

SporeAttic LLC

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P2 Advisor: Alistair Stewart



Self-introduction:



Hossein Khadivar

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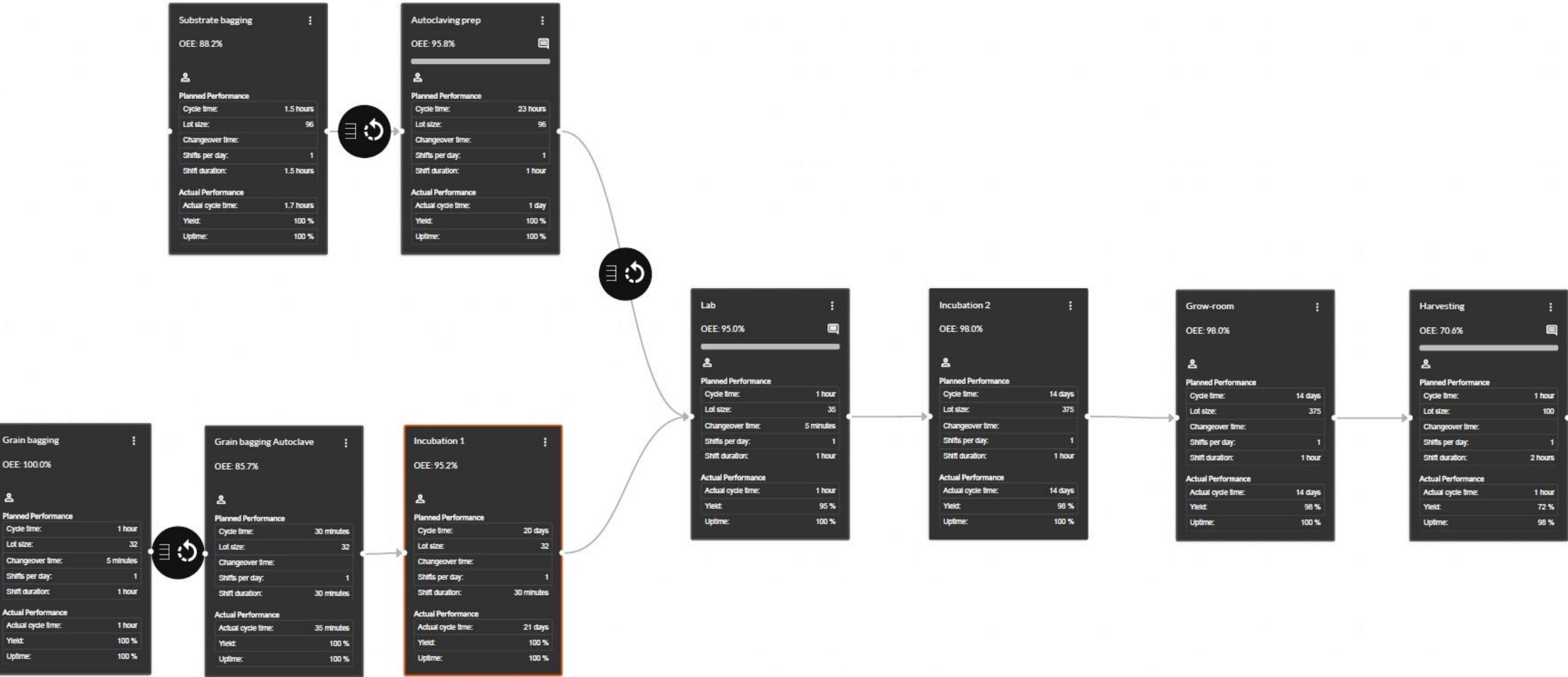
Background

SporeAttic LLC is a startup commercial gourmet mushroom farm in **Bozeman Montana**. They partnered with **Three Hearts Farm** to build their mushroom cultivation facility and officially hit the market in October 2020. Today, they sell a wide variety of specialty mushrooms to local restaurants, farmer's markets and local grocery stores.

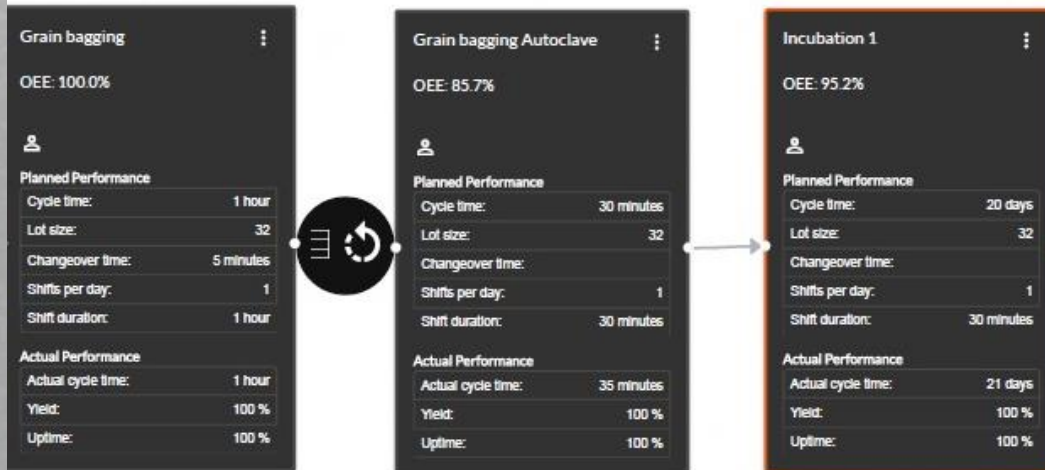
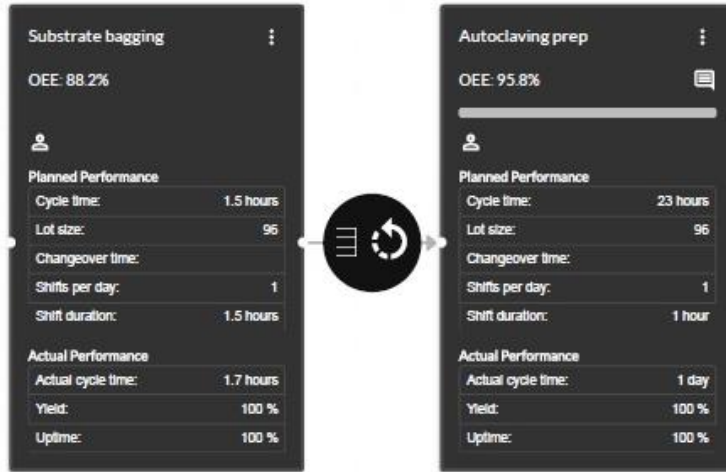
SporeAttic specializes in a wide variety of Gourmet Mushrooms including Oysters, Lion's Mane, King Trumpets, and Chestnuts



Value Stream Mapping



Value Stream Mapping



Value Stream Mapping



Investigating Pollution Sources

SporeAttic like other companies contributes to various pollutions such as air, water, soil, and solid waste. Some of the main pollutions are odor, water and solid waste.



Disposal/Recycling



Raw Material
Extraction



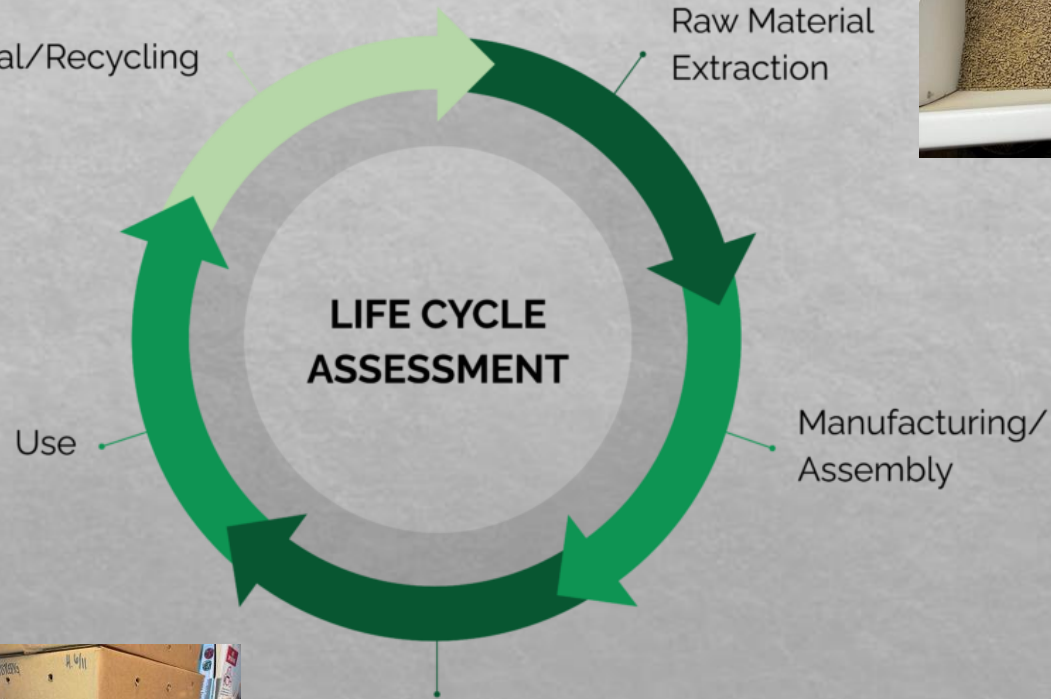
Use



Manufacturing/
Assembly



Transportation &
Distribution



Investigating Pollution Sources

Mushroom spent blocks

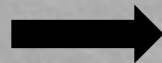
SporeAttic uses 3 ingredients to create the substrate to grow the mushrooms on

1. Hard wood pellets
2. Soy hulls
3. water

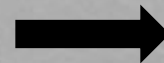
When substrates are used to grow mushrooms, the leftover substrate after mushroom have been harvested is called mushroom spent blocks.



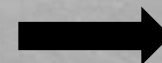
+
Water



Bagging



**Harvested
block**



Disposal

Mushroom spent blocks

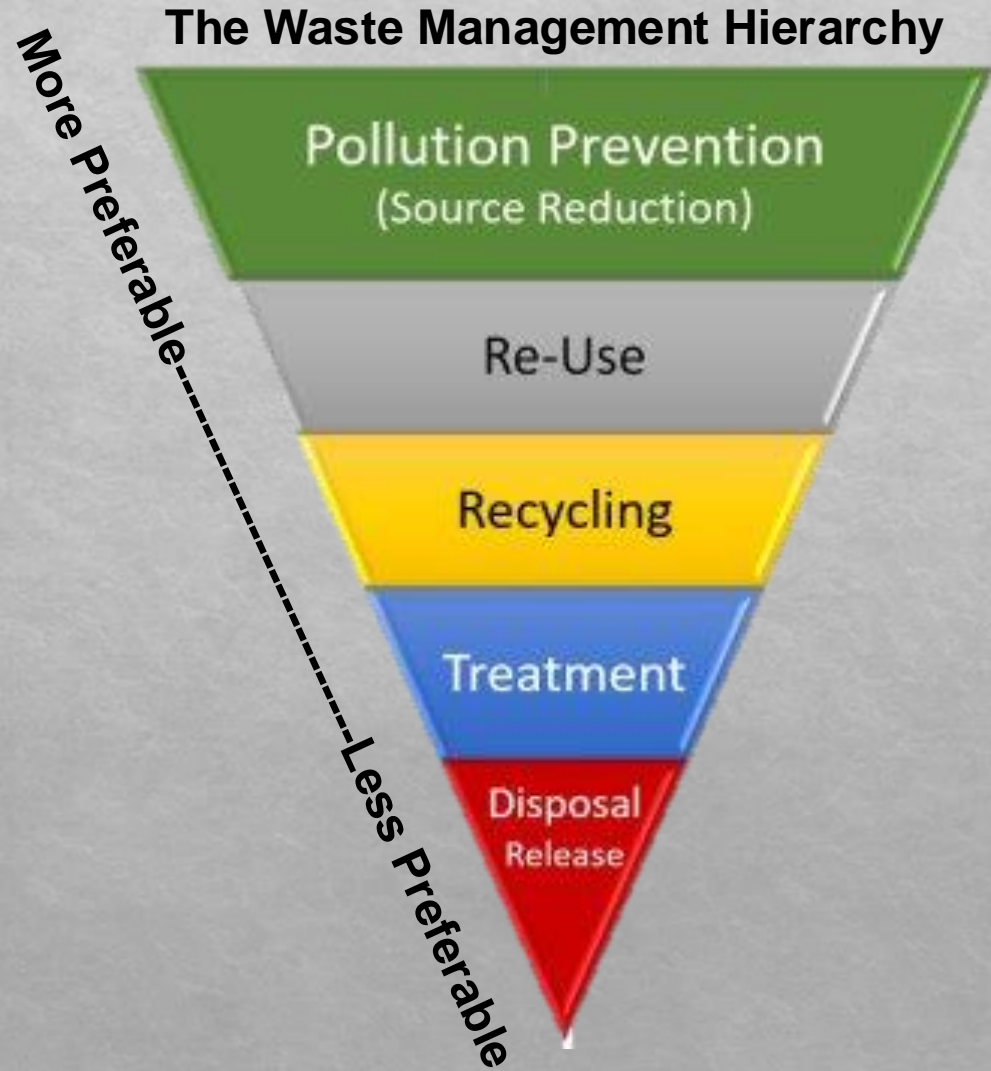
SporeAttic is currently producing about 850 lbs. mushrooms weekly which results in approximately **3800-4000 lbs. of “spent” blocks weekly.**

Current strategy: Three Hearts farmers have been using the mushroom spent blocks as compost, and soli amendments.

**Weekly: 4000 lbs.
Yearly: 208,000 lbs.**



Investigating Pollution Sources



P2

Aiming to reduce or eliminate waste before it's created

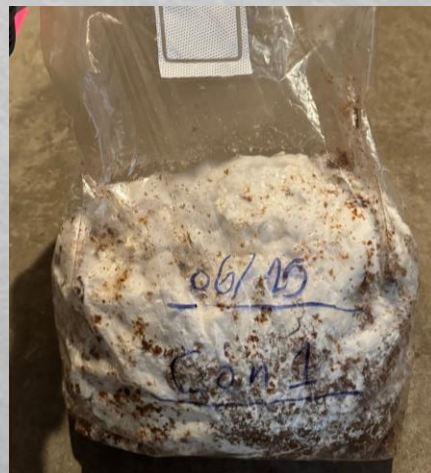
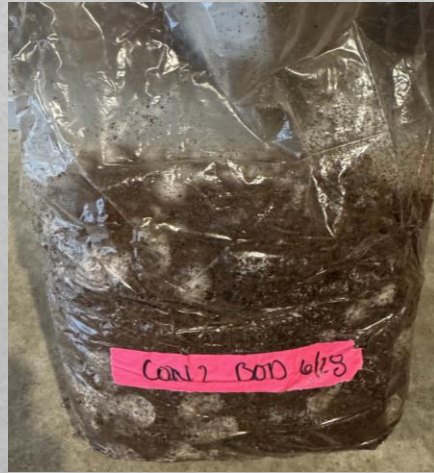
Reduce Waste by recycling/re-purposing the mushroom spent blocks

Investigating Pollution Sources



Re-using mushroom spent blocks

Inoculation → Incubation → Fruiting → Harvest



It is not clear how much of the initial substrate is used by the time mushrooms are harvested.

To investigate that, I designed simple growth experiments in different conditions to assess if “spent” substrates can be used again with/without using new substrate.

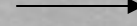
Re-using mushroom spent blocks

Re-using the “spent” substrates (if applicable in large scale) can slow down the rate of using new substrates and producing solid waste.

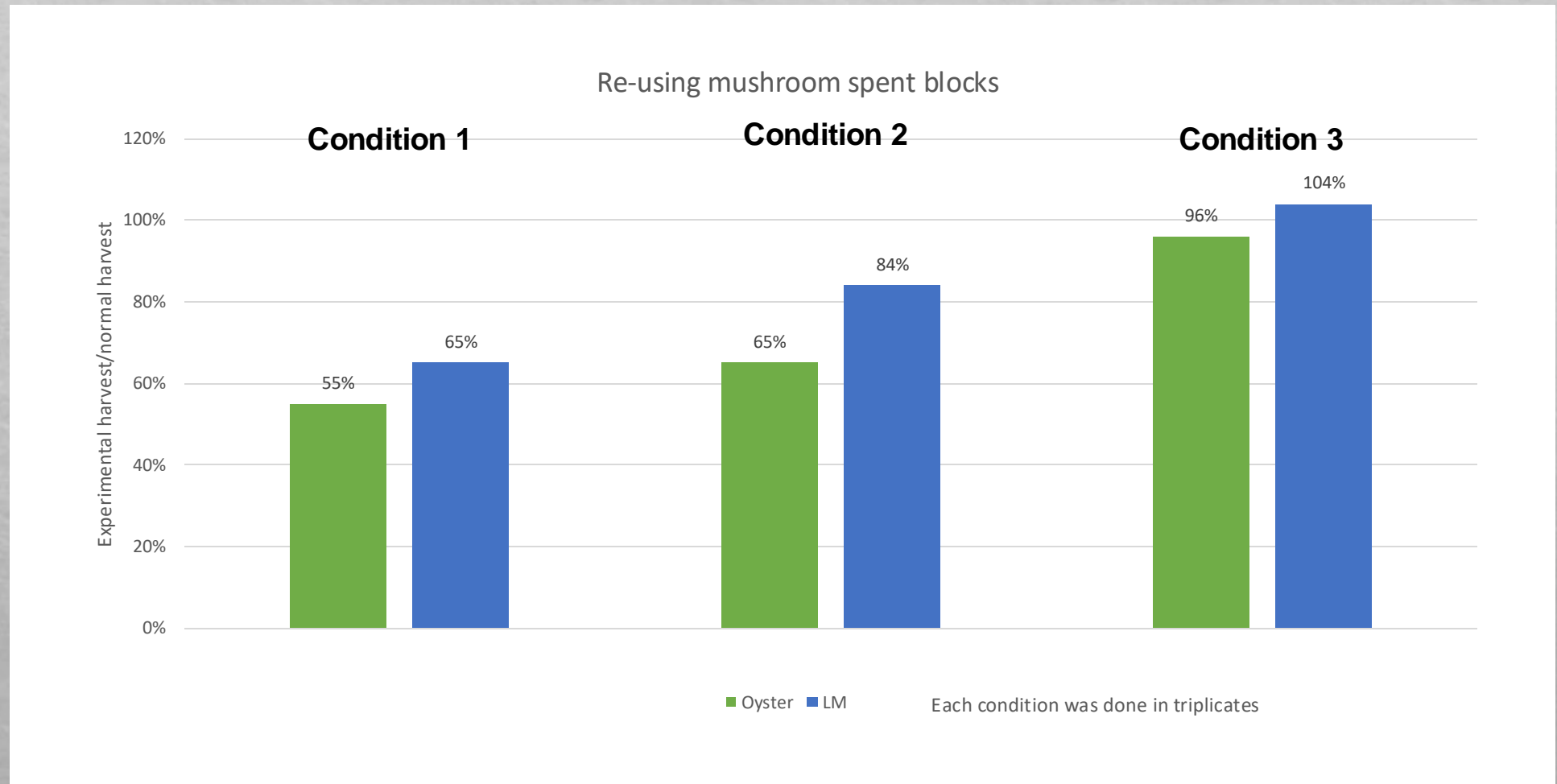
Growth Experiments

Conditions:

1. Using spent blocks directly after harvesting (second flushing)-**Already being done with some strains**
2. Using the spent blocks as substrates from scratch
3. Using 1:1 ratio spent blocks, and new substrate



Re-using mushroom spent blocks



**Considerable
results from 1:1
ratio conditions**

**Small sample
size**

Recycling mushroom spent blocks

Spent blocks consist of used & unused wood and soy hull pellets + water + mycelium

Re-using: to grow additional cycles

Recycling: to go through collection, and additional processes to create value-added products

1. Composting
2. Mulching
3. Mushroom spent block pellets

Approach	Requirements	Financial Considerations	Implementation
Composting	Space, composting equipment, personnel	Initial investment, operations	Cost-benefit analysis
Sell to composting facilities	Potential buyers, pricing and delivery terms	Transportation costs	Market research, pricing strategy, logistics
Mulching	Space, shredding and packaging eq	Initial investments, operations	Cost-benefit analysis
MSB pellet production	Space, pellet mill machine, packaging eq	Initial investments, operations	Can be used as fuel, additional cycles

Recommended P2 actions-overview

Recommended P2 actions	Annual reductions	Barrier to implement
Re-using mushroom spent blocks	50% reduction of raw materials (HW, soy), 30-40% reduction of water	Re-designing workflow, more data to support the claims
Re-purposing spent blocks	Complete elimination of waste by creating value-added products	Initial investments, cost-benefit analysis
5S and Lean practices	Reduction in overproduction and defects	Future employee training

Thank you



Jenny Grossenbacher
Barbara Watson
Alistair Stewart
Wan-Yuan Kuo



Benjamin Deuling
Becca Finch

