

Introduction

- I am Jocelyn Matthews a sophomore agriculture student at Virginia State University where I am pursuing my B.S. in agriculture. As an undergraduate student, I wanted to acquire as much experience as possible in biological recycling of agricultural wastes using edible fungus (oyster mushroom) to value added products such as a nematicide against the gastrointestinal parasite *Heamonchus contortus* or Barber Pole worm in sheep and goats
- The rapidly growing global population and expansion in the agriculture sector has resulted in the generation of large amount of agricultural wastes which are rich in organic substances such as lignocelluloses. Biological recycling could be a potential strategic solution to increase resource and efficiency while maintaining ecological sustainability
- Bio recycling research utilizes mushroom to convert the abundantly available agricultural wastes to fruiting bodies which have high nutritional values
- Mushrooms are also known for their high medicinal values and are considered to be natural anthelmintic against gastrointestinal nematode parasites
- The gastrointestinal nematode parasite commonly known as the Barber Pole worm causes significant economic loss to ruminant livestock
- Continuous and indiscriminate use of chemical control has resulted in anthelmintic resistant parasites
- An innovative alternative may be the use of oyster mushroom, edible fungus/mushroom of the genus *Pleurotus* species, that can be cultivated on agricultural wastes such as crop residues
- Crop residues are non-edible parts of plants remaining after harvest. Large amount of agricultural wastes are produced in the U.S.

Objectives

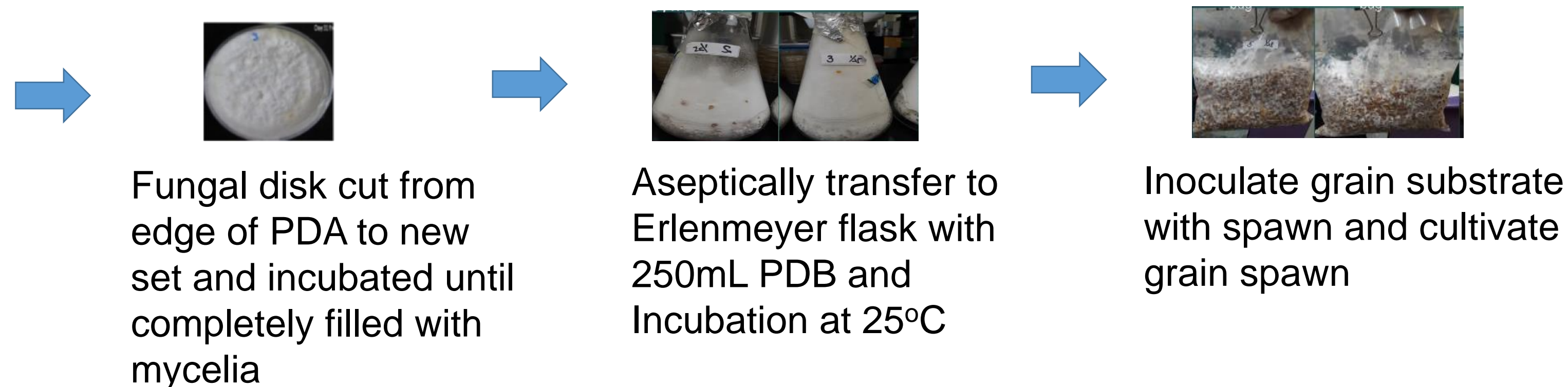
- Cultivate oyster mushroom on crop residues, harvest and prepare for evaluation as a nematicide
- Evaluate yield, biological efficiency and composition of oyster mushroom cultivated on crop residues

Materials, Activities and Methods

- The experiment was conducted in a mushroom growing room at Virginia State University
- Crop residues namely Corn stover (COST), Edamame straw (EDST) and a 50:50 mixture of the two (COED) were Collected and processed
- Oyster mushroom culture /spawn and substrate were prepared and cultivated on crop residues

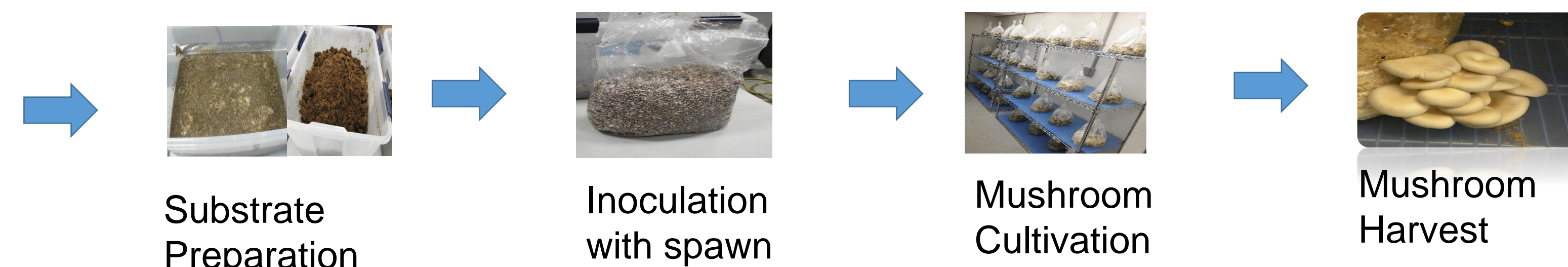
➤ Spawn Preparation

Obtained culture maintained on PDA medium @ 4°C



➤ Mushroom Cultivation

Crop Residue Obtention
• EDST
• COST
• COED



Materials, Activities and Methods

- All Harvested mushrooms were freeze dried and subsampled for composition analyses. The remaining samples were stored in a freezer (- 21°C) in vitro for nematicide test against Barber Pole worm..
- The test for the nematicide ability of oyster mushroom will be done both on the parasite eggs and larvae

Determination of mushroom growth and composition

- Biological efficiency (BE) was calculated as weight of mushroom harvested/substrate weight
- Proximate analyses was done to estimate percent Crude Protein, oil and ash composition

Summary

	Yield (g)	BE (%)
COST	300.8±3.8	72.4±1.7
EDST	135.1±3.2	48.24±1.1
COED	245.4±4.5	51.8±1.5

Table 1. Yield and Biological Efficiency (%) Oyster Mushroom cultivated on crop residues
The highest weight of mushroom harvested (300.8g) was obtained from EDST substrate followed by COED (245.4g) and COST (135.1g).
The highest BE (%) was recorded for EDST (72.4%) followed by COED (51.8%) and COST (48.2%).

	DM	CP	CF	Ash
	%			
COST	92	7	37	8.4
EDST	90	9	39	5.8
COED	91	8	35	8.3

Table 2. Composition of substrate used for cultivation of oyster mushroom
The DM, CP, CF (fat) and ash values decreased after cultivation of oyster mushroom.
There was an increase in the CP content of the substrate after mushroom cultivation which may be attributed to the mycelia.

	DM	CP	CF	Ash
	%			
COST	15	24	1.2	7.5
EDST	13	26	1.0	8.7
COED	14	25	1.1	7.7

Table 3. Composition of mushroom cultivated on crop residues
The DM content of Mushroom from the substrates was similar.
The %CP values were different between mushrooms cultivated on the different residues.
The percent fat and ash contents of mushroom cultivated on the different crop residues were similar

Knowledge and Skills Gained

- The intern in this project acquired skills involving layout and conduct of experiments, collecting and evaluating data
- The intern participated in preparation of spawn, substrate and cultivation of oyster mushroom and gained knowledge pertaining to sustainable agriculture.
- The young scholar completed the internship by creating a poster. This work will be presented at VSU agriculture undergraduate research, field day and other forums

Research Needs

Further studies of this research in sustainable agriculture will continue to completion to determine:

- Composition and nutritional quality of other varieties of mushroom cultivated on crop residues and/or agricultural wastes
- Nematicidal abilities of other varieties of mushrooms against gastrointestinal parasites in small ruminants
- Further studies with different application strategies of biological recycling including other varieties of mushrooms and microbes namely other fungi and bacteria and agro industrial wastes will be very helpful

Acknowledgement

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