

Cultivar

Recipe Library

77 open-source recipes for mushroom cultivation.
Liquid culture, grain spawn, all-in-one bags,
and bulk fruiting substrates.

All-in-One

Grain Spawn

Liquid Culture

Bulk Substrate

About This Library

This library contains 77 open-source recipes for mushroom cultivation, organized into four categories: All-in-One bags, Grain Spawn preparation, Liquid Culture media, and Bulk Fruiting Substrate. Every recipe includes target parameters, an ingredient list with percentages, cultivation notes, and a step-by-step protocol generated from the Cultivar recipe engine.

All recipes are released under the MIT License and are freely available at git.grove5.com/grove5/recipes. Contributions, corrections, and forks are welcome.

The Cultivar appliance automates the environmental conditions (temperature, humidity, CO2, fresh air exchange) required during colonization and fruiting. Substrate and spawn preparation — covered in these recipes — is performed before loading into the Cultivar.

INGREDIENT KEY

- **Base** Primary structural or nutrition component
- **Supplement** Secondary nutrition additive (raises contamination risk)
- **Additive** pH buffer, mineral, or conditioning agent

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All-in-One Bags

- Pearl Barley + Straw Layer
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- Paper + Coffee (Urban Tek)
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- Straw + Wheat Bran 10%
- Straw + Coffee Grounds 15%
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- ◆ Sawdust + Rice Bran 15%
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- ▲ Master's Mix 40/60 Soy Heavy

LIQUID CULTURE

20 recipes

Liquid Culture

Liquid culture (LC) is a suspension of mycelium in a nutrient solution. It is used to inoculate grain spawn, agar plates, and all-in-one bags. Good LC technique is the foundation of contamination-free cultivation.

LIQUID CULTURE

BEGINNER

#01

Standard LME (4%)

The benchmark liquid culture recipe. Works for nearly all species.

[standard] [all-purpose] [beginner-friendly]

PARAMETERS

TARGET PH
6.2

WATER
Distilled

STERILIZATION
121°C, 15psi, 30min

VOLUME
600ml per vessel

INGREDIENTS

■ Light Malt Extract — 40 g/L

40g/L light malt extract in distilled water. Good for nearly everything.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- 1 Measure water (Distilled) into vessel. 2 min
- 2 Dissolve nutrients: Light Malt Extract — 40 g/L. Stir until clear. 3 min
- 3 Check and adjust pH to 6.2. 3 min
- 4 Fill vessels to desired level, leaving 25% headspace. 2 min
- 5 Cap with self-healing injection port and polyfill filter or modified filter lid. 3 min

6	Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily.	30min
7	Cool to room temperature before inoculation. Hot liquid kills mycelium. ■ <i>Never inoculate warm LC.</i>	2–4 hrs
8	Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels.	5 min
9	Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance).	7–14 days

#02

Honey Water (Standard)

Simple honey water LC. Natural antibacterial properties may help.

[beginner-friendly] [budget] [natural]

PARAMETERS

TARGET PH
6.0

WATER
Distilled

INGREDIENTS

■ Raw Honey — 30 g/L

STERILIZATION

121°C, 15psi, 20min

30g raw honey per litre. Avoid pasteurized honey if possible.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- | | | |
|----------|--|-----------|
| 1 | Measure water (Distilled) into vessel. | 2 min |
| 2 | Dissolve nutrients: Raw Honey — 30 g/L. Stir until clear. | 3 min |
| 3 | Check and adjust pH to 6.0. | 3 min |
| 4 | Fill vessels to desired level, leaving 25% headspace. | 2 min |
| 5 | Cap with self-healing injection port and polyfill filter or modified filter lid. | 3 min |
| 6 | Sterilize at 121°C, 15psi, 20min. Do not exceed 30 min at pressure — LC caramelizes easily. | 20min |
| 7 | Cool to room temperature before inoculation. Hot liquid kills mycelium.
■ <i>Never inoculate warm LC.</i> | 2–4 hrs |
| 8 | Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. | 5 min |
| 9 | Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). | 7–14 days |

#03

Dextrose LC (4%)

Pure dextrose. Clean simple sugar, less prone to caramelization.

[defined-media] [clean] [research]

PARAMETERS

TARGET PH
6.0

WATER
Distilled

INGREDIENTS

■ Dextrose — 40 g/L

STERILIZATION

121°C, 15psi, 30min

Good for species where you want clean defined media.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- | | | |
|---|--|-----------|
| 1 | Measure water (Distilled) into vessel. | 2 min |
| 2 | Dissolve nutrients: Dextrose — 40 g/L. Stir until clear. | 3 min |
| 3 | Check and adjust pH to 6.0. | 3 min |
| 4 | Fill vessels to desired level, leaving 25% headspace. | 2 min |
| 5 | Cap with self-healing injection port and polyfill filter or modified filter lid. | 3 min |
| 6 | Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. | 30min |
| 7 | Cool to room temperature before inoculation. Hot liquid kills mycelium.
■ <i>Never inoculate warm LC.</i> | 2–4 hrs |
| 8 | Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. | 5 min |
| 9 | Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). | 7–14 days |

#04

Karo LC (Light Corn Syrup)

Budget-friendly corn syrup LC. Works for most aggressive species.

[budget] [beginner-friendly] [karo]

PARAMETERS

TARGET PH
6.0

WATER
Distilled

INGREDIENTS

■ Light Karo Syrup — 40 g/L

STERILIZATION

121°C, 15psi, 30min

40g/L light Karo syrup. Widely available.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- | | | |
|---|--|-----------|
| 1 | Measure water (Distilled) into vessel. | 2 min |
| 2 | Dissolve nutrients: Light Karo Syrup — 40 g/L. Stir until clear. | 3 min |
| 3 | Check and adjust pH to 6.0. | 3 min |
| 4 | Fill vessels to desired level, leaving 25% headspace. | 2 min |
| 5 | Cap with self-healing injection port and polyfill filter or modified filter lid. | 3 min |
| 6 | Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. | 30min |
| 7 | Cool to room temperature before inoculation. Hot liquid kills mycelium.
■ <i>Never inoculate warm LC.</i> | 2–4 hrs |
| 8 | Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. | 5 min |
| 9 | Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). | 7–14 days |

#05

Potato Dextrose Broth (PDB)

Commercial PDB powder. Rich medium matching PDA without agar.

[commercial-premix] [rich] [pdb]

PARAMETERS

TARGET PH
5.6

WATER
Distilled

INGREDIENTS

■ Potato Dextrose Broth (premix) — 24 g/L

STERILIZATION

121°C, 15psi, 30min

24g/L. Good for species that perform well on PDA plates.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- | | | |
|---|--|-----------|
| 1 | Measure water (Distilled) into vessel. | 2 min |
| 2 | Dissolve nutrients: Potato Dextrose Broth (premix) — 24 g/L. Stir until clear. | 3 min |
| 3 | Check and adjust pH to 5.6. | 3 min |
| 4 | Fill vessels to desired level, leaving 25% headspace. | 2 min |
| 5 | Cap with self-healing injection port and polyfill filter or modified filter lid. | 3 min |
| 6 | Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. | 30min |
| 7 | Cool to room temperature before inoculation. Hot liquid kills mycelium.
■ <i>Never inoculate warm LC.</i> | 2–4 hrs |
| 8 | Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. | 5 min |
| 9 | Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). | 7–14 days |

#06

Homemade Potato Broth

Boil potatoes, strain, add dextrose. Homemade PDB equivalent.

[budget] [homemade] [rich]

PARAMETERS

TARGET PH
5.8

WATER
Potato extract

INGREDIENTS

- Potato Extract (200g potato boiled in 1L) — 1 L
- Dextrose — 20 g/L

STERILIZATION

121°C, 15psi, 30min

Budget option. Boil 200g diced potato in 1L for 30 min, strain.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- 1 Measure water (Potato extract) into vessel. 2 min
- 2 Dissolve nutrients: Potato Extract (200g potato boiled in 1L) — 1 L, Dextrose — 20 g/L. Stir until clear. 3 min
- 3 Check and adjust pH to 5.8. 3 min
- 4 Fill vessels to desired level, leaving 25% headspace. 2 min
- 5 Cap with self-healing injection port and polyfill filter or modified filter lid. 3 min
- 6 Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. 30min
- 7 Cool to room temperature before inoculation. Hot liquid kills mycelium. 2–4 hrs
 - *Never inoculate warm LC.*
- 8 Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. 5 min
- 9 Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). 7–14 days

#07

Coconut Water LC

Pure coconut water. Natural sugars, minerals, and cytokinins.

[natural] [coconut] [tropical]

PARAMETERS

TARGET PH

5.5

WATER

Coconut water (100%)

INGREDIENTS

■ Coconut Water — 1 L

STERILIZATION

121°C, 15psi, 20min

No additional nutrients needed. Natural cytokinins may benefit growth.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- | | | |
|---|--|-----------|
| 1 | Measure water (Coconut water (100%)) into vessel. | 2 min |
| 2 | Dissolve nutrients: Coconut Water — 1 L. Stir until clear. | 3 min |
| 3 | Check and adjust pH to 5.5. | 3 min |
| 4 | Fill vessels to desired level, leaving 25% headspace. | 2 min |
| 5 | Cap with self-healing injection port and polyfill filter or modified filter lid. | 3 min |
| 6 | Sterilize at 121°C, 15psi, 20min. Do not exceed 30 min at pressure — LC caramelizes easily. | 20min |
| 7 | Cool to room temperature before inoculation. Hot liquid kills mycelium.
■ <i>Never inoculate warm LC.</i> | 2–4 hrs |
| 8 | Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. | 5 min |
| 9 | Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). | 7–14 days |

#08

Maple Syrup LC

Complex sugars + trace minerals. Popular in northeast US/Canada.

[budget] [maple] [north-american]

PARAMETERS

TARGET PH
6.0

WATER
Distilled

INGREDIENTS

■ Pure Maple Syrup — 30 g/L

STERILIZATION

121°C, 15psi, 30min

Complex sugars and minerals from maple. Good community alternative.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- | | | |
|---|--|-----------|
| 1 | Measure water (Distilled) into vessel. | 2 min |
| 2 | Dissolve nutrients: Pure Maple Syrup — 30 g/L. Stir until clear. | 3 min |
| 3 | Check and adjust pH to 6.0. | 3 min |
| 4 | Fill vessels to desired level, leaving 25% headspace. | 2 min |
| 5 | Cap with self-healing injection port and polyfill filter or modified filter lid. | 3 min |
| 6 | Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. | 30min |
| 7 | Cool to room temperature before inoculation. Hot liquid kills mycelium.
■ <i>Never inoculate warm LC.</i> | 2–4 hrs |
| 8 | Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. | 5 min |
| 9 | Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). | 7–14 days |

#09

LME + Stir Bar (Standard 150 RPM)

Agitated culture; faster colonization through mycelium breakup.

[agitated] [commercial] [scale-up] [stir-bar]

PARAMETERS

TARGET PH
6.2WATER
DistilledSTIR BAR
150 RPMSTERILIZATION
121°C, 15psi, 30min

INGREDIENTS

■ Light Malt Extract — 40 g/L

Stir bar breaks up mycelium for faster colonization and denser biomass.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs**Equipment:** Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- | | | |
|---|--|--------------|
| 1 | Measure water (Distilled) into vessel. | 2 min |
| 2 | Dissolve nutrients: Light Malt Extract — 40 g/L. Stir until clear. | 3 min |
| 3 | Check and adjust pH to 6.2. | 3 min |
| 4 | Add a sterile magnetic stir bar to each vessel. Fill to desired level leaving 25% headspace. | 2 min |
| 5 | Cap with self-healing injection port and polyfill filter or modified filter lid. | 3 min |
| 6 | Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. | 30min |
| 7 | Cool to room temperature before inoculation. Hot liquid kills mycelium.
■ <i>Never inoculate warm LC.</i> | 2–4 hrs |
| 8 | Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. | 5 min |
| 9 | Incubate on stir plate at 150 RPM until mycelium fills the vessel (5–10 days).
■ <i>Adjust RPM to create a gentle vortex without splashing.</i> | 5–10
days |

#10

LME Heavy (6%)*Higher concentration for denser mycelium growth.*

[high-nutrient] [dense-growth]

PARAMETERS

TARGET PH
6.0WATER
Distilled

INGREDIENTS

■ Light Malt Extract — 60 g/L

STERILIZATION

121°C, 15psi, 30min

*60g/L. Watch for caramelization during sterilization.***STEP-BY-STEP PROTOCOL****Prep:** 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs**Equipment:** Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- | | | |
|---|--|-----------|
| 1 | Measure water (Distilled) into vessel. | 2 min |
| 2 | Dissolve nutrients: Light Malt Extract — 60 g/L. Stir until clear. | 3 min |
| 3 | Check and adjust pH to 6.0. | 3 min |
| 4 | Fill vessels to desired level, leaving 25% headspace. | 2 min |
| 5 | Cap with self-healing injection port and polyfill filter or modified filter lid. | 3 min |
| 6 | Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. | 30min |
| 7 | Cool to room temperature before inoculation. Hot liquid kills mycelium.
■ <i>Never inoculate warm LC.</i> | 2–4 hrs |
| 8 | Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. | 5 min |
| 9 | Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). | 7–14 days |

#11

Dark Malt Extract

More complex sugars than LME. Some report better Hericium results.

[alternative] [hericium]

PARAMETERS

TARGET PH
6.0

WATER
Distilled

INGREDIENTS

■ Dark Malt Extract — 40 g/L

STERILIZATION

121°C, 15psi, 30min

Dark malt extract at 40g/L.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- | | | |
|---|--|-----------|
| 1 | Measure water (Distilled) into vessel. | 2 min |
| 2 | Dissolve nutrients: Dark Malt Extract — 40 g/L. Stir until clear. | 3 min |
| 3 | Check and adjust pH to 6.0. | 3 min |
| 4 | Fill vessels to desired level, leaving 25% headspace. | 2 min |
| 5 | Cap with self-healing injection port and polyfill filter or modified filter lid. | 3 min |
| 6 | Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. | 30min |
| 7 | Cool to room temperature before inoculation. Hot liquid kills mycelium.
■ <i>Never inoculate warm LC.</i> | 2–4 hrs |
| 8 | Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. | 5 min |
| 9 | Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). | 7–14 days |

#12

Honey Water (Heavy)

Concentrated honey LC for faster biomass production.

[high-nutrient] [fast-growth]

PARAMETERS

TARGET PH
5.8

WATER
Distilled

INGREDIENTS

■ Raw Honey — 60 g/L

STERILIZATION

121°C, 15psi, 20min

60g/L. Denser growth but higher contamination risk if technique is sloppy.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- 1 Measure water (Distilled) into vessel. 2 min
- 2 Dissolve nutrients: Raw Honey — 60 g/L. Stir until clear. 3 min
- 3 Check and adjust pH to 5.8. 3 min
- 4 Fill vessels to desired level, leaving 25% headspace. 2 min
- 5 Cap with self-healing injection port and polyfill filter or modified filter lid. 3 min
- 6 Sterilize at 121°C, 15psi, 20min. Do not exceed 30 min at pressure — LC caramelizes easily. 20min
- 7 Cool to room temperature before inoculation. Hot liquid kills mycelium. 2–4 hrs
 - *Never inoculate warm LC.*
- 8 Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. 5 min
- 9 Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). 7–14 days

#13

Glucose + Peptone

Defined media with nitrogen source. Good for Cordyceps.

[defined-media] [cordyceps] [research]

PARAMETERS

TARGET PH
6.0

WATER
Distilled

INGREDIENTS

■ Glucose — 20 g/L

■ Peptone — 5 g/L

STERILIZATION

121°C, 15psi, 30min

More defined than malt extract. Good for controlled nutrition.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- 1 Measure water (Distilled) into vessel. 2 min
- 2 Dissolve nutrients: Glucose — 20 g/L, Peptone — 5 g/L. Stir until clear. 3 min
- 3 Check and adjust pH to 6.0. 3 min
- 4 Fill vessels to desired level, leaving 25% headspace. 2 min
- 5 Cap with self-healing injection port and polyfill filter or modified filter lid. 3 min
- 6 Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. 30min
- 7 Cool to room temperature before inoculation. Hot liquid kills mycelium. 2–4 hrs
 - *Never inoculate warm LC.*
- 8 Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. 5 min
- 9 Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). 7–14 days

#14

Reishi LC (LME + Brown Sugar)

LME base with brown sugar for trace minerals. Good for Ganoderma.

[ganoderma] [supplemented] [reishi]

PARAMETERS

TARGET PH
6.0

WATER
Distilled

INGREDIENTS

■ Light Malt Extract — 30 g/L

■ Brown Sugar — 10 g/L

STERILIZATION

121°C, 15psi, 30min

Molasses in brown sugar adds trace minerals.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- 1 Measure water (Distilled) into vessel. 2 min
- 2 Dissolve nutrients: Light Malt Extract — 30 g/L, Brown Sugar — 10 g/L. Stir until clear. 3 min
- 3 Check and adjust pH to 6.0. 3 min
- 4 Fill vessels to desired level, leaving 25% headspace. 2 min
- 5 Cap with self-healing injection port and polyfill filter or modified filter lid. 3 min
- 6 Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. 30min
- 7 Cool to room temperature before inoculation. Hot liquid kills mycelium. 2–4 hrs
 - *Never inoculate warm LC.*
- 8 Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. 5 min
- 9 Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). 7–14 days

#15

Shiitake LC (LME + Sawdust Extract)

LME in sawdust extract water. Pre-adapts mycelium to wood substrate.

[substrate-adapted] [shiitake] [wood-species]

PARAMETERS

TARGET PH
5.8

WATER
Sawdust extract

INGREDIENTS

- Light Malt Extract — 30 g/L
- Hardwood Sawdust Extract (50g in 1L) — 1 L

STERILIZATION

121°C, 15psi, 30min

Potentially faster colonization on sawdust blocks.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- 1 Measure water (Sawdust extract) into vessel. 2 min
- 2 Dissolve nutrients: Light Malt Extract — 30 g/L, Hardwood Sawdust Extract (50g in 1L) — 1 L. Stir until clear. 3 min
- 3 Check and adjust pH to 5.8. 3 min
- 4 Fill vessels to desired level, leaving 25% headspace. 2 min
- 5 Cap with self-healing injection port and polyfill filter or modified filter lid. 3 min
- 6 Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. 30min
- 7 Cool to room temperature before inoculation. Hot liquid kills mycelium. 2–4 hrs
 - *Never inoculate warm LC.*
- 8 Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. 5 min
- 9 Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). 7–14 days

#16

Cordyceps Optimized (Glucose + YE)

Rich defined media optimized for C. militaris. Higher glucose, mineral salts.

[cordyceps] [defined-media] [research] [optimized] [stir-bar]

PARAMETERS

TARGET PH
6.5

WATER
Distilled

STIR BAR
120 RPM

STERILIZATION
121°C, 15psi, 30min

INGREDIENTS

■ Glucose — 40 g/L

■ Yeast Extract — 10 g/L

■ Peptone — 5 g/L

Yeast extract + peptone for nitrogen. Mineral salts for enzyme cofactors.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- 1 Measure water (Distilled) into vessel. 2 min
- 2 Dissolve nutrients: Glucose — 40 g/L, Yeast Extract — 10 g/L, Peptone — 5 g/L. Stir until clear. 3 min
- 3 Check and adjust pH to 6.5. 3 min
- 4 Add a sterile magnetic stir bar to each vessel. Fill to desired level leaving 25% headspace. 2 min
- 5 Cap with self-healing injection port and polyfill filter or modified filter lid. 3 min
- 6 Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. 30min
- 7 Cool to room temperature before inoculation. Hot liquid kills mycelium. 2–4 hrs
 - *Never inoculate warm LC.*
- 8 Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. 5 min
- 9 Incubate on stir plate at 120 RPM until mycelium fills the vessel (5–10 days). 5–10 days
 - *Adjust RPM to create a gentle vortex without splashing.*

#17

LME Heavy + Stir Bar 200 RPM

Maximum biomass production. Commercial inoculation scale only.

[maximum-biomass] [commercial] [stir-bar]

PARAMETERS

TARGET PH
6.0

WATER
Distilled

STIR BAR
200 RPM

STERILIZATION
121°C, 15psi, 30min

INGREDIENTS

■ Light Malt Extract — 60 g/L

Heavy concentration with aggressive agitation for maximum mycelium production.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- 1 Measure water (Distilled) into vessel. 2 min
- 2 Dissolve nutrients: Light Malt Extract — 60 g/L. Stir until clear. 3 min
- 3 Check and adjust pH to 6.0. 3 min
- 4 Add a sterile magnetic stir bar to each vessel. Fill to desired level leaving 25% headspace. 2 min
- 5 Cap with self-healing injection port and polyfill filter or modified filter lid. 3 min
- 6 Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. 30min
- 7 Cool to room temperature before inoculation. Hot liquid kills mycelium. 2–4 hrs
 - *Never inoculate warm LC.*
- 8 Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. 5 min
- 9 Incubate on stir plate at 200 RPM until mycelium fills the vessel (5–10 days). 5–10 days
 - *Adjust RPM to create a gentle vortex without splashing.*

#18

Dextrose + YE (Stir Bar)

Defined media + agitation. Research-grade reproducible LC.

[defined] [research] [stir-bar]

PARAMETERS

TARGET PH
6.0WATER
DistilledSTIR BAR
150 RPMSTERILIZATION
121°C, 15psi, 30min

INGREDIENTS

■ Dextrose — 40 g/L

■ Yeast Extract — 5 g/L

Defined formula with agitation for reproducible research results.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs**Equipment:** Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- | | | |
|---|--|-----------|
| 1 | Measure water (Distilled) into vessel. | 2 min |
| 2 | Dissolve nutrients: Dextrose — 40 g/L, Yeast Extract — 5 g/L. Stir until clear. | 3 min |
| 3 | Check and adjust pH to 6.0. | 3 min |
| 4 | Add a sterile magnetic stir bar to each vessel. Fill to desired level leaving 25% headspace. | 2 min |
| 5 | Cap with self-healing injection port and polyfill filter or modified filter lid. | 3 min |
| 6 | Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. | 30min |
| 7 | Cool to room temperature before inoculation. Hot liquid kills mycelium.
■ <i>Never inoculate warm LC.</i> | 2–4 hrs |
| 8 | Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. | 5 min |
| 9 | Incubate on stir plate at 150 RPM until mycelium fills the vessel (5–10 days).
■ <i>Adjust RPM to create a gentle vortex without splashing.</i> | 5–10 days |

#19

Czapek Dox Broth (Modified)

Fully synthetic defined medium. Academic and comparative research.

[synthetic] [defined] [research] [czapek]

PARAMETERS

TARGET PH
6.5

WATER
Distilled

STERILIZATION

121°C, 15psi, 30min

INGREDIENTS

- Sodium Nitrate — 2 g/L
- Potassium Chloride — 0.5 g/L
- Magnesium Sulfate — 0.5 g/L
- Ferrous Sulfate — 0.01 g/L
- Sucrose — 30 g/L
- Potassium Dihydrogen Phosphate — 1 g/L

Fully synthetic medium for controlled research conditions.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs

Equipment: Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- 1 Measure water (Distilled) into vessel. 2 min
- 2 Dissolve nutrients: Sodium Nitrate — 2 g/L, Potassium Chloride — 0.5 g/L, Magnesium Sulfate — 0.5 g/L, Ferrous Sulfate — 0.01 g/L, Sucrose — 30 g/L, Potassium Dihydrogen Phosphate — 1 g/L. Stir until clear. 3 min
- 3 Check and adjust pH to 6.5. 3 min
- 4 Fill vessels to desired level, leaving 25% headspace. 2 min
- 5 Cap with self-healing injection port and polyfill filter or modified filter lid. 3 min
- 6 Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. 30min
- 7 Cool to room temperature before inoculation. Hot liquid kills mycelium. 2–4 hrs
 - *Never inoculate warm LC.*
- 8 Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. 5 min
- 9 Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). 7–14 days

#20

YPD Broth (Yeast Peptone Dextrose)

Very rich; high nitrogen. Fast biomass. Research-grade.

[rich] [research] [ypd] [biomass]

PARAMETERS

TARGET PH
6.0WATER
Distilled

STERILIZATION

121°C, 15psi, 30min

INGREDIENTS

■ Yeast Extract — 10 g/L

■ Peptone — 20 g/L

■ Dextrose — 20 g/L

Standard rich medium for maximum biomass production.

STEP-BY-STEP PROTOCOL

Prep: 20–30 min · **Sterilization:** 30 min · **Cooling:** 2–4 hrs · **Total:** 3–5 hrs**Equipment:** Pressure cooker / autoclave, Glass LC vessels or jars, Magnetic stir bar (optional), Self-healing injection ports, Polyfill or filter discs, Scale

- 1 Measure water (Distilled) into vessel. 2 min
- 2 Dissolve nutrients: Yeast Extract — 10 g/L, Peptone — 20 g/L, Dextrose — 20 g/L. Stir until clear. 3 min
- 3 Check and adjust pH to 6.0. 3 min
- 4 Fill vessels to desired level, leaving 25% headspace. 2 min
- 5 Cap with self-healing injection port and polyfill filter or modified filter lid. 3 min
- 6 Sterilize at 121°C, 15psi, 30min. Do not exceed 30 min at pressure — LC caramelizes easily. 30min
- 7 Cool to room temperature before inoculation. Hot liquid kills mycelium. 2–4 hrs
 - *Never inoculate warm LC.*
- 8 Inoculate with agar wedge, spore syringe, or existing LC under sterile conditions. Flame-sterilize needle between vessels. 5 min
- 9 Agitate daily by swirling. Ready when mycelium is abundant (cloudy/milky appearance). 7–14 days

GRAIN PREP

17 recipes

Grain Prep

Grain spawn is the engine of any cultivation workflow. Fully colonized grain provides the inoculation mass for bulk substrate transfers. Rye and wheat berries are the most common; specialty grains offer different advantages in terms of surface area, nutrition, and durability.

GRAIN PREP

BEGINNER

#21

Standard Rye Prep

The benchmark grain spawn recipe. Soak overnight, simmer until kernels start to split, drain and dry.

[standard] [beginner-friendly] [all-purpose] [rye]

PARAMETERS

TARGET PH
6.5

MOISTURE
45%

PRE-SOAK
12 hours

SIMMER
15 min

JAR FILL
55%

STERILIZATION
121°C, 15psi, 90min

INGREDIENTS

- Whole Rye Berries — 100%
- Gypsum (CaSO₄) — 1%

Grains should crack when squeezed but not squish. Surface moisture must evaporate before loading jars.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 12 hours. 12 hours
- 3 Simmer for 15 min until kernels swell and a few start to crack. Do not over-simmer. 15 min
 - *Mushy grain contaminates easily. When in doubt, under-simmer.*

4	Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. ■ <i>Surface moisture is the #1 cause of grain spawn failure.</i>	25 min
5	Mix in supplements: Gypsum (CaSO ₄) — 1%.	2 min
6	Load jars to 55%% capacity. Apply filter disc and secure lids finger-tight. ■ <i>Do not overtighten — steam must escape during pressure cooking.</i>	10 min
7	Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI.	90min
8	Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature.	4–8 hrs
9	Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar.	2 min/jar

#22

No-Soak Rye (Boil Method)

Skip the overnight soak for faster turnaround. Bring to boil, simmer 20 min, drain.

[quick-prep] [low-burst] [rye]

PARAMETERS

TARGET PH
6.5

MOISTURE
42%

PRE-SOAK
0 hours

SIMMER
20 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

- Whole Rye Berries — 100%
- Gypsum (CaSO₄) — 1%

Slightly drier prep that reduces burst grain. Faster turnaround than overnight soak method.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Simmer for 20 min until kernels swell and a few start to crack. Do not over-simmer. 20 min
 - *Mushy grain contaminates easily. When in doubt, under-simmer.*
- 3 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 4 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 5 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 6 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 7 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 8 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#23

Standard Wheat Berry

Hard red winter wheat berries. Smaller grain = more inoculation points per jar.

[standard] [fine-grain] [wheat]

PARAMETERS

TARGET PH
6.5

MOISTURE
44%

PRE-SOAK
12 hours

SIMMER
12 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

- Whole Wheat Berries — 100%
- Gypsum (CaSO₄) — 1%

Simmer until kernels swell but do not burst. Slightly smaller than rye, more inoculation points.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 12 hours. 12 hours
- 3 Simmer for 12 min until kernels swell and a few start to crack. Do not over-simmer. 12 min
 - *Mushy grain contaminates easily. When in doubt, under-simmer.*
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 5 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#24

Whole Oat Prep

Whole oats with hull. Soak 18 hours, no simmer needed. Hulls aid air exchange.

[standard] [beginner-friendly] [oat]

PARAMETERS

TARGET PH
6.5

MOISTURE
46%

PRE-SOAK
18 hours

SIMMER
0 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

■ Whole Oats (with hull) — 100%

■ Gypsum (CaSO₄) — 1%

Hulls create air pockets in jars. Slightly more resistant to burst than rye. Good all-around grain.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 18 hours. 18 hours
- 3 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - Surface moisture is the #1 cause of grain spawn failure.
- 4 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 5 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - Do not overtighten — steam must escape during pressure cooking.
- 6 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 7 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 8 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#25

Oat + Rye 50/50 Blend

Equal parts whole oats and rye berries for combined benefits.

[blended] [all-purpose] [oat] [rye]

PARAMETERS

TARGET PH
6.5

MOISTURE
45%

PRE-SOAK
14 hours

SIMMER
12 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

- Whole Oats — 50%
- Whole Rye Berries — 50%
- Gypsum (CaSO₄) — 1%

Combines oat hull air exchange with rye nutrition density. Good all-purpose spawn.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 14 hours. 14 hours
- 3 Simmer for 12 min until kernels swell and a few start to crack. Do not over-simmer. 12 min
 - *Mushy grain contaminates easily. When in doubt, under-simmer.*
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 5 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#26

Cracked Corn Prep

Budget grain from feed stores. Good for *Agaricus* and outdoor beds.

[budget] [outdoor-beds] [corn]

PARAMETERS

TARGET PH
6.5

MOISTURE
42%

PRE-SOAK
12 hours

SIMMER
10 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

- Cracked Corn (yellow) — 100%
- Gypsum (CaSO₄) — 1%

Cheap and available at feed stores. Larger particle size than rye.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 12 hours. 12 hours
- 3 Simmer for 10 min until kernels swell and a few start to crack. Do not over-simmer. 10 min
 - *Mushy grain contaminates easily. When in doubt, under-simmer.*
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 5 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#27

White Sorghum (Milo)

Round grains with good heat tolerance. Common in commercial spawn production.

[commercial] [heat-tolerant] [sorghum]

PARAMETERS

TARGET PH
6.5

MOISTURE
43%

PRE-SOAK
12 hours

SIMMER
10 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

■ White Sorghum (Milo) — 100%

■ Gypsum (CaSO₄) — 1%

Good heat tolerance during sterilization. Common in commercial spawn production.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 12 hours. 12 hours
- 3 Simmer for 10 min until kernels swell and a few start to crack. Do not over-simmer. 10 min
 - *Mushy grain contaminates easily. When in doubt, under-simmer.*
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 5 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#28

Wild Bird Seed (WBS)

Mixed grain from pet stores. Variable composition but budget-friendly.

[budget] [beginner-friendly] [wbs]

PARAMETERS

TARGET PH
6.5

MOISTURE
44%

PRE-SOAK
12 hours

SIMMER
10 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

- Wild Bird Seed Mix — 100%
- Gypsum (CaSO₄) — 1%

Typically millet, milo, safflower, sunflower. Variable composition batch to batch.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · Sterilization: 1.5–2 hrs · Cooling: 4–8 hrs · Total: 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 12 hours. 12 hours
- 3 Simmer for 10 min until kernels swell and a few start to crack. Do not over-simmer. 10 min
 - Mushy grain contaminates easily. When in doubt, under-simmer.
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - Surface moisture is the #1 cause of grain spawn failure.
- 5 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - Do not overtighten — steam must escape during pressure cooking.
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#29

Rye + Coffee Grounds

Standard rye with 5% spent coffee grounds for nitrogen boost.

[supplemented] [nitrogen-boost] [rye] [coffee]

PARAMETERS

TARGET PH
6.3

MOISTURE
45%

PRE-SOAK
12 hours

SIMMER
15 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

- Whole Rye Berries — 95%
- Spent Coffee Grounds — 5%
- Gypsum (CaSO₄) — 1%

Mix coffee grounds in after draining. Some species respond well to the slight pH drop and extra nitrogen.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · Sterilization: 1.5–2 hrs · Cooling: 4–8 hrs · Total: 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 12 hours. 12 hours
- 3 Simmer for 15 min until kernels swell and a few start to crack. Do not over-simmer. 15 min
 - Mushy grain contaminates easily. When in doubt, under-simmer.
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - Surface moisture is the #1 cause of grain spawn failure.
- 5 Mix in supplements: Spent Coffee Grounds — 5%, Gypsum (CaSO₄) — 1%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - Do not overtighten — steam must escape during pressure cooking.
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#30

Wheat Berry + Bran

Wheat berries supplemented with 5% wheat bran for extra nutrition.

[supplemented] [high-nutrition] [wheat] [bran]

PARAMETERS

TARGET PH	MOISTURE
6.3	46%
PRE-SOAK	SIMMER
12 hours	12 min

INGREDIENTS

- Whole Wheat Berries — 95%
- Wheat Bran — 5%
- Gypsum (CaSO₄) — 1%

STERILIZATION

121°C, 15psi, 90min

Add bran after draining. Higher nutrition and moisture retention. Good for species that benefit from supplementation.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · Sterilization: 1.5–2 hrs · Cooling: 4–8 hrs · Total: 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 12 hours. 12 hours
- 3 Simmer for 12 min until kernels swell and a few start to crack. Do not over-simmer. 12 min
 - Mushy grain contaminates easily. When in doubt, under-simmer.
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - Surface moisture is the #1 cause of grain spawn failure.
- 5 Mix in supplements: Wheat Bran — 5%, Gypsum (CaSO₄) — 1%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - Do not overtighten — steam must escape during pressure cooking.
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#31

White Millet Prep

Small grain with maximum inoculation points. Best for G2G transfers.

[fine-grain] [high-inoculation-points] [g2g] [millet]

PARAMETERS

TARGET PH
6.5

MOISTURE
40%

PRE-SOAK
6 hours

SIMMER
0 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

- White Proso Millet — 100%
- Gypsum (CaSO₄) — 1%

Soak 6 hours max — millet absorbs water fast. Dry thoroughly. Tends to clump if over-hydrated.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 6 hours. 6 hours
- 3 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 4 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 5 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 6 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 7 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 8 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#32

Millet + Rye 30/70

30% millet fills gaps between rye for faster colonization.

[blended] [fast-colonization] [millet] [rye]

PARAMETERS

TARGET PH	MOISTURE
6.5	44%
PRE-SOAK	SIMMER
10 hours	12 min

INGREDIENTS

- White Proso Millet — 30%
- Whole Rye Berries — 70%
- Gypsum (CaSO₄) — 1%

STERILIZATION

121°C, 15psi, 90min

Soak and simmer together. Millet fills interstices and increases colonization speed through more contact points.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 10 hours. 10 hours
- 3 Simmer for 12 min until kernels swell and a few start to crack. Do not over-simmer. 12 min
 - *Mushy grain contaminates easily. When in doubt, under-simmer.*
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 5 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#33

Whole Corn Prep

Whole dried corn kernels. Heavy, durable grain for outdoor use.

[outdoor-beds] [durable] [corn]

PARAMETERS

TARGET PH
6.5

MOISTURE
44%

PRE-SOAK
24 hours

SIMMER
20 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

- Whole Corn Kernels (dried) — 100%
- Gypsum (CaSO₄) — 1.5%

Long soak and simmer required due to size. Very durable grain spawn for outdoor beds.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 24 hours. 24 hours
- 3 Simmer for 20 min until kernels swell and a few start to crack. Do not over-simmer. 20 min
 - *Mushy grain contaminates easily. When in doubt, under-simmer.*
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 5 Mix in supplements: Gypsum (CaSO₄) — 1.5%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#34

Rye + Gypsum Heavy

Double gypsum with calcium carbonate for pH buffering. Anti-clump formula.

[ph-buffered] [anti-clump] [rye]

PARAMETERS

TARGET PH
7.0

MOISTURE
45%

PRE-SOAK
12 hours

SIMMER
15 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

- Whole Rye Berries — 100%
- Gypsum (CaSO₄) — 2%
- Calcium Carbonate (CaCO₃) — 0.5%

Good for species that prefer slightly alkaline substrate. Gypsum prevents grain clumping.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · Sterilization: 1.5–2 hrs · Cooling: 4–8 hrs · Total: 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 12 hours. 12 hours
- 3 Simmer for 15 min until kernels swell and a few start to crack. Do not over-simmer. 15 min
 - Mushy grain contaminates easily. When in doubt, under-simmer.
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - Surface moisture is the #1 cause of grain spawn failure.
- 5 Mix in supplements: Gypsum (CaSO₄) — 2%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - Do not overtighten — steam must escape during pressure cooking.
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#35

Rye Berries (Unicorn Bag)

Standard rye in unicorn bags for commercial-scale spawn production.

[commercial] [bags] [scale-up] [rye]

PARAMETERS

TARGET PH
6.5

MOISTURE
45%

PRE-SOAK
12 hours

SIMMER
15 min

JAR FILL
60%

STERILIZATION
121°C, 15psi, 120min

INGREDIENTS

■ Whole Rye Berries — 100%

■ Gypsum (CaSO₄) — 1%

Higher fill percentage, longer sterilization for bag mass. Commercial-scale spawn production.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 12 hours. 12 hours
- 3 Simmer for 15 min until kernels swell and a few start to crack. Do not over-simmer. 15 min
 - *Mushy grain contaminates easily. When in doubt, under-simmer.*
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 5 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 6 Load jars to 60%% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 7 Pressure cook at 121°C, 15psi, 120min. Start timing when pressure reaches 15 PSI. 120min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#36

Sorghum (Cordyceps Optimized)

Drier prep for Cordyceps militaris. Low moisture prevents pooling.

[cordyceps] [low-moisture] [specialty] [sorghum]

PARAMETERS

TARGET PH	MOISTURE
6.5	38%
PRE-SOAK	SIMMER
8 hours	5 min

INGREDIENTS

- White Sorghum (Milo) — 100%
- Gypsum (CaSO₄) — 0.5%

STERILIZATION

121°C, 15psi, 90min

Light simmer only. Individual grains should be firm. For flat container Cordyceps cultivation.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 8 hours. 8 hours
- 3 Simmer for 5 min until kernels swell and a few start to crack. Do not over-simmer. 5 min
 - *Mushy grain contaminates easily. When in doubt, under-simmer.*
- 4 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 5 Mix in supplements: Gypsum (CaSO₄) — 0.5%. 2 min
- 6 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 7 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 8 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 9 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

#37

Hemp Seed Prep

Whole hemp seeds. High fat/protein for nitrogen-hungry species.

[experimental] [high-nitrogen] [hemp]

PARAMETERS

TARGET PH
6.5

MOISTURE
40%

PRE-SOAK
8 hours

SIMMER
0 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

■ Whole Hemp Seeds (sterilized) — 100%

■ Gypsum (CaSO₄) — 1%

Sterilized/non-viable hemp seeds. No simmer — soak only. Experimental use.

STEP-BY-STEP PROTOCOL

Prep: 2–4 hrs · **Sterilization:** 1.5–2 hrs · **Cooling:** 4–8 hrs · **Total:** 8–14 hrs

Equipment: Pressure cooker / autoclave, Mason jars with filter lids, Large pot for soaking, Colander, Clean towels, Scale

- 1 Rinse grain under cold water until it runs clear. 5 min
- 2 Soak in cold tap water for 8 hours. 8 hours
- 3 Drain thoroughly. Spread on a clean towel and surface-dry 20–30 min until grains look matte, not shiny. 25 min
 - *Surface moisture is the #1 cause of grain spawn failure.*
- 4 Mix in supplements: Gypsum (CaSO₄) — 1%. 2 min
- 5 Load jars to 55% capacity. Apply filter disc and secure lids finger-tight. 10 min
 - *Do not overtighten — steam must escape during pressure cooking.*
- 6 Pressure cook at 121°C, 15psi, 90min. Start timing when pressure reaches 15 PSI. 90min
- 7 Allow pressure to drop to 0 PSI naturally before opening. Cool jars fully to room temperature. 4–8 hrs
- 8 Inoculate when jars are at or below room temperature (<21°C). Flame-sterilize syringe needle between each jar. Inject 1–2 mL per jar. 2 min/jar

ALL-IN-ONE

9 recipes

All-in-One

All-in-one bags combine colonization grain and fruiting substrate into a single container. They are inoculated with liquid culture, colonized, and fruited without any additional substrate transfer. Ideal for beginners and growers with limited space.

ALL-IN-ONE

BEGINNER

#38

Pearl Barley + Straw Layer

Pearl barley colonization layer over pasteurized straw. Very economical. Excellent for oyster species that thrive on straw substrates.

[barley] [straw] [oyster] [budget]

PARAMETERS

TARGET PH
6.6

MOISTURE
68%

C:N RATIO
55

FIELD CAPACITY
80%

PRE-SOAK
12 hours

SIMMER
10 min

STERILIZATION

121°C, 15psi, 60min

INGREDIENTS

■ Pearl Barley — 35%

■ Wheat Straw (chopped) — 65%

Sterilize barley via pressure cooker. Pasteurize chopped straw with boiling water (1 hour soak). Combine in bag once both are at room temperature.

STEP-BY-STEP PROTOCOL

Prep: 2–6 hrs · **Sterilization:** 2–2.5 hrs · **Colonization:** 14–30 days · **Total:** 15–31 days

Equipment: Pressure cooker / autoclave, Sealable bags or jars, LC syringe, Micropore tape, Scale

1 Soak grain in cold water for 12 hours.

12 hours

2	Simmer grain for 10 min until grains swell but do not burst. Drain and surface-dry. ■ <i>Over-hydrated grain is the #1 failure mode.</i>	10 min
3	Load substrate into container, leaving 80% headspace.	3 min
4	Sterilize at 121°C, 15psi, 60min.	60min
5	Cool to room temperature (6–12 hours) before inoculation. ■ <i>Heat kills mycelium.</i>	6–12 hrs
6	Inject using LC syringe: flame-sterilize needle, wipe injection site with alcohol, inject 2–4 mL.	2 min/bag
7	Seal and incubate at 21–24°C in a dark, undisturbed location until fully colonized. ■ <i>Do NOT open to check — any seal breach risks contamination.</i>	14–30 days
8	When 100% colonized, initiate fruiting: cut an X in the bag wall to expose mycelium to fresh air.	N/A

#39

Popcorn Tek

Plain unflavored popcorn kernels. High surface area and natural starch content. Very popular for species that colonize grain aggressively.

[popcorn] [grain] [mason-jar] [fast-colonizer]

PARAMETERS

TARGET PH
6.6

MOISTURE
48%

WATER
Tap

PRE-SOAK
8 hours

SIMMER
8 min

STERILIZATION
121°C, 15psi, 75min

INGREDIENTS

■ Plain Popcorn Kernels (unpopped) — 100%

Use plain unflavored kernels only — no butter, oil, or salt. Soak 8 hours, simmer until just tender. Dry on towels before jarring.

STEP-BY-STEP PROTOCOL

Prep: 2–6 hrs · **Sterilization:** 2–2.5 hrs · **Colonization:** 14–30 days · **Total:** 15–31 days

Equipment: Pressure cooker / autoclave, Sealable bags or jars, LC syringe, Micropore tape, Scale

- | | | |
|---|---|------------|
| 1 | Soak grain in cold water for 8 hours. | 8 hours |
| 2 | Simmer grain for 8 min until grains swell but do not burst. Drain and surface-dry.
■ <i>Over-hydrated grain is the #1 failure mode.</i> | 8 min |
| 3 | Load substrate into container, leaving 20% headspace. | 3 min |
| 4 | Sterilize at 121°C, 15psi, 75min. | 75min |
| 5 | Cool to room temperature (6–12 hours) before inoculation.
■ <i>Heat kills mycelium.</i> | 6–12 hrs |
| 6 | Inject using LC syringe: flame-sterilize needle, wipe injection site with alcohol, inject 2–4 mL. | 2 min/bag |
| 7 | Seal and incubate at 21–24°C in a dark, undisturbed location until fully colonized.
■ <i>Do NOT open to check — any seal breach risks contamination.</i> | 14–30 days |
| 8 | When 100% colonized, initiate fruiting: cut an X in the bag wall to expose mycelium to fresh air. | N/A |

#40

PF Tek (BRF + Vermiculite)

Brown rice flour and vermiculite, traditionally in half-pint mason jars. The classic beginner AIO technique. Mycelium colonizes and fruits from the same substrate cake.

[pftk] [beginner-friendly] [mason-jar] [classic]

PARAMETERS

TARGET PH
6.5

MOISTURE
60%

C:N RATIO
30

WATER
Distilled

INGREDIENTS

■ Brown Rice Flour — 60%

■ Vermiculite — 40%

STERILIZATION

121°C, 15psi, 60min

Fill jars 2/3 with BRF+Verm mix (2:1 by volume), top with dry verm layer as contamination barrier. After full colonization, birth and dunk.

STEP-BY-STEP PROTOCOL

Prep: 2–6 hrs · Sterilization: 2–2.5 hrs · Colonization: 14–30 days · Total: 15–31 days

Equipment: Pressure cooker / autoclave, Sealable bags or jars, LC syringe, Micropore tape, Scale

1	Load substrate into container, leaving 20% headspace.	3 min
2	Sterilize at 121°C, 15psi, 60min.	60min
3	Cool to room temperature (6–12 hours) before inoculation. ■ Heat kills mycelium.	6–12 hrs
4	Inject using LC syringe: flame-sterilize needle, wipe injection site with alcohol, inject 2–4 mL.	2 min/bag
5	Seal and incubate at 21–24°C in a dark, undisturbed location until fully colonized. ■ Do NOT open to check — any seal breach risks contamination.	14–30 days
6	When 100% colonized, initiate fruiting: cut an X in the bag wall to expose mycelium to fresh air.	N/A

#41

Whole Brown Rice (WBS Tek)

Whole jasmine or long-grain brown rice in mason jars. Large surface area from whole grains colonizes quickly and fruits well for many species.

[wbs] [whole-grain] [mason-jar]

PARAMETERS

TARGET PH
6.7

MOISTURE
50%

WATER
Tap

PRE-SOAK
12 hours

SIMMER
10 min

STERILIZATION
121°C, 15psi, 75min

INGREDIENTS

■ Whole Brown Rice — 100%

Soak 12 hours, simmer 10 min until grains just start to split. Dry surface moisture thoroughly before jarring.

STEP-BY-STEP PROTOCOL

Prep: 2–6 hrs · Sterilization: 2–2.5 hrs · Colonization: 14–30 days · Total: 15–31 days

Equipment: Pressure cooker / autoclave, Sealable bags or jars, LC syringe, Micropore tape, Scale

- 1 Soak grain in cold water for 12 hours. 12 hours
- 2 Simmer grain for 10 min until grains swell but do not burst. Drain and surface-dry. 10 min
 ■ *Over-hydrated grain is the #1 failure mode.*
- 3 Load substrate into container, leaving 20% headspace. 3 min
- 4 Sterilize at 121°C, 15psi, 75min. 75min
- 5 Cool to room temperature (6–12 hours) before inoculation. 6–12 hrs
 ■ *Heat kills mycelium.*
- 6 Inject using LC syringe: flame-sterilize needle, wipe injection site with alcohol, inject 2–4 mL. 2 min/bag
- 7 Seal and incubate at 21–24°C in a dark, undisturbed location until fully colonized. 14–30 days
 ■ *Do NOT open to check — any seal breach risks contamination.*
- 8 When 100% colonized, initiate fruiting: cut an X in the bag wall to expose mycelium to fresh air. N/A

#42

Oat + CVG Layer (Budget AIO)

Whole oats (cheaper than rye) layered with CVG. Budget-friendly option with good results for most gourmet species. Oat hulls improve air exchange.

[oat] [cvg] [budget] [beginner-friendly] [layered]

PARAMETERS

TARGET PH
6.5

MOISTURE
60%

C:N RATIO
42

FIELD CAPACITY
75%

PRE-SOAK
18 hours

STERILIZATION
121°C, 15psi, 90min

INGREDIENTS

■ Whole Oats — 45%

■ Coco Coir — 35%

■ Vermiculite — 15%

■ Gypsum — 5%

Oats need no simmer — soak 18 hours only. Hulls create natural air pockets. CVG is pasteurized (not pressure cooked). Combine layers in bag.

STEP-BY-STEP PROTOCOL

Prep: 2–6 hrs · Sterilization: 2–2.5 hrs · Colonization: 14–30 days · Total: 15–31 days

Equipment: Pressure cooker / autoclave, Sealable bags or jars, LC syringe, Micropore tape, Scale

- | | | |
|---|--|------------|
| 1 | Soak grain in cold water for 18 hours. | 18 hours |
| 2 | Hydrate substrate layer to field capacity — a firm squeeze yields only 1–2 drops.
■ Too wet = bacterial bloom. Too dry = slow colonization. | 10 min |
| 3 | Layer into bag: grain on bottom, substrate on top. Keep layers distinct. | 5 min |
| 4 | Sterilize at 121°C, 15psi, 90min. | 90min |
| 5 | Cool to room temperature (6–12 hours) before inoculation.
■ Heat kills mycelium. | 6–12 hrs |
| 6 | Inoculate the grain layer using LC syringe: flame-sterilize needle, wipe injection site with alcohol, inject 2–4 mL. | 2 min/bag |
| 7 | Seal and incubate at 21–24°C in a dark, undisturbed location until fully colonized.
■ Do NOT open to check — any seal breach risks contamination. | 14–30 days |
| 8 | When 100% colonized, initiate fruiting: cut an X in the bag wall to expose mycelium to fresh air. | N/A |

#43

Grain + CVG Layer (Oyster AIO)

Bottom grain layer for mycelium establishment topped with coco coir, vermiculite, and gypsum fruiting substrate. Single-bag workflow ideal for oysters.

[layered] [oyster] [cvg] [intermediate]

PARAMETERS

TARGET PH
6.5

MOISTURE
65%

C:N RATIO
40

FIELD CAPACITY
75%

WATER
Tap

STERILIZATION
121°C, 15psi, 90min

INGREDIENTS

- Whole Wheat Berries — 40%
- Coco Coir — 35%
- Vermiculite — 20%
- Gypsum — 5%

Layer grain on bottom, CVG on top. Inoculate into grain layer. Once grain is colonized, mycelium runs through CVG. Slash bag to initiate fruiting.

STEP-BY-STEP PROTOCOL

Prep: 2–6 hrs · Sterilization: 2–2.5 hrs · Colonization: 14–30 days · Total: 15–31 days

Equipment: Pressure cooker / autoclave, Sealable bags or jars, LC syringe, Micropore tape, Scale

- 1 Hydrate substrate layer to field capacity — a firm squeeze yields only 1–2 drops. 10 min
 ■ Too wet = bacterial bloom. Too dry = slow colonization.
- 2 Layer into bag: grain on bottom, substrate on top. Keep layers distinct. 5 min
- 3 Sterilize at 121°C, 15psi, 90min. 90min
- 4 Cool to room temperature (6–12 hours) before inoculation. 6–12 hrs
 ■ Heat kills mycelium.
- 5 Inoculate the grain layer using LC syringe: flame-sterilize needle, wipe injection site with alcohol, inject 2–4 mL. 2 min/bag
- 6 Seal and incubate at 21–24°C in a dark, undisturbed location until fully colonized. 14–30 days
 ■ Do NOT open to check — any seal breach risks contamination.
- 7 When 100% colonized, initiate fruiting: cut an X in the bag wall to expose mycelium to fresh air. N/A

#44

Rye + Coco Coir Layer

Standard rye grain base topped with pasteurized coco coir. The rye provides colonization speed; the coir provides a clean fruiting surface.

[rye] [coir] [layered]

PARAMETERS

TARGET PH
6.4

MOISTURE
63%

C:N RATIO
38

FIELD CAPACITY
75%

PRE-SOAK
12 hours

SIMMER
15 min

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

■ Whole Rye Berries — 50%

■ Coco Coir — 50%

Prepare rye as normal. Hydrate coir to field capacity. Sterilize rye layer separately, pasteurize coir, combine in bag under SAB.

STEP-BY-STEP PROTOCOL

Prep: 2–6 hrs · Sterilization: 2–2.5 hrs · Colonization: 14–30 days · Total: 15–31 days

Equipment: Pressure cooker / autoclave, Sealable bags or jars, LC syringe, Micropore tape, Scale

- 1 Soak grain in cold water for 12 hours. 12 hours
- 2 Simmer grain for 15 min until grains swell but do not burst. Drain and surface-dry. 15 min
 - Over-hydrated grain is the #1 failure mode.
- 3 Hydrate substrate layer to field capacity — a firm squeeze yields only 1–2 drops. 10 min
 - Too wet = bacterial bloom. Too dry = slow colonization.
- 4 Layer into bag: grain on bottom, substrate on top. Keep layers distinct. 5 min
- 5 Sterilize at 121°C, 15psi, 90min. 90min
- 6 Cool to room temperature (6–12 hours) before inoculation. 6–12 hrs
 - Heat kills mycelium.
- 7 Inoculate the grain layer using LC syringe: flame-sterilize needle, wipe injection site with alcohol, inject 2–4 mL. 2 min/bag
- 8 Seal and incubate at 21–24°C in a dark, undisturbed location until fully colonized. 14–30 days
 - Do NOT open to check — any seal breach risks contamination.
- 9 When 100% colonized, initiate fruiting: cut an X in the bag wall to expose mycelium to fresh air. N/A

#45

Rye + Hardwood 70/30

70% rye grain mixed with 30% hardwood sawdust/pellets. The grain provides rapid colonization energy while hardwood structure improves gas exchange and extends flushes.

[rye] [hardwood] [blended] [intermediate] [multi-flush]

PARAMETERS

TARGET PH 6.3	MOISTURE 55%
C:N RATIO 32	FIELD CAPACITY 72%
PRE-SOAK 12 hours	SIMMER 15 min

INGREDIENTS

- Whole Rye Berries — 70%
- Hardwood Sawdust (HWFP) — 30%

STERILIZATION

121°C, 15psi, 90min

Pre-hydrate HWFP, mix with prepared rye after both are at field capacity. Combine and bag together. Good balance of speed and structure.

STEP-BY-STEP PROTOCOL

Prep: 2–6 hrs · Sterilization: 2–2.5 hrs · Colonization: 14–30 days · Total: 15–31 days

Equipment: Pressure cooker / autoclave, Sealable bags or jars, LC syringe, Micropore tape, Scale

- 1 Soak grain in cold water for 12 hours. 12 hours
- 2 Simmer grain for 15 min until grains swell but do not burst. Drain and surface-dry. 15 min
 ■ *Over-hydrated grain is the #1 failure mode.*
- 3 Load substrate into container, leaving 72% headspace. 3 min
- 4 Sterilize at 121°C, 15psi, 90min. 90min
- 5 Cool to room temperature (6–12 hours) before inoculation. 6–12 hrs
 ■ *Heat kills mycelium.*
- 6 Inject using LC syringe: flame-sterilize needle, wipe injection site with alcohol, inject 2–4 mL. 2 min/bag
- 7 Seal and incubate at 21–24°C in a dark, undisturbed location until fully colonized. 14–30 days
 ■ *Do NOT open to check — any seal breach risks contamination.*
- 8 When 100% colonized, initiate fruiting: cut an X in the bag wall to expose mycelium to fresh air. N/A

#46

Master's Mix AIO

50/50 hardwood fuel pellets (HWFP) and soy hulls. No grain layer — high-nutrient substrate inoculated directly with LC. Very high yields but requires strict sterile technique.

[masters-mix] [hardwood] [soy-hulls] [high-yield] [advanced] [no-grain]

PARAMETERS

TARGET PH
6.2

MOISTURE
60%

C:N RATIO
25

FIELD CAPACITY
70%

STERILIZATION
Autoclave

STERILIZATION
121°C, 15psi, 120min

INGREDIENTS

■ Hardwood Fuel Pellets (HWFP) — 50%

■ Soy Hulls — 50%

Rehydrate HWFP with boiling water to field capacity. Combine with soy hulls 50/50 by dry weight. Sterilize 2.5 hours minimum. High contamination risk — use quality LC only.

STEP-BY-STEP PROTOCOL

Prep: 2–6 hrs · **Sterilization:** 2–2.5 hrs · **Colonization:** 14–30 days · **Total:** 15–31 days

Equipment: Pressure cooker / autoclave, Sealable bags or jars, LC syringe, Micropore tape, Scale

1	Load substrate into container, leaving 70% headspace.	3 min
2	Sterilize at 121°C, 15psi, 120min.	120min
3	Cool to room temperature (6–12 hours) before inoculation. ■ Heat kills mycelium.	6–12 hrs
4	Inject using LC syringe: flame-sterilize needle, wipe injection site with alcohol, inject 2–4 mL.	2 min/bag
5	Seal and incubate at 21–24°C in a dark, undisturbed location until fully colonized. ■ Do NOT open to check — any seal breach risks contamination.	14–30 days
6	When 100% colonized, initiate fruiting: cut an X in the bag wall to expose mycelium to fresh air.	N/A

BULK SUBSTRATE

28 recipes

Bulk Substrate

Bulk fruiting substrate is what mushrooms grow from. Substrate receives colonized grain spawn, is fully colonized, and then induced to fruit. The substrate composition determines yield, flush count, and fruiting body quality.

BULK SUBSTRATE

BEGINNER

#47

Pasteurized Wheat Straw

The classic low-tech substrate for oyster mushrooms. No pressure cooker required.

[straw] [pasteurized] [oyster] [budget]

PARAMETERS

TARGET PH
7.0

MOISTURE
70%

C:N RATIO
80

FIELD CAPACITY
75%

PASTEURIZATION

60-80°C, 1-2 hours

INGREDIENTS

■ Wheat Straw (chopped) — 100%

Chop straw to 2-4 inches. Pasteurize in hot water bath or using lime/ash methods. Cool before inoculation.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1** Pasteurize using 60-80°C, 1-2 hours. 1–2 hrs
 - Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2** Hydrate to 70% — a firm squeeze should yield only 1–2 drops. 15 min
 - Too wet = anaerobic bacteria. Too dry = stalled colonization.

3	Cool to room temperature before use. <ul style="list-style-type: none"> Hot substrate will kill spawn. 	4–8 hrs
4	Mix with fully colonized grain spawn at 10–20% by volume.	5 min
5	Pack into fruiting container or bag, leaving headspace for gas exchange.	3 min
6	Incubate at 21–24°C until fully colonized (7–21 days depending on species).	7–21 days
7	Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads.	N/A

#48

CVG (Coco Coir + Vermiculite + Gypsum)

Popular bulk substrate for many species. Pasteurization only, no pressure cooker required.

[coir] [vermiculite] [gypsum] [cvg] [bulk]

PARAMETERS

TARGET PH
6.5

MOISTURE
65%

FIELD CAPACITY
75%

PASTEURIZATION
70°C, 1 hour

INGREDIENTS

■ Coco Coir — 65%

■ Vermiculite — 25%

■ Gypsum — 10%

Bucket tek or oven pasteurization works well. Good for oysters and as a fruiting layer over grain spawn.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Pasteurize using 70°C, 1 hour. 1–2 hrs
 ■ Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2 Hydrate to 65% — a firm squeeze should yield only 1–2 drops. 15 min
 ■ Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3 Cool to room temperature before use. 4–8 hrs
 ■ Hot substrate will kill spawn.
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#49

Sugarcane Bagasse + Bran

Agricultural waste substrate popular in tropical regions.

[sugarcane] [bagasse] [tropical] [oyster]

PARAMETERS

TARGET PH
6.5

MOISTURE
65%

C:N RATIO
45

FIELD CAPACITY
70%

PASTEURIZATION

70°C, 1-2 hours

INGREDIENTS

- Sugarcane Bagasse — 90%
- Wheat Bran — 10%

Bagasse should be fresh and sweet-smelling. Supplement with bran for better yields.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Pasteurize using 70°C, 1-2 hours. 1–2 hrs
■ Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2 Hydrate to 65% — a firm squeeze should yield only 1–2 drops. 15 min
■ Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3 Cool to room temperature before use. 4–8 hrs
■ Hot substrate will kill spawn.
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#50

Cardboard Substrate

Low-tech substrate from corrugated cardboard. Great for oysters and educational projects.

[cardboard] [recycling] [budget] [low-tech]

PARAMETERS

TARGET PH
6.5

MOISTURE
70%

INGREDIENTS

■ Corrugated Cardboard (torn) — 100%

PASTEURIZATION

Pour boiling water, soak 1 hour

Use clean cardboard without glossy coatings. Tear into pieces, soak in hot water, drain to field capacity.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Pasteurize using Pour boiling water, soak 1 hour. 1–2 hrs
■ *Monitor temp closely — too hot kills everything, too cool kills nothing.*
- 2 Hydrate to 70% — a firm squeeze should yield only 1–2 drops. 15 min
■ *Too wet = anaerobic bacteria. Too dry = stalled colonization.*
- 3 Cool to room temperature before use. 4–8 hrs
■ *Hot substrate will kill spawn.*
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#51

Cold Water Lime Pasteurization

No-heat pasteurization method using hydrated lime. Energy efficient.

[lime] [pasteurization] [cold-method] [straw]

PARAMETERS

TARGET PH	MOISTURE
10-12 (temporary)	70%

TREATMENT
12-24 hours

INGREDIENTS

- Chopped Straw — 100%
- Hydrated Lime (Ca(OH)₂) — 0.5-1% by weight
- Water — to saturation

Mix lime with water, soak straw 12-24 hours. Drain well — pH will normalize during colonization.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- | | | |
|---|--|-------------|
| 1 | Soak with lime treatment for 12-24 hours. pH will normalize during colonization. | 12-24 hours |
| 2 | Drain and allow to drip-dry to 70%. Firm squeeze = 1–2 drops.
■ Too wet = anaerobic bacteria. | 1–2 hrs |
| 3 | Cool to room temperature before use.
■ Hot substrate will kill spawn. | 4–8 hrs |
| 4 | Mix with fully colonized grain spawn at 10–20% by volume. | 5 min |
| 5 | Pack into fruiting container or bag, leaving headspace for gas exchange. | 3 min |
| 6 | Incubate at 21–24°C until fully colonized (7–21 days depending on species). | 7–21 days |
| 7 | Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. | N/A |

#52

Paper + Coffee (Urban Tek)

Zero-cost substrate using waste paper and coffee grounds.

[paper] [coffee] [urban] [zero-cost]

PARAMETERS

TARGET PH
6.0

MOISTURE
70%

PASTEURIZATION
70°C, 1 hour

INGREDIENTS

- Shredded Paper (non-glossy) — 70%
- Spent Coffee Grounds — 30%

Use newspaper, office paper, or cardboard (avoid glossy). Shred finely, mix with coffee, pasteurize.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1** Pasteurize using 70°C, 1 hour. 1–2 hrs
 - Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2** Hydrate to 70% — a firm squeeze should yield only 1–2 drops. 15 min
 - Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3** Cool to room temperature before use. 4–8 hrs
 - Hot substrate will kill spawn.
- 4** Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5** Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6** Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7** Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#53

Corn Cob + Stover

Midwest agricultural waste substrate using corn cobs and stover.

[corn-cob] [agricultural-waste] [midwest]

PARAMETERS

TARGET PH
6.5

MOISTURE
65%

PASTEURIZATION
70°C, 1-2 hours

INGREDIENTS

- Crushed Corn Cobs — 70%
- Corn Stover (leaves/stalks) — 25%
- Wheat Bran — 5%

Crush cobs to increase surface area. Soak in hot water overnight, then drain.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Pasteurize using 70°C, 1-2 hours. 1–2 hrs
 - Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2 Hydrate to 65% — a firm squeeze should yield only 1–2 drops. 15 min
 - Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3 Cool to room temperature before use. 4–8 hrs
 - Hot substrate will kill spawn.
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#54

Straw + Wheat Bran 10%

Supplemented straw for higher yields without sterilization.

[straw] [bran] [supplemented] [oyster]

PARAMETERS

TARGET PH
7.0

MOISTURE
70%

C:N RATIO
50

PASTEURIZATION
70-80°C, 1-2 hours

INGREDIENTS

■ Wheat Straw — 90%

■ Wheat Bran — 10%

Bran adds nitrogen for better yields while maintaining pasteurization-only process.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Pasteurize using 70-80°C, 1-2 hours. 1–2 hrs
 ■ *Monitor temp closely — too hot kills everything, too cool kills nothing.*
- 2 Hydrate to 70% — a firm squeeze should yield only 1–2 drops. 15 min
 ■ *Too wet = anaerobic bacteria. Too dry = stalled colonization.*
- 3 Cool to room temperature before use. 4–8 hrs
 ■ *Hot substrate will kill spawn.*
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#55

Straw + Coffee Grounds 15%

Straw substrate boosted with coffee for nitrogen.

[straw] [coffee] [high-nitrogen] [oyster]

PARAMETERS

TARGET PH
6.5

MOISTURE
70%

PASTEURIZATION

70-80°C, 1-2 hours

INGREDIENTS

■ Wheat Straw — 85%

■ Spent Coffee Grounds — 15%

Coffee must be fresh (within 24 hours). Slight pH drop benefits some species.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Pasteurize using 70-80°C, 1-2 hours. 1–2 hrs
 ■ Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2 Hydrate to 70% — a firm squeeze should yield only 1–2 drops. 15 min
 ■ Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3 Cool to room temperature before use. 4–8 hrs
 ■ Hot substrate will kill spawn.
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#56

Oat Straw Pasteurized

Softer alternative to wheat straw with similar results.

[oat-straw] [soft] [oyster]

PARAMETERS

TARGET PH
7.0

MOISTURE
70%

INGREDIENTS

■ Oat Straw (chopped) — 100%

PASTEURIZATION

70-80°C, 1-2 hours

Softer stems colonize more easily than wheat. Good alternative if wheat straw is unavailable.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- | | | |
|----------|---|-----------|
| 1 | Pasteurize using 70-80°C, 1-2 hours.
■ Monitor temp closely — too hot kills everything, too cool kills nothing. | 1–2 hrs |
| 2 | Hydrate to 70% — a firm squeeze should yield only 1–2 drops.
■ Too wet = anaerobic bacteria. Too dry = stalled colonization. | 15 min |
| 3 | Cool to room temperature before use.
■ Hot substrate will kill spawn. | 4–8 hrs |
| 4 | Mix with fully colonized grain spawn at 10–20% by volume. | 5 min |
| 5 | Pack into fruiting container or bag, leaving headspace for gas exchange. | 3 min |
| 6 | Incubate at 21–24°C until fully colonized (7–21 days depending on species). | 7–21 days |
| 7 | Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. | N/A |

#57

Master's Mix 50/50

The industry standard for oyster mushrooms and many other species.

[masters-mix] [50-50] [hardwood] [soy-hulls]

PARAMETERS

TARGET PH
6.2

MOISTURE
60%

C:N RATIO
25

FIELD CAPACITY
70%

STERILIZATION

121°C, 15psi, 120-150min

INGREDIENTS

■ Hardwood Fuel Pellets (HWFP) — 50%

■ Soy Hulls — 50%

Rehydrate pellets to field capacity. Mix with soy hulls. Long sterilization required due to high nutrition.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

1	Sterilize at 121°C, 15psi, 120-150min.	120-150 min
2	Hydrate to 60% — a firm squeeze should yield only 1–2 drops. ■ Too wet = anaerobic bacteria. Too dry = stalled colonization.	15 min
3	Cool to room temperature before use. ■ Hot substrate will kill spawn.	4–8 hrs
4	Mix with fully colonized grain spawn at 10–20% by volume.	5 min
5	Pack into fruiting container or bag, leaving headspace for gas exchange.	3 min
6	Incubate at 21–24°C until fully colonized (7–21 days depending on species).	7–21 days
7	Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads.	N/A

#58

Sawdust + Wheat Bran 20%

Classic enriched hardwood substrate. Good for shiitake, maitake, and other wood-loving species.

[hardwood] [bran] [shiitake] [enriched]

PARAMETERS

TARGET PH
6.0

MOISTURE
60%

C:N RATIO
35

FIELD CAPACITY
65%

STERILIZATION

121°C, 15psi, 120-150min

INGREDIENTS

■ Hardwood Sawdust — 80%

■ Wheat Bran — 20%

Mix thoroughly. The bran provides nitrogen for better yields. Standard for shiitake and maitake blocks.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- | | | |
|---|---|-------------|
| 1 | Sterilize at 121°C, 15psi, 120-150min. | 120-150 min |
| 2 | Hydrate to 60% — a firm squeeze should yield only 1–2 drops.
■ Too wet = anaerobic bacteria. Too dry = stalled colonization. | 15 min |
| 3 | Cool to room temperature before use.
■ Hot substrate will kill spawn. | 4–8 hrs |
| 4 | Mix with fully colonized grain spawn at 10–20% by volume. | 5 min |
| 5 | Pack into fruiting container or bag, leaving headspace for gas exchange. | 3 min |
| 6 | Incubate at 21–24°C until fully colonized (7–21 days depending on species). | 7–21 days |
| 7 | Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. | N/A |

#59

Coffee Grounds + Straw 50/50

Urban recycling substrate using spent coffee grounds. Good nitrogen boost from coffee.

[coffee] [recycling] [urban] [oyster]

PARAMETERS

TARGET PH
6.0

MOISTURE
65%

FIELD CAPACITY
70%

PASTEURIZATION
70°C, 1-2 hours

INGREDIENTS

- Spent Coffee Grounds — 50%
- Pasteurized Straw — 50%

Use coffee grounds within 24 hours of brewing to avoid mold. Mix with straw to improve structure.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1** Pasteurize using 70°C, 1-2 hours. 1–2 hrs
 - Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2** Hydrate to 65% — a firm squeeze should yield only 1–2 drops. 15 min
 - Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3** Cool to room temperature before use. 4–8 hrs
 - Hot substrate will kill spawn.
- 4** Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5** Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6** Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7** Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#60

Phase II Compost (Agaricus)

Fully composted and pasteurized manure/straw mix for button mushrooms.

[manure] [compost] [agaricus] [button]

PARAMETERS

TARGET PH
7.0-7.5

MOISTURE
65-70%

C:N RATIO
15-20

PASTEURIZATION
58-60°C, 6-8 hours

INGREDIENTS

■ Composted Horse/Chicken Manure — 60%

■ Wheat Straw — 35%

■ Gypsum — 5%

Requires proper composting phase before pasteurization. Standard for Agaricus species.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Pasteurize using 58-60°C, 6-8 hours. 1–2 hrs
■ Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2 Hydrate to 65-70% — a firm squeeze should yield only 1–2 drops. 15 min
■ Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3 Cool to room temperature before use. 4–8 hrs
■ Hot substrate will kill spawn.
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#61

Hardwood Chip Bed (Outdoor)

Outdoor cultivation bed for wine cap, shiitake, and other wood-loving species.

[chip-bed] [outdoor] [wood] [wine-cap]

PARAMETERS

TARGET PH
6.0-7.0

MOISTURE
60%

STERILIZATION
None needed

INGREDIENTS

- Hardwood Chips — 80%
- Straw or Leaves — 15%
- Wheat Bran — 5%

Layer chips and spawn in a shaded outdoor bed. Water regularly. Works for wine cap, oysters, and turkey tail.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Hydrate to 60% — a firm squeeze should yield only 1–2 drops. 15 min
 ■ *Too wet = anaerobic bacteria. Too dry = stalled colonization.*
- 2 Cool to room temperature before use. 4–8 hrs
 ■ *Hot substrate will kill spawn.*
- 3 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 4 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 5 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 6 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#62

Oak Log Cultivation

Traditional method for shiitake and other wood-loving mushrooms.

[log] [inoculation] [outdoor] [shiitake]

PARAMETERS

TARGET PH
6.0-7.0

MOISTURE
Natural weather

COLONIZATION
6-18 months

INGREDIENTS

- Fresh-cut Oak Logs (4-6 inch diameter) — 100%
- Plug Spawn or Sawdust Spawn — as needed
- Cheese Wax (for sealing) — as needed

Use fresh logs (cut within 2 weeks). Drill holes, insert spawn, seal with wax. Soak logs 24 hours to trigger fruiting.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- | | | |
|----------|--|-----------|
| 1 | Cool to room temperature before use.
■ <i>Hot substrate will kill spawn.</i> | 4–8 hrs |
| 2 | Mix with fully colonized grain spawn at 10–20% by volume. | 5 min |
| 3 | Pack into fruiting container or bag, leaving headspace for gas exchange. | 3 min |
| 4 | Incubate at 21–24°C until fully colonized (7–21 days depending on species). | 7–21 days |
| 5 | Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. | N/A |

#63

Cotton Seed Hull Substrate

High-nitrogen agricultural byproduct popular in southern US mushroom production.

[cotton-seed] [hulls] [high-nitrogen] [southern]

PARAMETERS

TARGET PH
6.5

MOISTURE
65%

C:N RATIO
25

PASTEURIZATION
70-80°C, 2 hours

INGREDIENTS

- Cotton Seed Hulls — 90%
- Wheat Bran — 10%

High nitrogen requires careful pasteurization. Popular for oyster production in cotton-growing regions.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Pasteurize using 70-80°C, 2 hours. 1–2 hrs
 ■ Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2 Hydrate to 65% — a firm squeeze should yield only 1–2 drops. 15 min
 ■ Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3 Cool to room temperature before use. 4–8 hrs
 ■ Hot substrate will kill spawn.
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#64

Rye + Coco Coir Layer

Standard rye grain base topped with pasteurized coco coir.

[rye] [coir] [layered] [intermediate]

PARAMETERS

TARGET PH
6.4

MOISTURE
63%

C:N RATIO
38

FIELD CAPACITY
75%

STERILIZATION

121°C, 15psi, 90min

INGREDIENTS

- Whole Rye Berries — 50%
- Coco Coir — 50%

Sterilize rye layer separately, pasteurize coir, combine in bag under SAB.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Sterilize at 121°C, 15psi, 90min. 90min
- 2 Hydrate to 63% — a firm squeeze should yield only 1–2 drops. 15 min
 - Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3 Cool to room temperature before use. 4–8 hrs
 - Hot substrate will kill spawn.
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#65

Coir + Aged Manure 50/50

Coir/manure blend for button mushroom cultivation.

[coir] [manure] [button] [agaricus]

PARAMETERS

TARGET PH
7.0

MOISTURE
65%

PASTEURIZATION
60°C, 1 hour

INGREDIENTS

- Coco Coir — 50%
- Aged Horse Manure — 50%

Manure must be fully composted/aged. Good for button mushroom varieties and other Agaricus species.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Pasteurize using 60°C, 1 hour. 1–2 hrs
 - Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2 Hydrate to 65% — a firm squeeze should yield only 1–2 drops. 15 min
 - Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3 Cool to room temperature before use. 4–8 hrs
 - Hot substrate will kill spawn.
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#66

Banana Leaf/Stem Substrate

Tropical agricultural waste substrate. Good for oyster species in warm climates.

[banana] [tropical] [agricultural-waste]

PARAMETERS

TARGET PH
6.5

MOISTURE
70%

PASTEURIZATION
70°C, 1-2 hours

INGREDIENTS

- Banana Leaves/Stems (chopped) — 90%
- Wheat Bran — 10%

Chop banana material finely. High moisture content — drain well. Popular in tropical mushroom farming.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Pasteurize using 70°C, 1-2 hours. 1–2 hrs
 ■ Monitor temp closely — too hot kills everything, too cool kills nothing.
- 2 Hydrate to 70% — a firm squeeze should yield only 1–2 drops. 15 min
 ■ Too wet = anaerobic bacteria. Too dry = stalled colonization.
- 3 Cool to room temperature before use. 4–8 hrs
 ■ Hot substrate will kill spawn.
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#67

Hemp Hurd + Soy Hull

Emerging substrate using hemp hurds (shiv) and soy hulls. Experimental but promising.

[hemp] [hurd] [soy-hull] [experimental]

PARAMETERS

TARGET PH
6.5

MOISTURE
65%

INGREDIENTS

■ Hemp Hurd — 60%

■ Soy Hulls — 40%

STERILIZATION

121°C, 15psi, 120min

Hemp hurd provides structure; soy provides nitrogen. Rehydrate well before use. Still experimental.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- | | | |
|---|--|-----------|
| 1 | Sterilize at 121°C, 15psi, 120min. | 120min |
| 2 | Hydrate to 65% — a firm squeeze should yield only 1–2 drops.
■ <i>Too wet = anaerobic bacteria. Too dry = stalled colonization.</i> | 15 min |
| 3 | Cool to room temperature before use.
■ <i>Hot substrate will kill spawn.</i> | 4–8 hrs |
| 4 | Mix with fully colonized grain spawn at 10–20% by volume. | 5 min |
| 5 | Pack into fruiting container or bag, leaving headspace for gas exchange. | 3 min |
| 6 | Incubate at 21–24°C until fully colonized (7–21 days depending on species). | 7–21 days |
| 7 | Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. | N/A |

#68

Sawdust + Rice Bran 15%

Traditional Asian shiitake formula using rice bran as supplement.

[sawdust] [bran] [rice] [asian] [shiitake]

PARAMETERS

TARGET PH
6.0

MOISTURE
60%

C:N RATIO
35

STERILIZATION
121°C, 15psi, 120min

INGREDIENTS

- Hardwood Sawdust — 85%
- Rice Bran — 15%

Rice bran provides different nutrient profile than wheat bran. Traditional for Asian shiitake production.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Sterilize at 121°C, 15psi, 120min. 120min
- 2 Hydrate to 60% — a firm squeeze should yield only 1–2 drops. 15 min
 - *Too wet = anaerobic bacteria. Too dry = stalled colonization.*
- 3 Cool to room temperature before use. 4–8 hrs
 - *Hot substrate will kill spawn.*
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#69

Pure Hardwood Sawdust

Unsupplemented hardwood for shiitake browning strain cultivation.

[pure-hardwood] [low-nutrient] [browning] [shiitake]

PARAMETERS

TARGET PH
6.0

MOISTURE
58%

C:N RATIO
500+

STERILIZATION
121°C, 15psi, 120min

INGREDIENTS

■ Hardwood Sawdust (oak, beech) — 100%

No supplements for proper browning/melanization. Required for shiitake strains that form brown caps.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- 1 Sterilize at 121°C, 15psi, 120min. 120min
- 2 Hydrate to 58% — a firm squeeze should yield only 1–2 drops. 15 min
 ■ *Too wet = anaerobic bacteria. Too dry = stalled colonization.*
- 3 Cool to room temperature before use. 4–8 hrs
 ■ *Hot substrate will kill spawn.*
- 4 Mix with fully colonized grain spawn at 10–20% by volume. 5 min
- 5 Pack into fruiting container or bag, leaving headspace for gas exchange. 3 min
- 6 Incubate at 21–24°C until fully colonized (7–21 days depending on species). 7–21 days
- 7 Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. N/A

#70

Master's Mix 60/40 Sawdust Heavy

Sawdust-heavy variant for lower contamination risk with similar yields.

[masters-mix] [60-40] [hardwood-heavy]

PARAMETERS

TARGET PH
6.2

MOISTURE
60%

C:N RATIO
35

STERILIZATION
121°C, 15psi, 120min

INGREDIENTS

■ Hardwood Fuel Pellets — 60%

■ Soy Hulls — 40%

Lower soy hull content reduces contamination risk while maintaining good yields.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- | | | |
|---|--|-----------|
| 1 | Sterilize at 121°C, 15psi, 120min. | 120min |
| 2 | Hydrate to 60% — a firm squeeze should yield only 1–2 drops.
■ <i>Too wet = anaerobic bacteria. Too dry = stalled colonization.</i> | 15 min |
| 3 | Cool to room temperature before use.
■ <i>Hot substrate will kill spawn.</i> | 4–8 hrs |
| 4 | Mix with fully colonized grain spawn at 10–20% by volume. | 5 min |
| 5 | Pack into fruiting container or bag, leaving headspace for gas exchange. | 3 min |
| 6 | Incubate at 21–24°C until fully colonized (7–21 days depending on species). | 7–21 days |
| 7 | Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. | N/A |

#71

Oak Sawdust + Soy Hull 30%

High-supplementation oak substrate for maximum shiitake yields.

[oak] [soy-hull] [high-supplement] [shiitake]

PARAMETERS

TARGET PH
6.0

MOISTURE
60%

C:N RATIO
30

STERILIZATION
121°C, 15psi, 150min

INGREDIENTS

■ Oak Sawdust — 70%

■ Soy Hulls — 30%

Oak provides superior flavor for shiitake. High soy content for yields. Extended sterilization required.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- | | | |
|---|--|-----------|
| 1 | Sterilize at 121°C, 15psi, 150min. | 150min |
| 2 | Hydrate to 60% — a firm squeeze should yield only 1–2 drops.
■ <i>Too wet = anaerobic bacteria. Too dry = stalled colonization.</i> | 15 min |
| 3 | Cool to room temperature before use.
■ <i>Hot substrate will kill spawn.</i> | 4–8 hrs |
| 4 | Mix with fully colonized grain spawn at 10–20% by volume. | 5 min |
| 5 | Pack into fruiting container or bag, leaving headspace for gas exchange. | 3 min |
| 6 | Incubate at 21–24°C until fully colonized (7–21 days depending on species). | 7–21 days |
| 7 | Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. | N/A |

#72

Eucalyptus Sawdust + Bran

Specialized substrate for regions where eucalyptus is abundant.

[eucalyptus] [australian] [experimental]

PARAMETERS

TARGET PH
6.0

MOISTURE
60%

INGREDIENTS

- Aged Eucalyptus Sawdust — 80%
- Wheat Bran — 20%

STERILIZATION

121°C, 15psi, 150min

Eucalyptus must be aged 6+ months to reduce volatile oils. Pink oyster works well.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- | | | |
|---|--|-----------|
| 1 | Sterilize at 121°C, 15psi, 150min. | 150min |
| 2 | Hydrate to 60% — a firm squeeze should yield only 1–2 drops.
■ <i>Too wet = anaerobic bacteria. Too dry = stalled colonization.</i> | 15 min |
| 3 | Cool to room temperature before use.
■ <i>Hot substrate will kill spawn.</i> | 4–8 hrs |
| 4 | Mix with fully colonized grain spawn at 10–20% by volume. | 5 min |
| 5 | Pack into fruiting container or bag, leaving headspace for gas exchange. | 3 min |
| 6 | Incubate at 21–24°C until fully colonized (7–21 days depending on species). | 7–21 days |
| 7 | Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. | N/A |

#73

Cordyceps Rice Substrate

Specialized fruiting substrate for *Cordyceps militaris*. Grown in flat containers.

[cordyceps] [rice] [fruiting] [specialty]

PARAMETERS

TARGET PH
6.5

MOISTURE
60%

STERILIZATION

121°C, 15psi, 60min

INGREDIENTS

■ White Rice — 50g per container

■ Water — 50ml per container

■ Silkworm Pupae (optional) — 2-3 per container

Use shallow containers with vented lids. Inoculate with LC. Incubate 15-20°C for mycelium.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

1	Sterilize at 121°C, 15psi, 60min.	60min
2	Hydrate to 60% — a firm squeeze should yield only 1–2 drops. ■ Too wet = anaerobic bacteria. Too dry = stalled colonization.	15 min
3	Cool to room temperature before use. ■ Hot substrate will kill spawn.	4–8 hrs
4	Mix with fully colonized grain spawn at 10–20% by volume.	5 min
5	Pack into fruiting container or bag, leaving headspace for gas exchange.	3 min
6	Incubate at 21–24°C until fully colonized (7–21 days depending on species).	7–21 days
7	Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads.	N/A

#74

Master's Mix 40/60 Soy Heavy

High-supplementation mix for maximum yields. Requires strict sterile technique.

[masters-mix] [40-60] [soy-heavy] [high-yield]

PARAMETERS

TARGET PH
6.2

MOISTURE
60%

C:N RATIO
20

STERILIZATION
121°C, 15psi, 150min

INGREDIENTS

■ Hardwood Fuel Pellets — 40%

■ Soy Hulls — 60%

Maximum nutrition for highest yields. High contamination risk — use quality spawn and strict technique only.

STEP-BY-STEP PROTOCOL

Prep: 1–2 hrs · **Pasteurization:** 1–2 hrs · **Cooling:** 4–8 hrs · **Colonization:** 7–21 days

Equipment: Large tub or barrel for pasteurization, Thermometer, Colander, Clean towels, Fruiting containers or bags, Fully colonized grain spawn

- | | | |
|---|--|-----------|
| 1 | Sterilize at 121°C, 15psi, 150min. | 150min |
| 2 | Hydrate to 60% — a firm squeeze should yield only 1–2 drops.
■ <i>Too wet = anaerobic bacteria. Too dry = stalled colonization.</i> | 15 min |
| 3 | Cool to room temperature before use.
■ <i>Hot substrate will kill spawn.</i> | 4–8 hrs |
| 4 | Mix with fully colonized grain spawn at 10–20% by volume. | 5 min |
| 5 | Pack into fruiting container or bag, leaving headspace for gas exchange. | 3 min |
| 6 | Incubate at 21–24°C until fully colonized (7–21 days depending on species). | 7–21 days |
| 7 | Initiate fruiting by introducing fresh air when substrate is fully white. Look for small pinheads. | N/A |

Quick Reference

Method	Temp / Time	Use For	Kills
Pressure Cook (PC)	121°C / 15 psi	Grain, AIO, Masters Mix	All spores & bacteria
Pasteurization (Hot)	60–80°C / 1–2 hrs	Straw, CVG, coffee grounds	Most bacteria & molds
Cold Lime	pH 12 / 12–24 hrs	Straw only	Bacteria & many molds
None (outdoor)	N/A	Chip beds, logs	Competitor suppression only

Field Capacity Test

Squeeze a handful of prepared substrate firmly. At field capacity, only 1–2 drops of water should fall. No drops = too dry. A stream = too wet. This test applies to grain, CVG, straw, and most other substrates.

Contamination Colour Guide

Color	Likely Contaminant	Action
Green / Blue-green	Trichoderma (green mold)	Discard immediately — highly aggressive
Black	Aspergillus or Rhizopus	Discard — can produce mycotoxins
Pink / Red / Orange	Bacterial contamination (Serratia)	Discard — usually from poor pasteurization
Yellow patches	Metabolite secretion or early bacteria	Monitor closely — may still abort
White mycelium, fuzzy	Could be Cobweb mold	Increase fresh air; may resolve

Open Source & Contributing

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