Project Number: 82-W4
Project Title: Brush Utilization - Mushroom Compost (Also included is the exerpt of the 1982 Annual Report Summary Booklet dated March 1983

OBJECTIVES

1. To develop a ground almond brush composting technique for mushroom growing.

2. To develop a new composition formula of almond brush compost for higher mushroon yield.

INTERPRETIVE SUMMARY

Tests conducted during the 1981-82 fiscal year showed that an improved compost formula (50% almond brush) gave approximately 28% higher yields to the traditional straw compost. However, 100% almond brush gave inconsistant yields.

Experiments carried out at the Mills mushroom farm did not show the yield difference between the two composts.

Composting technique was also improved by mixing some supplements at the prewetting stage and combined with straw sooner that previous experiment. Brush also gave conditioning effects to the compost and increased aeration and hence it reduced anaerobic zone in the lower middle part of pile.

EXPERIMENTAL PROCEDURE

1. Prewetting Procedure:

Chicken manure (.5% of dry weight) was added at the prewetting stage to expedite the breakdown of brushes. Watering was maintained just to keep them soaked during first three weeks.

2. Composting Procedure:

Prewetted brush was then mixed with regular straw with modified formula and proceeded with conventional composting procedures.

3. Modified Formula:

One inch screened ground almond brushes were composted in the following composition:

100% Almond Brush Mushroom Compost Weight Ratio (%)

Almond Brush	74.66
Gypsum	4.57
Lime	.38
Grape Pomace	14.21
Cotton Seed Meal	.76
Cotton Hulls	1.76
Chicken Manure	3.66

50% Almond Brush + 50% Regular Compost Weight Ratio (%)

Almond Brush + Straw	74.66

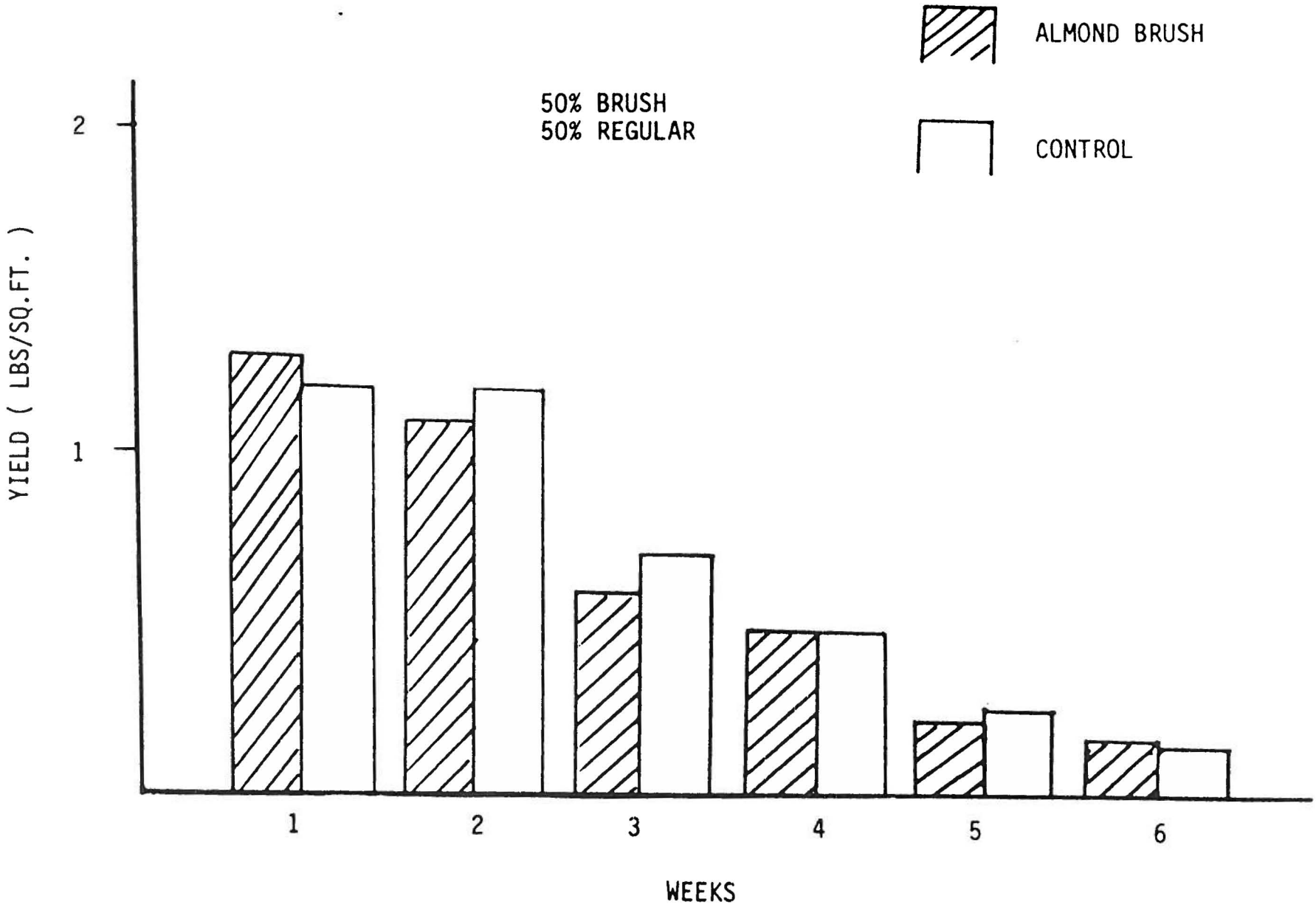
Other additives are the same as above.

4. Spawning:

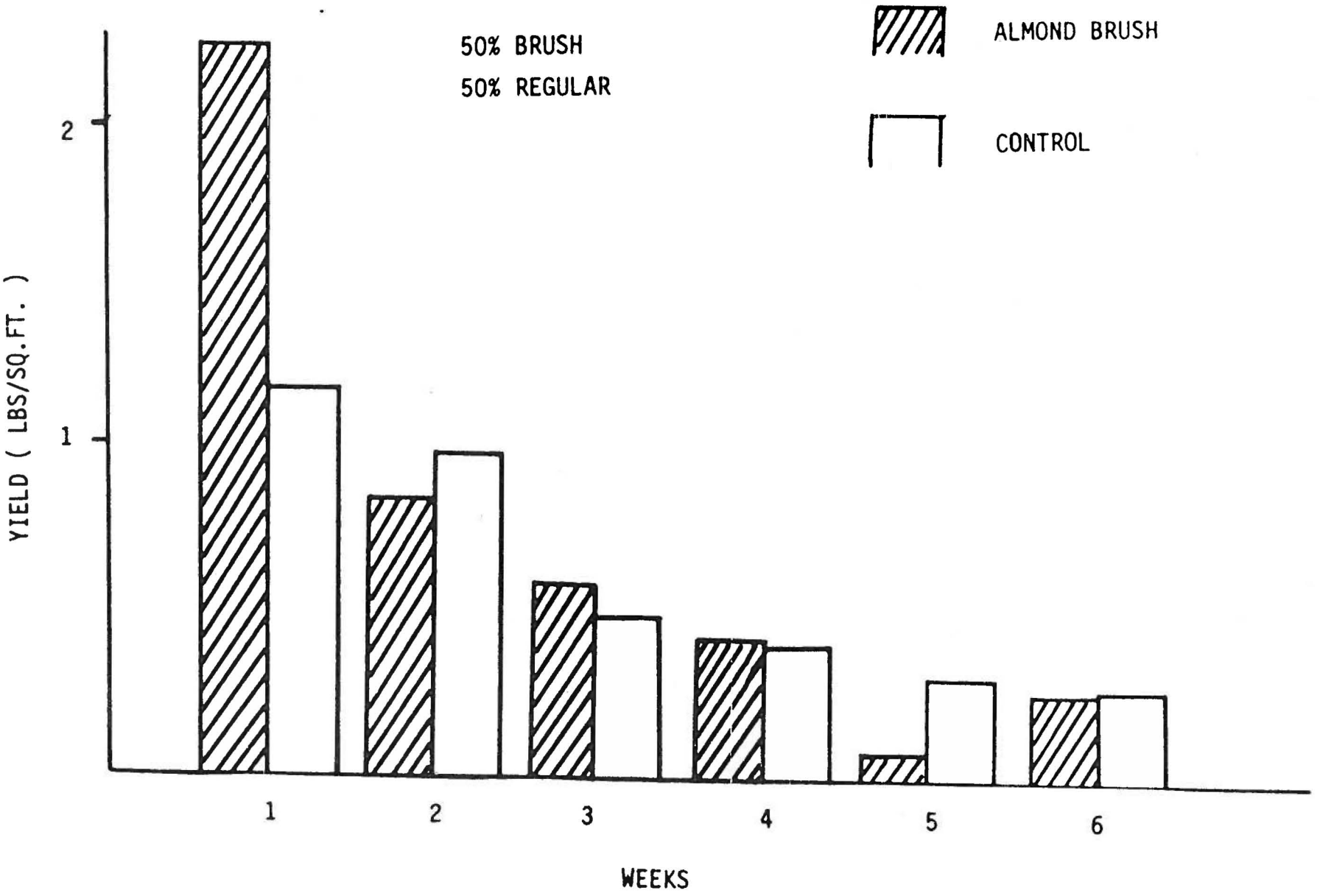
Off white strain (Stoller's Research Co. product) was used in the experiment. Sixteen trays were filled for each regular and Almond brush compost comparison test.

5. Results:

Comparison results between almond brush compost and controls (regular compost) are shown in the following figure:



MUSHROOM YIELD COMPARISON RESULTS BETWEEN ALMOND BRUSH COMPOST (50%) AND CONTROL (19 EXPERIMENT)



MUSHROOM YIELD COMPARISON RESULTS BETWEEN ALMOND BRUSH COMPOST (50%) AND CONTROL (1982 XPERIMENT)

6. Discussion:

Improved composting technique with modified formula gave approximately 28% higher yields to the traditional straw compost.

Adding a certain supplement to almond brushes at the prewetting stage improved composting process. Also the better compost was achieved by mixing straw (for 50/50% formula) sooner than previous experiment, which results in reducing composting period by at least six days.

However, it requires further development of composting technique as almond brush still needs a longer curing period than regular straw. Improved composition formula gave an encouraging result and the additional experiments will be carried out for further verification.

Section IV - Almond Brush Utilization Research

Project No. 82-W4 - Brush Utilization
Mushroom Compost

Project Leader: Dr. Joo I. Kim (209) 294-2681 or 294-2861
Department of Agricultural Industry and Education
California State University
Fresno CA 93740

Objectives: (1) To develop a ground almond brush composting technique for mushroom growing. (2) To develop a new composition formula of almond brush compost for higher button mushroom yield.

Interpretive Summary: A new prewetting method has been developed which substantially shortens the time needed to compost brush. While brush is prewetted, chicken manure (2.5 percent by weight) is added and this expedites brush breakdown. Using this new method, the prewetting and composting period for the brush-straw mixture described below is four weeks, while last year using traditional methods, it took seven weeks. For comparison, it takes three weeks to prewet and compost the traditional straw media.

Two almond brush composts were tested this season at the Fresno state mushroom growing facilities. Prunings used were shredded with a commercial tubgrinder using a one-inch screen. For one compost, shredded brush was substituted for wheat straw (74.66% of compost by weight). For the other, the 74.66% percent allocated to wheat straw was split so that half was wheat straw and half was almond prunings. The new composting techniques described above were used. The 50 percent almond brush compost gave 31 percent higher yields than the traditional straw compost (4.6 pounds/square foot from six flushes for the 50 percent almond brush compost compared to 3.5 pounds/square foot from the straw compost.) The 100% almond brush compost gave inconsistent yields.

The same experiments were run at Mills Mushroom Farms, Geyserville, except that traditional prewetting and composting techniques were used. Yields of the 50 percent almond brush compost and the traditional straw compost were equivalent. Again, yields from the 100% almond brush compost were inconsistent.

Brush imparts positive conditioning effects to the composting media by making it more flocculent. This increases aeration so that the anaerobic zone in the center of compost piles is diminished and improves pasteurization by permitting better steam penetration.

Project No. 82-X4 - Brush Utilization
Densifying and Transporting Brush

Project Leader: Donald G. Tretheway (916) 243-5831
CH2M Hill
1525 Court Street
Box 2088
Redding CA 96099

Objectives: To identify a feasible and cost-effective method for removing, processing and transporting almond brush from the orchard to a potential buyer(s) of densified almond brush.

Interpretive Summary: An appropriation was made for this project to cover unanticipated brush utilization research needs which may develop during the 1982-83 fiscal year. To date no services have been required and no funds have been spent.

Project No. 82-Y3 - Brush Utilization
Field Trials

Project Leader: George E. Miller, Jr. (916) 752-1896
Agricultural Engineering Extension
University of California
Davis CA 95616

Objectives: To develop a feasible and cost-effective method for removing, processing, and transporting almond brush from the orchard to potential buyers of densified brush.

Interpretive Summary: Two methods of brush densification have been identified: in-row and orchard-side densification. In-row densification involves use of a continuously-moving chipper or hammermill. In-row densification eliminates need for buck-raking but can cause damage to orchards and interferes with orchard activities. Orchard-side densification may involve the use of a semi-stationary hammermill, tubgrinder, chipper, baler or module builder in addition to loaders. All of this equipment has been field tested.

During 1982, Dr. Bryan Jenkins, UC Davis, designed, constructed and tested a module cutter. Demonstrations held earlier had shown that brush compacted by moduling and then cut into units of approximately one ton each could be ground through a tubgrinder about three times faster than brush not compacted. The cutter was tested in Fresno and then returned to Davis for modification.

A cooperative program was developed, presented and approved by the California Energy Commission for funding a heavy-duty module builder. The module builder was constructed by Taylor Machinery Corporation, Visalia. Weaver's Tree Service, Fresno, agreed to purchase it. Weaver's has the necessary support equipment including a Medallion 1010 tubgrinder and loading equipment. The module cutter will be loaned to Weaver's during the testing period. Actual operation of this line began in January 1983.

Other brush harvesting concepts have been developed by other parties and are either in actual operation or in experimental stages. These include Morbark chippers, Nicholson chippers, in-row shredders built by Rear and L.A. By-Products and an in-row harvester constructed by Tink. Also a baling concept using packer trucks is being developed.