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GREEN HOUSE

for Mushroom Growing

Complete Turnkey Solution For
Button Mushroom Cultivation

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Manufacturers, Repairs & Maintenance of:
Chambers, Air-conditioning Systems, Deep Freezers, Cold Rooms,
Refrigeration Systems & Allied Equipment

Applications

- Commercial Button Mushroom Farms
- Controlled Environment Mushroom Production
- Modern Greenhouse-Based Cultivation Systems

Brand Association
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Advanced Greenhouse Solutions for High-Yield Button Mushroom Production

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ABOUT THE GREENHOUSE SYSTEM

Greenhouse for Mushroom Growing

This project is a modern greenhouse system specially designed for Button Mushroom cultivation.
The entire setup is created to maintain controlled temperature, humidity, airflow, and hygiene, which are essential for consistent mushroom production.
Unlike traditional open or temporary structures, this greenhouse is a fully enclosed, insulated growing environment that allows year-round production with better yield, quality, and control.

Purpose of This Greenhouse System

The greenhouse system is designed to:

- Maintain ideal growing conditions for Button Mushroom
- Support small, medium, and large-scale projects
- Reduce dependency on external weather conditions
- Improve production consistency and hygiene
- Allow efficient use of equipment and materials

This system can be customized according to:

- Project size
- Daily or monthly production capacity
- Available space
- Client requirements

Controlled Growing Environment

This mushroom growing setup is designed as a fully enclosed and controlled growing environment, where key conditions required for Button Mushroom cultivation are maintained throughout the production cycle.

- Fully controlled internal environment
- Insulated walls and roof for temperature stability
- Controlled air circulation and CO_2 management
- Controlled humidity and moisture levels
- Hygienic and enclosed growing space

All growing conditions are maintained through controlled systems, independent of external climate variations.

System Scope

The greenhouse system covers the complete mushroom production process, including:

- Compost preparation infrastructure
- Controlled growing rooms
- Temperature and humidity control systems
- Air circulation and filtration
- Internal layout for mushroom bags and racks
- Harvesting and basic handling support

This makes it a complete greenhouse solution for mushroom growing, not just a room or storage space.

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Stage -1

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OVERALL PROCESS FLOW

Greenhouse-Based Button Mushroom Production

The Greenhouse for Mushroom Growing system follows a structured process where each stage supports the next. All activities are carried out within a controlled and hygienic environment to ensure stable production and consistent quality. This page provides a high-level overview of the complete process.

Step 1 – Compost Preparation
Preparation of mushroom compost using selected raw materials
Compost is conditioned to support healthy mushroom growth
Compost handling is carried out using manual or mechanical systems
This stage prepares the growing medium required for Button Mushroom cultivation.

Compost Preparation

Step 2 – Bag Filling and Spawning
Prepared compost is filled into 10 kg mushroom growing bags
Mushroom spawn is mixed with compost before room placement
Bags are ready for placement inside the greenhouse growing room
This step ensures uniform distribution of spawn within the compost.

Bag Filling and Spawning

Step 3 – Controlled Growing Room
Mushroom bags are placed on racks inside the insulated greenhouse room
Environmental conditions are maintained using refrigeration, airflow, and humidity systems
All cultivation stages take place inside the same controlled room
This allows efficient use of space and equipment.

Controlled Growing Room

Environmental Management

Step 4 – Environmental Management
Temperature, humidity, and CO_2 levels are monitored and adjusted
Fresh air circulation and filtration are maintained
Systems can be operated manually or through automation
This ensures stable conditions throughout the production cycle.

Harvesting and Basic Handling

Step 5 – Harvesting and Basic Handling
Button mushrooms are harvested manually at maturity
Harvesting is done in clean and controlled conditions
Mushrooms are prepared for packing after harvest

Process Integration
All steps are interconnected and designed to function as a single greenhouse system.
This integrated approach supports reliable production, hygiene, and efficient operation.

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Stage -2

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COMPOST PREPARATION SYSTEM

Compost Preparation for Button Mushroom Growing

Compost preparation is the most critical stage in Button Mushroom cultivation.
The compost acts as the growing medium and food source for mushrooms. If compost quality is poor, mushroom yield and quality are directly affected.
For this reason, the Greenhouse for Mushroom Growing system includes a dedicated compost preparation infrastructure, supported by specific machines and laboratory facilities.

1. Mixing Yard (Initial Compost Preparation Area)

The compost preparation process starts in a mixing yard.

Why a mixing yard is required:

- To combine all raw compost materials in correct proportion
- To ensure uniform moisture and texture before compost conditioning
- To prepare a consistent mixture before transferring to bunkers

Raw materials handled in the mixing yard:

- **Cocopeat –** helps retain moisture and improves compost structure
- **Straw / Bhusa (wheat straw) –** main organic base for compost
- **Chicken manure –** provides nitrogen required for compost activity
- **Urea –** added in controlled quantity to support compost conditioning
- **Gypsum –** improves compost texture and prevents stickiness

How mixing is carried out:

- Manual mixing using human labor
- Mechanical mixing using JCB or loader for larger quantities
- Compost mixing machines to improve speed and uniformity

Without proper mixing, compost quality becomes uneven, which affects mushroom growth later.

mixing yard

Compose Prepration

Bunker system

2. Bunker System (Open Aerated Compost Conditioning Stage) After mixing, the compost is transferred into bunkers.

Machines and materials used

Why bunkers are used:

- To allow compost to undergo controlled biological activity
- To prevent compost from overheating
- To prepare compost gradually before tunnel conditioning

Bunker system characteristics:

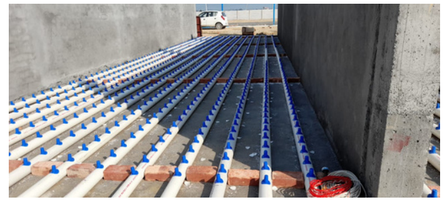
- Open structure for easy loading and unloading
- Designed for bulk compost holding
- Compost remains in bunkers for approximately 7 days
- Multiple bunkers allow rotation of compost batches

Why aeration is necessary in bunkers:

- Compost generates heat naturally
- Without air supply, compost can get damaged
- Proper aeration keeps compost active but stable

Machines and materials used for aeration:

- Industrial air blowers (5 HP / 7.5 HP / 10 HP)
- Push fresh air into the compost mass
- Spigots (air diffusers)
- Distribute air evenly below compost
- Perforated air pipes / ducting
- Carry air from blower to spigots



Spigots (air diffusers)

This system ensures compost temperature remains under control and suitable for mushroom growth.

3. Tunnel System (Enclosed & Insulated Compost Conditioning)
After bunker conditioning, compost is moved into tunnels.

Why tunnels are required:

- To complete compost conditioning in a controlled environment
- To protect compost from external air and contamination
- To stabilize temperature and moisture before bag filling

Tunnel system features:

- Fully enclosed structure
- Highly insulated walls and roof
- Airtight design to prevent air leakage

Machines and equipment used inside tunnels:

- Air circulation system for uniform conditioning
- Dampers to regulate airflow
- Temperature measuring rods or probes
- Insulated panels for thermal stability

Tunnel system

Machines and equipment

The tunnel system ensures compost is uniform, stable, and ready for mushroom cultivation.

4. Compost Transfer & Bag Filling Machines
To reduce manual effort and improve consistency, mechanical handling machines are used.

Why transfer and filling machines are used:

- To move compost efficiently between stages
- To reduce labor dependency
- To ensure uniform filling and weight

Machines included:

Bunker / Tunnel Filling Machine

- Transfers compost from mixing yard into bunkers and tunnels
- Same machine used for both operations

Compost Bag Filling Machine

- Fills compost into mushroom growing bags
- Ensures consistent 10 kg weight per bag

Mushroom growing bags:

- Special plastic mushroom growing bags
- Suitable for air exchange required during cultivation
- Capacity: 10 kg per bag📸 Image to be added: Bag filling machine and filled grow bags

Compost Transfer

SECTION B – SPAWN PREPARATION & LABORATORY SYSTEM

Spawn Preparation for Button Mushroom

Spawn is the seed material required for mushroom growth.
Without healthy spawn, mushrooms cannot grow, even if compost quality is good.
Therefore, spawn must be prepared under controlled and sterile laboratory conditions.

Laboratory Equipment Used

Why laboratory equipment is required:

- To prevent contamination
- To ensure healthy and active spawn

Equipment included:

Autoclave

- Sterilizes grains, media, and tools
- Eliminates harmful bacteria and fungi

Autoclave

BOD Incubator

- Provides controlled temperature for spawn development
- Supports uniform and stable growth of spawn culture

Prepared spawn is mixed with compost before or during the bag filling stage, ensuring even distribution throughout the compost.

BOD Incubator

System Importance

The compost preparation infrastructure, machines, and spawn laboratory together form the base system of the Greenhouse for Mushroom Growing project.
Each component is essential and directly supports commercial Button Mushroom production.

Greenhouse Structure for Mushroom Growing

The Greenhouse for Mushroom Growing is constructed as a fully enclosed and insulated structure. Its main purpose is to create a stable internal environment where temperature, humidity, airflow, and hygiene can be controlled throughout the mushroom production cycle.
This page explains the structural materials, construction components, and supporting accessories used to build the greenhouse system

1. PUF Panel Structure (Insulated Enclosure)
The greenhouse growing rooms are constructed using PUF (Polyurethane Foam) Panels.

Why PUF Panels are used

- To maintain stable internal temperature
- To reduce heat gain and heat loss
- To improve energy efficiency of refrigeration systems
- To create a hygienic and easy-to-clean surface

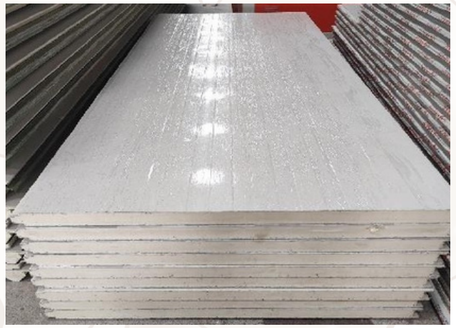
PUF panels act as the main enclosure of the greenhouse, forming walls and roof.

PUF Panel Thickness Options

Panels are selected based on room size and project requirement.
Common thicknesses include:

- 30 mm
- 60 mm
- 80 mm
- 100 mm
- 120 mm
- 150 mm

Thicker panels provide better insulation and temperature stability.



Wall Puff Panels

Roof & Ceiling Puff Panels

2. Wall Panels & Roof Panels

Wall Panels
Used for all four sides of the greenhouse room
Provide structural strength and insulation
Installed with tight joints to prevent air leakage
Roof Panels
Corrugated insulated panels are used for roofing
Designed to prevent water accumulation
Improve structural durability
These panels together form a sealed greenhouse enclosure, essential for mushroom growing.

3. Panel Accessories & Installation Materials

To ensure proper installation and long-term durability, the following accessories are used:
Accessories Used

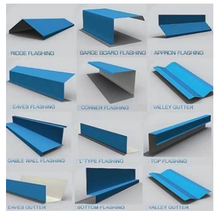
Fasteners (Bolts, Screws & Fixing Elements)
Used to secure PUF panels, structural members, and accessories
Provide load-bearing strength and alignment
Essential for stable and long-lasting panel installation

Fasteners

POP Rivets
Used to fix panels securely
Provide mechanical strength

POP Rivets

Flashing Sheets
Used at joints and corners
Prevent air and moisture leakage



Flashing Sheets

Silicone Sealant
Seals gaps between panels
Improves airtightness and hygiene
These accessories ensure the greenhouse remains airtight, insulated, and stable

Silicone Sealant

Puff Panels hings Door

4. Mushroom Growing Doors

Specially designed mushroom growing doors are installed in each greenhouse room.

Why special doors are required

To maintain airtight conditions
To reduce temperature loss during entry and exit
To support hygiene and easy cleaning
Doors are insulated and compatible with PUF panel structures.

5. Flooring System & Drainage Arrangement

RCC Flooring

Reinforced Cement Concrete (RCC) flooring is constructed before panel installation
Provides a strong and durable base
Supports racks, compost bags, and movement inside the room

Floor Slope (Drainage Design)

Floor is constructed with a controlled slope
Allows excess water to flow toward drainage points

Drainage System

4-inch drainage pipe installed within the floor
Drainage pipe positioned strategically inside the room
Prevents water accumulation and maintains hygiene
Proper drainage is essential to:
Avoid water stagnation
Maintain clean growing conditions
Support regular washing and cleaning

6. Structural Importance

The greenhouse structure:
Protects the growing environment from external climate
Supports refrigeration and humidity systems
Ensures hygiene and operational efficiency
All construction materials used are essential components of the Greenhouse for Mushroom Growing system.

Puff Panels OverLap Door

Environmental Control in Greenhouse for Mushroom Growing

Button Mushroom cultivation requires precise control of temperature, humidity, airflow, and carbon dioxide levels.
Natural conditions are not sufficient or stable enough, therefore the Greenhouse for Mushroom Growing system uses mechanical and electronic control systems to maintain the required environment at all times.
This page explains the machines, sensors, and control equipment used to regulate the internal greenhouse conditions.

1. Refrigeration System

The refrigeration system is used to maintain the required temperature inside the mushroom growing greenhouse.

Why refrigeration is required

- Button Mushroom requires low and stable temperatures
- Temperature must be controlled regardless of outside weather
- Cooling is essential during compost conditioning and growing stages

Refrigeration System

Refrigeration Units Used

- Commercial refrigeration machines suitable for greenhouse use
- Systems are selected based on room size and heat load

Typical cooling capacities include:

- **10,000 BTU 15,000 BTU 20,000 BTU 30,000 BTU**
- **40,000 BTU 60,000 BTU 80,000 BTU**

Higher capacity units are used for larger rooms, while smaller units are used for compact greenhouse spaces.

2. Air Circulation & Ventilation System

Proper air circulation is essential in Button Mushroom growing to maintain uniform temperature, balanced humidity, and controlled CO_2 levels throughout the greenhouse.
For this purpose, the greenhouse is equipped with a fully ducted air circulation system connected to the refrigeration unit.

Ducted Air Distribution System

The refrigeration system consists of indoor and outdoor units.
The indoor unit is installed inside the greenhouse and is fully connected to a GI ducting system.

GI ducting is used because it is:

- Strong and durable
- Suitable for continuous airflow
- Easy to clean and maintain

Only the fan outlet openings of the indoor unit are connected to the ducting system.

Ducted Air Distribution System

Polythene Air Distribution Ducts
To ensure gentle and even airflow, mushroom-grade polythene ducts are installed at duct outlet points.

- Each GI duct outlet is connected to a perforated polythene duct
- Air is released through multiple small openings
- Airflow is distributed evenly in all directions

This prevents direct air blast on mushroom bags and ensures uniform conditions across the room.

Polythene Air Distribution Ducts

3. Humidity Control System
Humidity control is critical for healthy mushroom growth.
Why humidity control is required

- Mushrooms require high and stable humidity
- Low humidity causes drying and poor yield
- Excess humidity can cause disease

Equipment Used
Humidifiers

- Used to increase and maintain required humidity levels
- Designed for continuous operation in enclosed rooms

Humidity Sensors / Humidity Meters

- Measure real-time humidity levels
- Provide feedback to control systems

Humidity Control System

4. Carbon Dioxide (CO_2) Monitoring System
Carbon dioxide levels directly affect mushroom development.
Why CO_2 control is required

- High CO_2 levels slow mushroom growth
- Controlled CO_2 improves shape and yield
- Proper ventilation depends on CO_2 readings

Equipment Used

- CO_2 Sensors / CO_2 Meters
- Measure carbon dioxide concentration
- Help regulate fresh air intake

Carbon Dioxide (CO_2) System

5. Control Panel & Automation System

All environmental systems are managed through a central control system.

Types of Control Systems

Manual Control Panels

Operators adjust temperature, humidity, and airflow manually

HMI-Based Automatic Control Panels

- Touch-screen operated system
- Displays real-time data
- Stores historical data for analysis
- Controls refrigeration, humidity, airflow, and CO_2 automatically

Why automation is used

- Improves accuracy and consistency
- Reduces human error
- Allows long-term performance monitoring

6. System Importance

The environmental control and refrigeration systems ensure:

- Stable growing conditions
- Year-round production
- Efficient energy usage
- Consistent mushroom quality

These machines and control systems are essential components of the Greenhouse for Mushroom Growing project.

Control Panel & Automation System

Internal Arrangement of Greenhouse for Mushroom Growing

1. Mushroom Growing Rack Systems

Mushroom cultivation inside the greenhouse is carried out using multi-level rack systems.
Two main types of rack systems are used.

A. MS (Mild Steel) Rack System – Bag Method

In this system, compost is filled into mushroom growing bags and placed on MS racks.
Features of MS rack system:

- Fabricated using mild steel
- Multi-level vertical structure
- Designed according to room height and layout

Working method:

- Compost and spawn are filled into bags
- Bags are placed on rack levels
- Workers access racks using:
  - Stairs
  - Pedestal walkways

Why this system is used:

- Simple and widely used
- Flexible layout
- Suitable for different project sizes

MS (Mild Steel) Rack System

B. GI (Galvanized Iron) Rack System – Tray Method

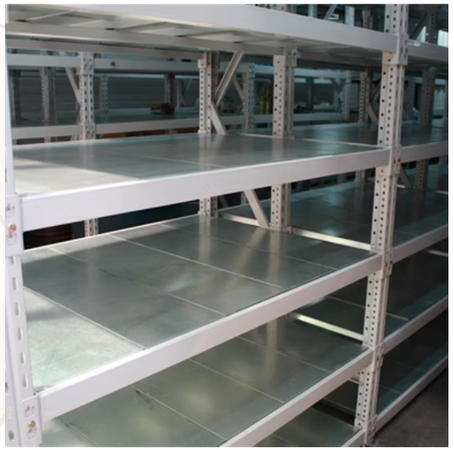
In this system, compost is not packed in bags.
Instead, compost is spread directly into GI trays fixed within the rack structure.

Features of GI tray rack system:

- Made from galvanized iron
- Equipped with removable trays
- Compost is spread directly in trays after mixing with spawn

Why tray system is used:

- Reduces use of plastic bags
- Easier compost handling and removal
- Trays can be cleaned and reused



(Galvanized Iron) Rack System

After the production cycle, compost can be removed by taking out trays and emptying them, making cleaning easier.

2. **Trolley Track System (For Tray Rack Arrangement)**
In GI tray rack systems, an additional trolley track system may be installed.

Purpose of trolley system:

- Used when racks are tall and multi-level
- Allows workers to sit on a moving trolley
- **Enables easy movement:**
- Side-to-side
- Up-and-down along the racks

Benefits:

- Reduces physical strain on workers
- Improves working efficiency
- Makes harvesting and maintenance easier

This system is mainly used in tray-based GI rack arrangements.

Trolley Track System

3. PET Wire Support System (Cost-Effective Option for MS Rack System)
In MS (Mild Steel) rack systems, PET wire is commonly used as a cost-effective internal support arrangement.
Why PET wire is used in MS rack systems:

- Made of strong plastic material
- Corrosion-free and lightweight
- Reduces overall rack system cost
- Used to support mushroom growing bags between rack frames
- Maintains proper spacing for airflow and easy handling

PET wire is mainly used where bags are placed on MS racks and helps lower material cost compared to fully fabricated metal shelves.

PET Wire Support System

4. Lighting System
Lighting inside the greenhouse is required mainly for visibility and working convenience.
Lighting equipment used:

- 20-watt tube lights or equivalent low-heat lights

Why low-heat lights are used:

- Do not affect internal temperature
- Provide sufficient light for workers
- Suitable for continuous operation

Lighting System

5. Watering System

Mushrooms require gentle and controlled watering.

Watering equipment used:

- Gardena shower

Why Gardena shower is used:

Provides soft water spray
Prevents damage to mushrooms
Maintains required moisture level

Watering System

6. Internal Hygiene & Working Safety

- Smooth panel surfaces allow easy cleaning
- Drainage supports regular washing
- Rack layout supports safe movement of workers

Maintaining hygiene is essential for stable mushroom production.

System Importance:

The internal setup ensures:

- Efficient use of space
- Flexible production methods
- Worker comfort and safety
- Consistent mushroom quality

All internal materials and systems described are integral parts of the Greenhouse for Mushroom Growing project.

Harvesting in Greenhouse for Mushroom Growing

Button Mushrooms are harvested manually inside the controlled greenhouse environment. Harvesting is carried out under hygienic conditions to maintain product quality and freshness.

Harvesting features:

- Manual harvesting to avoid damage
- Clean internal environment
- Controlled temperature and humidity during harvest

Post-Harvest Handling

After harvesting, mushrooms are handled carefully to prepare them for packing.

Why controlled handling is required:

- To maintain freshness
- To prevent physical damage
- To avoid contamination

Basic sorting and handling are carried out inside or near the greenhouse facility.

Packaging Materials:

Mushroom Packing Punnets For packing harvested mushrooms, plastic punnets are used.

Punnet characteristics:

- Made of food-grade plastic
- Suitable for fresh Button Mushroom packaging
- Designed for safe handling and transport

These punnets are commonly used for local distribution and market supply

Mushroom Packing

Cleaning & Hygiene Maintenance

- Greenhouse floors and racks are cleaned regularly
- Proper drainage supports easy washing
- Smooth panel surfaces help maintain hygiene

Regular cleaning is essential for:

- Disease prevention
- Stable production cycles
- Long-term system performance

Complete Greenhouse System Summary

The Greenhouse for Mushroom Growing includes:

- Compost preparation infrastructure and machines
- Spawn preparation laboratory
- Insulated greenhouse structure
- Environmental control and refrigeration systems
- Internal racks, lighting, and watering systems
- Harvesting and packaging support

All components work together as a single integrated greenhouse system designed for commercial Button Mushroom production.

Cleaning & Hygiene Maintenance

Spawn preparation laboratory

THANK YOU

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