). Once these frames and oviposition trays are to be used, they must be disinfected with alcohol and chlorine, and then transferred to the egg harvesting area. The oviposition frame is lined with organza fabric on both sides, then it is placed in the egg deposit tray, which is the one that collects the eggs of the adults. It must be verified that the frames and trays must meet the necessary requirements for their use. The registration sheet must be filled out with the following information: Date, Start time, number of frames, number of oviposition trays, amount of water (liters), amount of alcohol (ml), amount of chlorine (ml), and amount of detergent (gm), Masking Tape, EPP, End time.
b) CLEANING PHASE OF ADULTS AND EGGS SITOTROGA CEREALELLA. This phase begins with the transfer of the porrones from the cabinets, which contain the adults of Sitotroga Cerealella, which are collected daily, passing them to the cleaning area, which is an extractor, placing the porrón at a certain distance from it, performing some non-abrupt movements to remove the dust or scale, leaving the content in the jar clean, leaving only the adults and some eggs at the bottom of the jar. Carrying out the weighing of the adults and the eggs that are inside the porrón, then the empty porrón is weighed to determine its weight. In the registration sheet, you must fill in the following information: date, start time, frame coding, the number of porrón, cabinet, and frame, the weight of adults, eggs collected (gm), Masking Tape, EPP, and end time.

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c) PHASE OF OVIPOSITION AND EXTRACTION OF *SITOTROGA CEREALELLA EGGS*. The beginning of this phase is with him the transfer and deposit of the adults and eggs in the oviposition frames and trays. These eggs are the ones that remain in the lower part of the pochard, which are the first postures of the adults. This period of oviposition is for a term of 6 to 7 days maximum, which is the life cycle of the adult. When emptying the adults in the tray, a brush is used to remove the eggs from the lower part of the porrón, the harvest of eggs is daily, they are cleaned by means of a cell, and they are measured in grams and selected according to their degree of maturity. , classifying them into white and fresh eggs that will be transferred for the breeding of *Trichogramma*, and red ones for the breeding of *chrysopas*. Subsequently, they are refrigerated as a finished product, noting the date, for a period of 15 days at a temperature of 10-15 degrees Celsius. The following information must be filled in the registration sheet: date of oviposition, start time, number of frames, the weight of adults, cabinet number, number of porrón, the weight of eggs collected (gm), EPP, end time.

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