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Yield of oyster mushroom (*Pleurotus ostreatus*) using different growth promoters

Garcia, Jerlyn G.*

Isabela State University – Echague Campus, Philippines

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Abstract

The effect of different growth promoters on oyster mushroom growth and yield was conducted from December 2023 to February, 2024 at Barangay Canangan, Angadanan, Isabela. Six different growth promoters namely: Fermented fruit juice, Nutrient solution, Gibberellic acid, Urea solution, Cytokinin solution, Rice wash and plain water as control at a rate of 30 ml per liter of water was applied in the mushroom fruiting bags. The study was laid in a Completely Randomized Design with three replications. Cultural management such as pasteurizing the substrates for 10 hours prior to oyster mushroom spawn inoculation and other management protocols were strictly adhered. Results of the study showed that irrespective of the growth promoters' sources, there was consistent mushroom cap thickness across all treatments. The application of rice wash resulted in the largest cap diameter, however, comparable to Nutrient Solution Fermented Fruit Juice, Cytokinin, and Gibberellic acid. Gibberellic acid treated fruiting bag had elongated stalks in fruit bodies similar to those treated with Fermented Fruit Juice and rice wash. Differences in mushroom cap numbers were observed among different growth promoters. Nutrient solution attained the heaviest mushroom caps among the growth promoters. Biological efficiency analysis indicated that Rice wash appeared as the most effective growth promoter, showing high efficiency in converting substrate into mushroom biomass. The return analysis revealed that Treatment 6 (Rice wash) gave the highest return on investment at 116.48 percent per fruiting bag. These findings stress out the possibility of rice wash as a cost-effective and efficient growth promoter for mushroom cultivation, offering promising implications for agricultural practices and production sustainability.

* **Corresponding Author:** Jerlyn G.✉ gjerlyn1724@gmail.com

Introduction

Mushroom production has been a subject of extensive research due to its potential in food security, nutrition, and sustainable agriculture. However, several research gaps remain, offering opportunities for future studies and advancements. As such, the utilization of growth promoters to enhance crop growth and yield, particularly through biological approaches, has gained widespread adoption globally, promoting eco- and agriculture-friendly practices. These beneficial microbes not only foster growth but also contribute to the overall health and development of individual plants (Young *et al.* 2012).

It is speculated that growth-stimulating bacteria play a crucial role in promoting mushroom growth and increasing productivity. This stimulation is achieved through various mechanisms, including the secretion of growth hormones, the breakdown of inhibitory volatiles produced by vegetative mycelia, phosphate solubilization (Zarenejad *et al.* 2012).

The utilization of growth promoters in mushroom cultivation is a scientifically supported approach with a multitude of advantages. These benefits range from heightened productivity and optimized nutrient utilization to increase disease resistance and economic gains. Growth promoters play a pivotal role in propelling the field of mushroom cultivation towards sustainability and profitability. With increase productivity, growers can efficiently meet market demands, potentially expanding their customer base and boosting revenue. Additionally, a shortened cultivation cycle allows for more frequent harvests, further contributing to higher profits. The adoption of growth promoters can lead to more sustainable mushroom cultivation practices.

Growth promoters facilitate the efficient absorption and utilization of nutrients by the mushroom mycelium. This optimization ensures that mushrooms receive essential nutrients at the right time, promoting healthy development and minimizing nutrient wastage. Specific growth promoters, such as nutrients or bio-stimulants, significantly enhance the overall growth rate of mushrooms. These substances provide essential elements that encourage mycelium development and expedite the maturation of fruiting bodies, resulting in higher yields per unit area. Certain growth promoters stimulate rapid substrate colonization by mushroom mycelium, leading to quicker and more uniform mushroom production.

Nevertheless, local mushroom growers are not widely adopting growth promoters because there is limited information on which ones are the most effective and the appropriate dilution which is primary purpose for conducting this study.

Materials and methods

Materials for the production of substrate

Securing mother culture

The mother culture substrate was made with high-quality sorghum grains and $CaCO_3$, placed in a bottle and sterilized for one hour at 121°C in an autoclave. These were inoculated with *Pleurotus florida* pure culture and incubated for 15 to 20 days, until the substrate turns white owing to mycelium growth. Mother culture was secured from the Regional Crop Protection Center (RCPC), City of Ilagan, Isabela.

Preparation of substrates

The proportions used was 78 kg sawdust, 20 kg rice bran, one-kilogram dark brown sugar or 1 liter molasses, one kg agricultural lime and water.

Fermenting of substrate

All the dry materials (sawdust, rice bran, sugar and agri-lime) were mixed using shovel. Afterwhich, these were wetted and mixed to 50 percent moisture content and covered with plastic and mixed every seven (7) days until 21 days.

Preparation of fruiting bag

The components were well mixed, and the moisture content was increased by adding water until it reached around 50 percent. The 800 grams prepared substrate was packed snugly into polypropylene bags (6 x 12 inches). To facilitate the inoculums, a 35 cm hole or ring made of PVC tubing was inserted into the

mouth of the polypropylene bag. The fruiting bags was sealed with a rubber band after being stuffed with paper. The fruiting bags was sterilized for 8 hours in the steel drum and then maintained for 12 hours to cool. Each fruiting bags have a teaspoonful of mother culture materials including mycelia poured aseptically through the hole in each treatment and repeated three times. Then it was kept in an incubation environment to allow the whitish mycelial growth to finish.

Maintenance of fruiting bag

After the fruiting bags have been entirely covered with white mycelial growth, these were placed inside a low-cost mushroom house and hanged using a small size plastic rope with appropriate ventilation. To maintain the warmth and humidity essential for the development of the fruiting body, water was applied to the floor as well as on top of the fruiting bag.

Experimental design and treatments

The experiment was laid out in Completely Randomized Design (CRD) with six treatments and three replications. The experimental lay out is shown in Figure 1. The different growth promoters as treatments were as follows:

T_1 – Fermented Fruit Juice
T_2 – Nutrient Solution
T_3 – Gibberellic Acid
T_4 – Urea Solution
T_5 – Cytokinin Solution
T_6 – Rice Wash
T_7 – Control (Pure Water)

The dilution of the following growth promoters was as follows:

Fermented fruit juice

Ten ml of FPJ was diluted into 100 ml of water then sprayed the solution directly onto the mushroom caps and stalk but avoiding the gills.

Nutrient solution

The 50 grams of A solution was diluted evenly into 500 ml water and stirred well. Likewise, 50 grams of B solution was diluted into 500 ml water. Solution A and B are added equally into 10 ml per liter of water. The solution was applied by spraying at the opening of fruiting bags.

Gibberellic acid

Gibberellin solution was diluted according to the manufacturer's recommendations. The recommended concentration for mushrooms typically 50 ppm. This was applied evenly and directly to the stipes and pilei of the mushrooms.

Urea

Ten grams of urea was dissolved into 100 ml warm water to ensure complete dilution. The solution was stirred thoroughly until no undissolved particles were remained. The solution was applied during the early stage of mushroom development by spraying directly onto the stipes and pilei of the mushroom ensuring even coverage.

Cytokinin

Cytokinin solution was diluted following the manufacturer's instruction at 50 ppm. The solution was applied directly to the developing primordia of the oyster mushrooms.

Rice wash

Rice wash was applied during the vegetative stage which is the period after colonization or before fruiting bodies appear. Rice wash was at a rate of 50 ppm was applied during the early stages of fruiting.

Harvesting

The mushrooms should be harvested when the cap begins to fold inwards. Picking was done by twisting the mushroom gently without disturbing the surrounding fruit bodies.

Data gathered

Data on the mycelium colonization period, pin head formation period, stalk length, Biological Efficiency, stipe length and pileus diameter was recorded.

Cap (Pileus) Diameter

Ten marketable caps per treatment were randomly

selected every harvest. The diameter was measured using ruler.

Length of Stalk

The length of stalk from the 10 sample mushrooms per treatment was measured using a ruler and divided by 10 to get the average.

Pileus Thickness (cm).

The thickness of the pileus was likewise measured using a ruler.

Number of cap mushroom

The number of cap mushroom in every bag using 10 samples every harvest was recorded and summed-up at the end of the study.

Weight of Mushroom (1st, 2nd, 3rd Flush...)

The weight of mushroom every harvest were added to the previous harvest and summed-up to determine the total weight.

Biological Efficiency (BE).

This was computed using the formula:

$$BE = \frac{\text{Weight of Fresh Mushroom (g)}}{\text{Weight of Dried substrate (g)}} \times 100$$

where: BE = biological efficiency (%)
MFW = mushroom fresh weight (g) and
SDW = substrate dry weight (g)

Cost and return analysis

Production cost was determined by recording all the expenses incurred throughout the conduct of the study from gathering of substrate, harvesting and postharvest handling operations. Gross income was computed by multiplying the yield of each treatment plot to thecurrent price of fresh oyster mushroom. Net profit was obtained by subtracting the total expenses from the gross income using the formula:

Net Profit = Gross income - Total Cost of Production

Statistical analysis

All data gathered were analyzed using the Statistical Tool for Agricultural Research (STAR) for the analysis of variance (ANOVA) while the comparison of treatment means were subjected to Tukey's Honest Significant Difference (HSD) test.

Discussion of Results

Cap thickness (cm)

The application of various growth promoters to substrates had no effect on the thickness of mushroom caps as evidenced by the data presented in Table 1. This indicates that all the growth promoters yielded an average cap thickness ranging from 0.77 cm to 0.97 centimeters. The caps of the oyster mushrooms thrived and exhibited robust growth irrespective of the presence of growth promoters in the substrates which can be attributed to the cap's role as the primary site for nutrient absorption.

The lack of significant differences in values suggests that all the mushrooms absorbed nutrients from the substrates equally, leading to comparable thickness of caps and the growth promoters supplied to the substrates have similar effect.

Table 1. Cap Thickness of Oyster Mushroom (cm) as affected by Growth Promoters.

TREATMENTS	Cap Thickness (cm)
T_1 – Fermented Fruit Juice	0.93
T_2 – Nutrient Solution	0.93
T_3 – Gibberellic Acid	0.90
T_4 – Urea Solution	0.93
T_5 – Cytokinin Solution	0.93
T_6 – Rice Wash	0.97
T_7- Control (Pure Water)	0.77
F- RESULTS	ns
C. V. (%)	24.14

ns-not significant.

The lack of significant differences in the values related to mushroom cap thickness and the effectiveness of growth promoters indicates a robust and consistent nutrient absorption capability of the mushrooms, as well as a reliable performance of the growth promoters across different substrates.

Cap diameter (cm)

Table 2 shows the cap diameter of the mushroom as affected by the application of different growth promoters. The optimum harvest criterion for mushrooms is the size of the caps and a selective harvesting method is preferred.

It showed that different growth promoters significantly affect cap diameter of the oyster mushroom. Mushrooms treated with rice wash yielded the biggest cap diameter at 5.80 cm. Following closely were mushrooms treated with Nutrient Solution (T_2) and Control (T_7) though those mushrooms treated with Fermented Fruit Juice, Cytokinin, and Gibberellic acid exhibited comparable sizes of caps. The smallest caps were observed in mushrooms treated with urea solution, however comparable in size of caps to those in Treatment 1, Treatment 5 and Treatment 3. Among the growth promoters tested, rice wash produced the largest caps attributed to the composition although in little amount of carbohydrates, minerals, and vitamins in rice wash which are conducive to mycelial growth conditions (Quaicoe *et al.,* 2014). Likewise, vitamins that are very necessary for the growth of oyster mushrooms are thiamin (Vitamin B_1), nicotinic acid (vitamin B_3), pantothenic amino acid (vitamin B_5), biotin (vitamin B_7), pyridoxin, and inositol usually found in rice products. Furthermore, Naraian *et al.* (2009) cited that even in a little amount of these supplements, it promotes the vegetative growth throughout the growing period of mushroom provided there is favorable temperature.

Table 2. Cap Diameter (cm) of Mushroom as affected by Growth Promoters.

TREATMENTS	Cap Diameter (cm)
T_1 – Fermented Fruit Juice	4.87bc
T_2 – Nutrient Solution	4.90b
T_3 – Gibberellic Acid	4.43bc
T_4 – Urea Solution	4.17c
T_5 – Cytokinin Solution	4.53bc
T_6 – Rice Wash	5.80a
T_7- Control (Pure Water)	4.20b
F- RESULTS	**
C. V. (%)	4.50

Note: Means with common letter are not significantly different with each other using Tukey's HSD.
**-significant at 1% level.

Length of stalk (cm)

There were significant differences in the length of stalk of mushroom applied with different growth promoters which is shown in Table 3.

It showed that longer stalk (3.50 cm) was recorded in the substrate supplied with gibberellic acid (T_3) indicating that the amount of mushroom fruit body was affected by the absorption of nutrients in the media and produced longer stalk. It shows that GA_3 application seem to contribute towards increasing the length of stalk of mushroom. This finding corroborates to the findings of Mukhopadhyay *et al.* (2004) who reported that hormones like GA_3 not only enhanced the protein content of the mycelia by 3-5% over the control and also promotes better growth and development (Michniewicz, 1987).

Similarly, an elongation on stalk of mushroom was observed in the substrate enriched with fermented fruit juice that composes of molasses. Molasses is known to have trace amount of glucose, and sucrose Hoa and Wang (2015) thus influencing mushroom growth. On the other hand, rice wash, containing

additional nutrients conducive to cell development, yielded favorable outcomes in oyster mushroom production, as highlighted by Erkel (2009). On the other hand, the control plots (T_7) had the shortest stalk however, comparable to T_2, T_5, T_4 and Treatment 1 respectively.

Table 3. Length of Stalk (cm) as affected by Growth Promoters.

TREATMENTS	Length of Stalk
T_1 – Fermented Fruit Juice	3.07^{abc}
T_2 – Nutrient Solution	2.87^{c}
T_3 – Gibberellic Acid	3.50^{a}
T_4 – Urea Solution	2.93^{bc}
T_5 – Cytokinin Solution	2.90^{c}
T_6 – Rice Wash	3.40^{ab}
T_7- Control (Pure Water)	2.73^{c}
F- RESULTS	**
C. V. (%)	4.34

Note: Means with common letter are not significantly different with each other using Tukey's HSD.
**-significant at 1% level.

Number of cap mushroom.

Table 4 shows that the number of caps per flushing obtained per treatment was not definite as each substrate had its peak at different periods. On the average, the first harvesting period gave the highest number of caps while it decreases in the succeeding harvesting periods. The mushrooms treated with growth promoters showed variations in cap numbers during the initial flushing period. Notably, those treated with Fermented Fruit Juice (T_1) exhibited higher number of caps (15.33) compared to plots treated with gibberellic acid (12.67). However, the number of caps produced through the application of Fermented Fruit Juice was similar to those supplemented with Nutrient solution (15.00 caps), rice wash (14.00 caps), urea (13.67), cytokinin (13.00) and Control (12.67). It shows that while each growth promoter plays a specific role, they collectively stimulate and increased cap production but similar across all treatments.

Table 4. Number of Mushroom (1st to 5th Flushing) as affected by Growth Promoters.

TREATMENTS	First Flushing	Second Flushing	Third Flushing	Fourth Flushing	Fifth Flushing	TOTAL Number
T_1 – Fermented Fruit Juice	15.33^{a}	12.00	10.67^{ab}	10.67^{a}	8.00^{ab}	57.00^{ab}
T_2 – Nutrient Solution	15.00^{ab}	13.67	12.00^{a}	10.67^{a}	8.67^{a}	59.33^{a}
T_3 – Gibberellic Acid	12.67^{b}	12.33	11.67^{ab}	10.33^{ab}	7.33^{ab}	54.33^{ab}
T_4 – Urea Solution	13.67^{ab}	12.00	9.67^{b}	9.33^{ab}	7.67^{ab}	51.67^{ab}
T_5 – Cytokinin Solution	13.00^{ab}	12.33	9.67^{b}	8.00^{ab}	6.67^{b}	49.33^{b}
T_6 – Rice Wash	14.00^{ab}	11.67	11.67^{ab}	7.33^{b}	7.33^{ab}	52.00^{ab}
T_7- Control (Pure Water)	12.67^{ab}	12.67	9.00^{b}	8.33ab	5.33^{b}	48.00^{b}
F-RESULTS	**	ns	**	**	*	**
C. V. (%)	8.39	7. 27	7. 69	11.57	12.71	5.57

Note: Means with the same letter are not significantly different using HSD
**-significant at 1% level
*-significant at 5% level
ns- not significant.

Overall, the observed variations in cap numbers highlight the importance of selecting appropriate growth promoters tailored to the specific needs and growth requirements of mushrooms, as different treatments may elicit different growth responses. Variation on the number of caps during the second flushing period in the number of caps did not show any differences across all treatments with an average value ranging from 12.00 to 13.67 caps. Since harvesting of mushroom is carried out when caps

reach a certain size, it is an expected development that the number of mushroom caps will show similarity. Moreover, similar values are also an indication that the harvest is carried out at the optimum time.

During the third flushing period, the highest number of caps was produced by utilizing Nutrient solution, yielding 12 caps. This number was paralleled to the caps produced with the application of Gibberellic acid (T_3) and rice wash (T_6). However, this cap counts were closely similar to the number of caps observed when applying Urea, Cytokinin and the control treatment.

More caps were recorded on the substrates supplemented with Nutrient Solution and Fermented Fruit Juice, with a mean of 10.67 counts during the fourth harvesting period. This was higher than the cap count observed over substrates applied with rice wash, which yielded only 7.33 caps, though not at par with the effect of Gibberellic acid, urea, cytokinin application and water (Control), which produced similarly number of caps.

Table 5. Weight (g) of Mushroom (1st to 5th Flushing) as affected by Growth Promoters.

TREATMENTS	First Flushing (g)	Second Flushing (g)	Third Flushing (g)	Fourth Flushing (g)	Fifth Flushing (g)	TOTAL WEIGHT (g)
T_1 – Fermented Fruit Juice	77.43^{b}	77.80^{b}	76.67^{b}	71.03^{b}	65.40^{ab}	368.33^{b}
T_2 – Nutrient Solution	90.50^{a}	88.67^{a}	87.90^{a}	80.03^{a}	69.00^{a}	416.10^{a}
T_3 – Gibberellic Acid	76.87^{b}	76.87^{b}	75.33^{b}	68.67^{b}	66.70^{a}	364.43^{b}
T_4 – Urea Solution	78.13^{b}	78.90^{ab}	75.80^{ab}	70.67^{b}	67.67^{a}	371.13^{b}
T_5 – Cytokinin Solution	79.47^{b}	79.07^{ab}	78.47^{ab}	73.00^{ab}	66.67^{a}	376.67^{b}
T_6 – Rice Wash	77.93^{b}	81.73^{ab}	77.43^{ab}	72.70^{b}	60.00^{b}	369.80^{b}
T_7- Control (Pure Water)	74.43^{c}	75.10^{b}	60.67^{c}	59.33^{c}	51.70^{c}	321.23^{c}
F-RESULTS	**	**	**	**	**	**
C. V. (%)	0.99	3.28	2.55	2.74	3.54	1.48

Note: Means with the same letter are not significantly different using HSD

**-significant at 1% level.

During the fifth flushing period, growth promoters influence the number of caps. The fruiting bag applied with Nutrient Solution likewise produced the highest number of caps with 8.67 caps while the rest of the treatments had the same number of harvested caps with Nutrient solution while those applied with cytokinin and pure water (control) produced lower number of caps with 49.33 (T_5) and 48.00 (T_7).

This indicates that there is no synchronization in mushroom cap production as the substrates are exposed to the same environmental conditions such as temperature, humidity and light. The analysis of variance revealed significant findings regarding the total number of caps recorded during the last flushing period. Substrate applied with Nutrient Solution recorded 59.33 caps higher than Cytokinin Solution with 49.33 and the control treatment (Pure Water) with 48.00 caps. On the same manner, using Fermented fruit juice, Gibberellic acid, rice wash and urea solution resulted in a comparable number of caps.

Table 6. Biological Efficiency of Mushroom (%) as affected by Growth Promoters.

TREATMENTS	Fresh Weight of Mushroom (g)	Dry Weight of Substrate (g)	Biological Efficiency (%)
T_1 – Fermented Fruit Juice	368.33	723	50.94
T_2 – Nutrient Solution	416.10	790	52.67
T_3 – Gibberellic Acid	364.43	734	49.65
T_4 – Urea Solution	371.13	712	52.13
T_5 – Cytokinin Solution	376.67	725	51.95
T_6 – Rice Wash	369.80	689	53.67
T_7- Control (Pure Water)	321.23	615	52.23

The superiority on the production of more caps from Nutrient Solution application could be attributed from the essential nutrients necessary for mushroom growth as it act as a fertilizer containing mainly inorganic ions from soluble salts of essential elements for optimum growth (Benton, 2005). Fermented fruit juice that composes of trace amount of glucose and sucrose (Hoa and Wang (2015), Gibberellic acid, urea solution that provides a readily available form, supporting healthy mycelial growth and fruiting and rice wash conducive to cell development (Erkel, 2009).

Table 7. Cost and Return Analysis.

	TREATMENT	Total Cost of Production (P)	Gross Income (P)	Net Income (P)	ROI (%)
T_1	Fermented Fruit Juice	60	128.91	68.91	114.85
T_2	Nutrient Solution	75	145.63	70.63	94.17
T_3	Gibberellic Acid	65	127.55	62.55	96.23
T_4	Urea Solution	60	129.89	69.89	116.48
T_5	Cytokinin Solution	70	131.83	61.83	88.33
T_6	Rice Wash	55	138.88	83.88	162.51
T_7	Control (Pure Water)	55	112.43	57.43	104.42

Note: Cost of mushroom = P350/kg (0.35/gram) Cost of fruiting bag/pc = P25.00.

Further, it shows that the inconsistency in the number of caps during the second and fifth flushing periods is due to the time of when the caps reach a marketable size before harvesting. The market price and quality of mushrooms are influenced by their uniformity, thereby waiting time for the caps to fully developed is to be considered.

Weight of mushroom (g)

The inclusion of growth promoters in the substrates led to boost in mushroom yield during the initial flushing period is shown in Table 5. In this phase, the weight measured in the Nutrition Solution showed an increase of about 16.87% compared to T_1, 76.87% on T_3, 23.75% T_4, 13.87% for T_5, and 22.41% compared to T_6 (rice wash) fruiting bags. The differences in yield observed among applications are due to the differences in the number of caps. The significant increase in the number of caps by Nutrient solution can be explained by the fact that nitrogen available can be become available.

The production yields of oyster mushrooms on nutrients during the second, third, and fourth flushes were noteworthy. This indicates that these treatments excel in substrates treated with Nutrient solution, highlighting that mushrooms thrive when this growth promoter is applied. However, apart from the application of Gibberellic acid, which yielded similar to the other treatments, all other treatments demonstrated significant yield improvements.

The analysis of mushroom weight during the fifth flushing period reveals significant findings. With the exception of the fruiting bags treated with rice wash, which exhibited a lighter weight but were comparable to those treated with Fermented Fruit Juice, the remaining treatments consistently produced heavier mushrooms.

The cumulative weight of mushroom caps across the initial five flushing periods showed that the application of Nutrient Solution resulted in the highest yield, averaging to 416.10 grams per fruiting bag. On the other hand, the use of any growth promoters yielded comparable weights, showing their equal effectiveness in producing same weights of mushroom caps while the control treatment produced the lightest cumulative mushroom weight with 321.23 grams.

The heavier caps from the Nutrient Solution are due to the composition of different levels of nutrients separated in two concentrates (SNAP A and SNAP B). As fertilizer and aqueous solution, it contains mainly inorganic ions from soluble salts of essential elements responsible for the growth of higher plants (Benton, 2005).

Biological efficiency (%)

The result revealed the biological efficiency of mushroom on different growth promoters (Table 6). It was found out that the maximum yield of mushroom was obtained when it was cultivated and applied with Nutrient Solution. However, biological efficiency was higher at rice wash (T_6) which attained 53.67 percent. Followed by Nutrient Solution, urea solution, cytokinin, Fermented Fruit Juice and gibberellic acid which recorded the lowest biological efficiency.

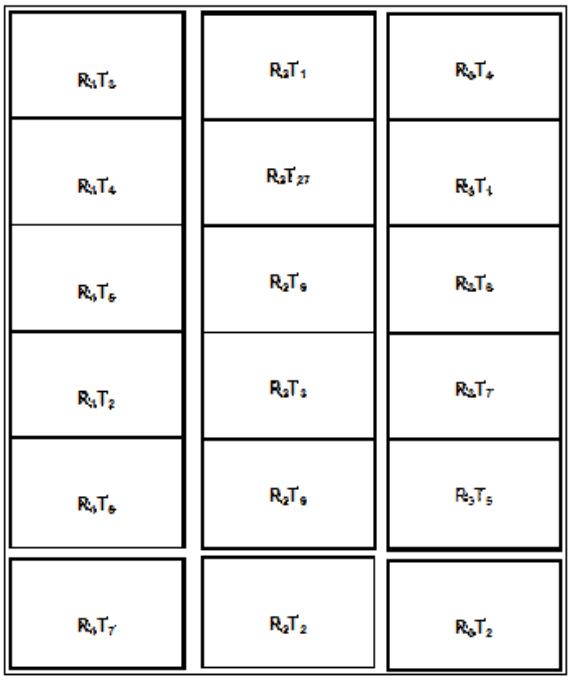

Fig. 1. Experimental Lay Out.

Treatments: T_1 – Fermented Fruit Juice, T_2 – Nutrient Solution, T_3 – Gibberellic Acid, T_4 – Urea Solution, T_5 – Cytokinin Solution, T_6 – Rice Wash, T_7- Control (Pure Water).

When comparing the effectiveness of six different growth promoters for cultivating mushrooms, it becomes evident that the substrate treated with rice wash facilitated the most robust mushroom growth, as indicated by its higher biological efficiency.

The elevated biological efficiency observed in mushrooms cultivated with this promoter could be attributed to the supplements embedded in the extract, which likely accelerated substrate decomposition rates, strain, substrate nutrition, and growth conditions (Mondal, 1990).

Cost and return analysis

The cost and return analysis of mushroom cultivation is shown in Table 7 associated with the utilization of various growth promoters revealed that Treatment 6 (Rice wash) yielded the highest return on investment at 162.51 percent, whereas Treatment 5 (Cytokinin Solution) generated the lowest return at percent 83.33 percent.

Conclusion

The study was conducted to determine the viability of using growth promoters on oyster mushrooms. Six different growth promoters along with pure water as a control, were utilized. The objective was to identify which of the seven growth promoters would enhance production and prove to be more cost-effective in oyster mushroom cultivation. The study followed a Completely Randomized Design, with three replications.

Based on result, regardless of the growth promoter used, mushroom caps maintained similar thicknesses, indicating equal nutrient absorption from the substrates. Rice wash as growth promoter produced the largest cap diameter closely followed in size by Nutrient Solution while mushrooms treated with Fermented Fruit Juice, Cytokinin, and Gibberellic acid also exhibited comparable cap sizes. The application of Gibberellic acid in the fruit body resulted in longer stalks which were comparable to mushrooms treated with Fermented Fruit Juice and rice wash. Differences in the quantity of mushroom caps were observed among various growth promoters applied during the first, third, and fourth flushes as well as the total number of mushroom caps. Among the growth promoters, Nutrient solution yielded the heaviest mushroom caps. Rice wash is the most effective among various growth promoters as indicated by the highest biological efficiency in converting substrate into mushroom biomass. In addition, Treatment 6 (Rice wash) had the highest return on investment at 152.51 %, while Treatment 2 (Nutrient Solution) had the lowest return at 94.17%. Thus, rice wash can serve as alternative growth promotant in mushroom cultivation.

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