# **Development of a Knowledge Test to Assess Knowledge of mushroom Growers about Mushroom and its cultivation**

**Abstract**

Mushroom cultivation is an emerging agri-business venture that requires technical knowledge at various steps of its cultivation. At every stage of a capacity development intervention in mushroom production, assessing the knowledge of participating growers is essential. An attempt has been made to develop and standardize a knowledge test on mushroom cultivation for mushroom growers in Meghalaya. An initial pool of 91 knowledge items was collected, analysed and sent for expert opinion. Pre-testing, calculation of difficulty index, discrimination index and point biserial correlation were carried out by collecting data from 30 respondents outside the study area. 20 items were retained for the final knowledge test. The test was found to be significantly reliable and valid which was indicated by high significant value of reliability co-efficient (0.86) and content validity. The developed test was administered to 120 mushroom growers from three districts of Meghalaya. It was found that the mean knowledge score of the respondents was 9.46. The respondents were classified into low, medium and high knowledge groups based on the mean and standard deviation. The findings indicated that 66.67% of the respondents had a medium level of knowledge on mushroom cultivation. The identified knowledge gaps can further guide various stakeholders involved in capacity building to design effective strategies for bridging those gaps.

Key words: *Mushroom, Knowledge test, Difficulty index, Discrimination index*

**Introduction**

Mushrooms, the fruiting body of macro fungi, is a highly coveted food among different cultures all across the globe. Also known as the ‘Boneless meat’ or ‘White vegetable’, it has unique taste and huge array of nutritional and medicinal benefits which makes it a valuable food product. Mushroom cultivation presents a promising agribusiness opportunity with the prospects to tackle several important challenges, such as efficient resource utilization, promotion of circular economy, employment generation, ensuring sustainability and enhancement of nutritional security. The cultivation of mushrooms has resulted in the generation of revenue, particularly benefiting unemployed youth, farming community, women and self-help groups residing in both urban and rural areas (Jayaram *et al.*, 2024). The agro-climatic condition and the naturally available biomass makes North-east India, well-suited for growing mushrooms; and, hence mushroom enterprise is a promising venture for agri-business in the region (Kadirvel *et al.*, 2018). Its cultivation offers great potential, integrating well with crop- and animal-based farming. Mushroom cultivation requires minimal capital and can yield substantial profits within short span of time. In the Northeastern states, it is emerging as a leading industry. (Baishya *et al.*, 2021; Marak *et al.* 2024). Meghalaya harbours a rich diversity of wild mushrooms—both edible and non-edible—thriving in its forested regions due to its congenial climatic condition. These mushrooms have been harvested and consumed for centuries, enriched by the rich traditional knowledge passed down through local tribes. With the advent of scientific cultivation techniques, several edible mushroom species are now being cultivated for consumption and marketing. In response to the growing demand and the state's potential, several stakeholders are taking initiatives that aims to scale up mushroom production in the state. ​According to the 2023–24 data from the Ministry of Agriculture & Farmers Welfare, Government of India, Meghalaya produced approximately 80 metric tonnes (MT) of mushrooms (INDIASTAT, 2024). ​The figure reflects the state's growing engagement in mushroom cultivation, which is increasingly recognized as a viable agri-business venture.

According to Shirur *et al.* (2019), knowledge on any entrepreneurial venture forms an important basis for making wise decisions in an enterprise. The knowledge of mushroom entrepreneurship is more critical considering various technical steps involved in its cultivation like, spawn production, compost preparation, environment management to suit to different mushroom varieties, pest and disease control, marketing management, processing of mushrooms, etc. (Sharma, 2021). Several studies highlighted that lack of knowledge on various aspects like spawn production, scientific mushroom cultivation technology, post-harvest management, etc. were the major impediments faced by mushroom growers (Mavi and Thakur, 2021; Singh and Singh, 2017; Purnima *et al.*, 2020). Knowledge on various aspects of mushroom cultivation will enable the growers to cultivate mushroom in more scientific and efficient manner.

Given the rising importance of mushroom cultivation, fuelled by increased awareness and high market demand in Meghalaya, various stakeholders are actively involved in capacity development of growers regarding different aspects of mushroom cultivation. The process of extension, as applied to development programmes which intend to carry out planned extension effort, involves five essential phases (SOTER) i.e. Analysis of the Situation, Objectives or Goals to be accomplished, Teaching, Evaluation and Reconsidering*(Leagans, 1961).* Hence, before implementing any interventions, it is crucial to assess the current level of knowledge among mushroom growers.

Keeping these factors in mind, a knowledge test was developed and standardized to assess the knowledge level of mushroom growers of Meghalaya on mushroom and its cultivation. Evaluation of their current knowledge will help in designing the targeted capacity development programmes that addresses their specific gaps and needs, enhance their cultivation practices and improve overall efficiency in mushroom farming.

**Objective:**

To develop a knowledge test and to measure the knowledge level of mushroom growers of Meghalaya about different aspects of mushroom and its cultivation.

**Methodology:**

**Collection and selection of items**

The knowledge test was developed in the line elucidated by Lindquist (1951). A comprehensive list of items, about mushroom and mushroom cultivation were compiled from different sources viz., review of literature like research articles, popular articles, books, discussions with experts and researcher’s personal experience. Items are basically contents which are knowledge questions of the test (Devarani and Bandhyopadhyay, 2014). Initial pool contained 91 no. of items about mushroom and its cultivation, which were in the form of true/false, multiple choice, blanks and picture-based questions for in-depth assessment. These items were edited and organized in logical sequence in such a way that each item represents only one idea without any ambiguity. The correctness and suitability of the knowledge items and the corresponding answers to the study context were evaluated by 3 subject experts from College of Post Graduate Studies in Agricultural Sciences, Umiam, Meghalaya and ICAR Research Centre for North East Region, Umiam, Meghalaya.

The items were subjected to scrutiny by an expert panel of judges to determine the relevancy and screening for inclusion in the final test (Kline, 1986). The questionnaire was sent to 45 no. of experts through google forms on 2nd November, 2024. The experts were to rate the items on a three-point continuum *viz*., highly relevant, relevant and not relevant with scores 3, 2 and 1 respectively. The experts included scientist, professors, subject matter specialist, and few doctoral scholars with minimum two years of research experience in the concerned department by 15th December, 2024, 30 out of 45 experts responded, and their suggestions were incorporated by addition, rewording and deletion of duplicate items. Out of 91 items, 58 items were selected for item analysis based on the mean score of ≥2.8.

**Item analysis**

The items were checked and modified on the basis of pre-testing and administered to 30 mushroom growers of Liarkhla village of Ri-Bhoi district, Meghalaya for item analysis. A score of ‘1’ for correct answer and ‘0’ for the wrong answer was assigned against individual responses. The total correct response was the knowledge score obtained by an individual respondent. Based on pretest responses, item analysis was carried out by calculating difficulty and discrimination index.

Based on total score obtained, the mushroom growers were arranged in descending order and were distributed into 6 groups (G1 to G 6) having 5 farmers each. Only four extreme groups with high and low scores were ruminated for calculation of item difficulty and item discrimination indices.

**Item difficulty index**

Difficulty of an item refers to the relative aggravation faced by the respondents to answer the item or question correctly. Based on the responses, item difficulty was calculated using the formula:

Where,

Pi = Item Difficulty Index,

ni= Number of respondents who answered the question correctly

N= Total number of respondents

**Item discrimination index**

The item discrimination index represented by “E1/3”, indicates how well an item discriminates between a well-informed respondent from poorly informed respondent.

E 1/3 =

Where,

* S1, S2 and S5, S6 are the frequencies of correct answers in the groups G1, G2 and G5 and G6 respectively.
* ‘N’ is the total member of respondents of the sample selected for the item analysis that is 30.

The discrimination index varies from 0 to 1.

**Table 1: Grouping of respondents in pretest for item analysis.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Group of respondents | G1 | G2 | G3 | G4 | G5 | G6 |
| No. of respondents | 5 | 5 | 5 | 5 | 5 | 5 |
| Range of scores | 38-43 | 33-36 | 30-33 | 28-29 | 25-28 | 14-25 |

**Point biserial correlation coefficient**

The main aim of calculating point biserial correlation is to work out the internal consistency of the items i.e. the relationship of the total score to a dichotomised answer to any given item.

rpbis = x √pq

rpbis = Point biserial correlation.

MP = Mean of the total scores of the respondents who answered the item correctly.

MQ = Mean of the total scores of the respondents who answered the item incorrectly.

SD = Standard deviation of the entire sample.

P = Proportion of the respondents giving correct answer to the item.

q= Proportion of the respondents giving incorrect answer to the item (or) q=1-p

Cronbach alpha, Guttman split-half and Spearman brown coefficient were used for testing the reliability of the test developed. Point biserial correlation (Item-total correlation) and experts’ opinion were used for testing the content and construct validity of the test.

The final test was administered to 120 respondents from three districts of Meghalaya—Ri-Bhoi, East Khasi Hills, and West Garo Hills. These districts were selected based on the highest number of mushroom growers. One block from each district was chosen, and four villages from each selected block were identified based on ongoing interventions related to mushroom cultivation being provided by various stakeholders. From each village, 10 farmers were selected, resulting in a total of 40 respondents per district and 120 respondents overall. Each respondent was assigned a score of ‘1’ for a correct answer and ‘0’ for an incorrect answer. The total knowledge scores obtained by the respondents were then categorized using the mean and standard deviation. Data were collected using a semi-structured schedule through personal interviews January, 2025 and analysed using SPSS.

**Results and Discussion**

**Development of the Knowledge Test:**

The results of the item analysis of the 58 knowledge items retained after the relevancy test are summarized in Table 2. The items with ‘p’ values ranging from < 20 and > 80 were considered for the final test to avoid extremely simple and difficult items for further analysis. For item discrimination, items having value within 0.2 to 0.8 were retained. This value describes how well an item discriminates well-informed respondents from poorly-informed ones. Regarding Point biserial correlation, items having significant point biserial correlation either at 1 per cent or 5 per cent level were retained. Point biserial correlation indicates the relationship between the overall score and a dichotomized response for each particular item.

Hence, out of the initial 58 items, 20 were finally retained for the knowledge test. Longchar *et al.* (2025) included 16 items in a knowledge test on nutritional knowledge after conducting item analysis. Similarly, Koyu *et al.* (2019) reported the inclusion of 22 items in the final knowledge test on the package of practices for apple cultivation. The items in the present study were selected based on the following criteria:

• Items with difficulty level indices ranging from 20 to 80.

• Items with discrimination indices ranging from 0.2 to 0.8.

• Items having significant point biserial correlation either at 1 per cent or 5 per cent level.

**Table 2: Difficulty index, discrimination index and point biserial correlation for knowledge items.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sl no. | Frequencies of correct answer of respondents in four extreme groups | | | | Difficulty index | Discrimination index | Rpbis | Accepted/rejected |
| G-1 | G-2 | G-3 | G-4 |
| 1. | 1 | 1 | 1 | 1 | 13.33 | 0 | 0.043 | Rejected |
| 2. | 4 | 4 | 2 | 1 | 53.33 | 0.5 | **.446\*** | Accepted |
| 3. | 4 | 4 | 4 | 3 | 83.33 | 0.1 | 0.218 | Rejected |
| 4. | 3 | 1 | 3 | 2 | 50.00 | -0.1 | 0.050 | Rejected |
| 5. | 4 | 2 | 1 | 1 | 36.67 | 0.4 | 0.352 | Rejected |
| 6. | 0 | 1 | 0 | 0 | 3.33 | 0.1 | 0.131 | Rejected |
| 7. | 2 | 1 | 1 | 2 | 46.67 | 0 | -0.097 | Rejected |
| 8. | 2 | 4 | 3 | 4 | 70.00 | -0.1 | -0.169 | Rejected |
| 9. | 3 | 2 | 4 | 1 | 53.33 | 0 | 0.137 | Rejected |
| 10. | 4 | 5 | 2 | 0 | 56.67 | 0.7 | **.557\*\*** | Accepted |
| 11. | 5 | 4 | 0 | 0 | 40.00 | 0.9 | **.668\*\*** | Accepted |
| 12. | 2 | 1 | 0 | 1 | 23.33 | 0.2 | 0.213 | Rejected |
| 13. | 4 | 2 | 1 | 2 | 43.33 | 0.3 | 0.246 | Rejected |
| 14. | 4 | 4 | 4 | 5 | 80.00 | -0.1 | -0.104 | Rejected |
| 15. | 3 | 2 | 2 | 1 | 50.00 | 0.2 | 0.249 | Rejected |
| 16. | 4 | 5 | 2 | 3 | 73.33 | 0.4 | **.406\*** | Accepted |
| 17. | 0 | 1 | 0 | 0 | 10.00 | 0.1 | 0.053 | Rejected |
| 18. | 4 | 5 | 1 | 1 | 66.67 | 0.7 | **.482\*\*** | Accepted |
| 19. | 5 | 5 | 1 | 3 | 73.33 | 0.6 | **.451\*** | Accepted |
| 20. | 3 | 3 | 1 | 2 | 53.33 | 0.3 | 0.266 | Rejected |
| 21. | 1 | 0 | 0 | 0 | 3.33 | 0.1 | 0.214 | Rejected |
| 22. | 4 | 5 | 1 | 3 | 70.00 | 0.5 | 0.297 | Rejected |
| 23. | 4 | 2 | 4 | 5 | 70.00 | -0.3 | -0.191 | Rejected |
| 24. | 5 | 5 | 5 | 4 | 93.33 | 0.1 | 0.130 | Rejected |
| 25. | 2 | 0 | 0 | 0 | 16.67 | 0.2 | 0.329 | Rejected |
| 26. | 5 | 5 | 3 | 2 | 70.00 | 0.5 | **.482\*\*** | Accepted |
| 27. | 3 | 1 | 1 | 1 | 33.33 | 0.2 | 0.246 | Rejected |
| 28. | 5 | 2 | 4 | 3 | 66.67 | 0 | 0.102 | Rejected |
| 29. | 4 | 5 | 3 | 4 | 76.67 | 0.2 | 0.187 | Rejected |
| 30. | 4 | 2 | 4 | 2 | 60.00 | 0 | 0.256 | Rejected |
| 31. | 2 | 1 | 1 | 2 | 26.67 | 0 | 0.100 | Rejected |
| 32. | 2 | 2 | 3 | 2 | 43.33 | -0.1 | 0.066 | Rejected |
| 33. | 4 | 2 | 3 | 1 | 53.33 | 0.2 | 0.257 | Rejected |
| 34. | 5 | 5 | 3 | 2 | 70.00 | 0.5 | **.482\*\*** | Accepted |
| 35. | 4 | 5 | 3 | 1 | 70.00 | 0.5 | **.514\*\*** | Accepted |
| 36. | 4 | 5 | 2 | 2 | 73.33 | 0.5 | **.474\*\*** | Accepted |
| 37. | 4 | 5 | 2 | 0 | 60.00 | 0.7 | **.601\*\*** | Accepted |
| 38. | 3 | 5 | 1 | 5 | 70.00 | 0.2 | -0.039 | Rejected |
| 39. | 5 | 5 | 5 | 4 | 70.00 | 0.1 | 0.069 | Rejected |
| 40. | 5 | 4 | 2 | 1 | 60.00 | 0.6 | **.570\*\*** | Accepted |
| 41. | 5 | 4 | 5 | 1 | 60.00 | 0.3 | 0.337 | Rejected |
| 42. | 3 | 2 | 4 | 1 | 36.67 | 0 | 0.094 | Rejected |
| 43. | 4 | 3 | 3 | 1 | 56.67 | 0.3 | **.386\*** | Accepted |
| 44. | 3 | 3 | 0 | 3 | 40.00 | 0.3 | 0.120 | Rejected |
| 45. | 0 | 0 | 0 | 0 | 0.00 | 0 | .b | Rejected |
| 46. | 5 | 3 | 4 | 3 | 66.67 | 0.1 | 0.155 | Rejected |
| 47. | 1 | 1 | 1 | 0 | 16.67 | 0.1 | 0.142 | Rejected |
| 48. | 4 | 2 | 3 | 3 | 53.33 | 0 | 0.057 | Rejected |
| 49. | 4 | 3 | 3 | 1 | 46.67 | 0.3 | 0.292 | Rejected |
| 50. | 3 | 3 | 3 | 2 | 50.00 | 0.1 | 0.139 | Rejected |
| 51. | 5 | 5 | 4 | 2 | 73.33 | 0.4 | **.474\*\*** | Accepted |
| 52. | 4 | 5 | 4 | 1 | 60.00 | 0.4 | **.378\*** | Accepted |
| 53. | 3 | 3 | 1 | 0 | 43.33 | 0.5 | **.377\*** | Accepted |
| 54. | 5 | 5 | 4 | 0 | 70.00 | 0.6 | **.634\*\*** | Accepted |
| 55. | 5 | 5 | 4 | 2 | 73.33 | 0.4 | **.474\*\*** | Accepted |
| 56. | 4 | 4 | 2 | 1 | 60.00 | 0.5 | **.388\*** | Accepted |
| 57. | 2 | 3 | 3 | 1 | 40.00 | 0.1 | 0.110 | Rejected |
| 58. | 5 | 5 | 3 | 0 | 66.67 | 0.7 | **.693\*\*** | Accepted |

Split half method was used to compute the reliability of the knowledge test. The test administered to 30 respondents were divided into 2 halves, based on odd and even numbered statements. To quantify the reliability different methods were worked out, but before this 'case processing summary' (Table 3) was calculated to check the valid responses and exclude the invalid one. It was found that all 30 cases (i.e. responses from 30 non-sample farmers) were valid and none of the response was excluded.

**Table 3: Case Processing Summary**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | n | % |
| Cases  (Responses from 30 mushroom growers) | Valid responses | 30 | 100.00 |
| Excluded responsesa | 0 | 000.00 |
| Total | 30 | 100.00 |
| 1. Listwise deletion based on all variables in the procedure.   n= No. of respondents  %= Percentage | | | |

The coefficient of correlation between forms (odd and even items) was 0.764 and Spearman-Brown Coefficient for both equal length and unequal length were 0.866, thus showing high reliability of the knowledge test. The results were in conformity with the studies of Chandhana *et al.* (2022) and Vijayan *et al*. (2023), who found reliability coefficients of 0.78 and 0.8, respectively, and concluded high reliability of the developed knowledge test. Reliability was re-authenticated by Guttman split-half coefficient value, which was 0.854 (Table 3), there by testifying the reliability of the test. This method of reliability triangulation was suggested by Lal *et al.* (2016) while suggesting methodological pathway for the scale development.

**Table 4: Reliability Statistics of knowledge test**

|  |  |  |
| --- | --- | --- |
|  | Total no. of items | 20 |
| Correlation between forms |  | .764 |
| Spearman-Brown Coefficient | Equal Length | .866 |
|  | Unequal Length | .866 |
| Guttman Split-Half Coefficient |  | .854 |

The validity of the test was established on account of both ‘content validity’ as well as ‘construct validity’ (Sinha *et al.*, 2020). Point bi-serial correlation coefficient was used to test the construct validity of the test. About content validity, as explained by Anastasi (1968), essentially involves the systematic examination of the test content to determine whether it covers a representative sample of the behaviour domain to be measured which is knowledge here. Accordingly, all possible statements, covering wide aspects of mushroom cultivation were collected and the same were subjected to measure the difficulty as well as discrimination indices in order to select the final statements. Hence, it is reasonable to consider the developed test to be content valid (Srinivas *et al.*, 2017).

**Assessment of Knowledge level of respondents using the developed Knowledge test**

The developed and validated knowledge test consisting of 20 items was administered to the final 120 sample respondent. The frequency and percentage of respondents who gave correct response to each of the knowledge items are presented in table 5. The respondents were further divided into three categories on the basis of their mean and standard deviation of their knowledge score. The results are presented in table 6.

**Table 5: Distribution of respondents according to their correct response to the knowledge items (n=120)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl. No.** | **Knowledge Items** | **Frequency** | **Percentage** |
| **1.** | Which type of mushroom is typically grown on logs in outdoor environments?  a) Shiitake b) Button c) Cremini d) Lion’s mane | 86 | 71.66 |
| **2.** | Spawn is ready for use when the mycelium has fully covered each grain of the substrate. (True/False) | 69 | 57.50 |
| **3.** | Oyster mushroom can be cultivated using different substrates like paddy straw, wheat straw, oat straw etc. (True/False) | 56 | 46.66 |
| **4.** | Why is pasteurization of substrate important in mushroom cultivation?  a) It increases the temperature for spawn germination  b) It removes toxins from the compost  c) It kills harmful pathogens in the growing substrate  d) It speeds up mushroom growth | 65 | 54.16 |
| **5.** | The straw should be 100% dry for spawning. (True /False) | 56 | 46.66 |
| **6.** | Darkness is often preferred during incubation while indirect light is required during fruiting stage of mushroom. (True/False) | 64 | 53.33 |
| **7.** | The right time to harvest oyster mushroom is when the edges of the caps begin to flatten out but before they start to curl upward.  (True /False) | 47 | 39.16 |
| **8.** | Relative humidity, carbon-dioxide concentration and temperature are important aspects of button mushroom cultivation. (True /False) | 53 | 44.16 |
| **9.** | Mushrooms need to be harvested by light twisting without disturbing the casing soil. (True /False) | 62 | 51.66 |
| **10.** | Mushrooms are source of Vitamin B, Vitamin D, Vitamin E, potassium, calcium, phosphorus (True/ False) | 46 | 38.33 |
| **11.** | Mention 2 diseases of Button mushroom | 50 | 41.66 |
| **12.** | Identify the disease in the picture below?  a) Bacterial blotch b) Wet bubble disease c) Green mould d) Cobweb disease  Ginger Blotch stock photo - Minden Pictures | 36 | 30.00 |
| **13.** | Mention any two medicinal properties of mushroom. | 49 | 40.83 |
| **14.** | Pasteurization of straw for mushroom cultivation can be done in which of the following way:  a) Dipping in hot water  b) Passing the straw through steam  c) Chemical sterilization  d) All of the above | 57 | 47.50 |
| **15.** | Spawn of 3 months old is best for plating. (True/False) | 55 | 45.83 |
| **16.** | Contaminated bags with mold should be separated and discarded.  (True/False) | 48 | 40.00 |
| **17.** | Casing in button mushroom is done to prevent moisture loss from compost and induce fruiting. (True /False) | 51 | 42.50 |
| **18.** | Compared to oyster mushroom, button mushroom requires cooler temperature for cultivation (True/False) | 66 | 55.00 |
| **19.** | Mention at least three materials used in making compost for button mushroom. | 63 | 52.50 |
| **20.** | Which of the following can be used as for casing?  a) Garden soil and sand  b) Decomposed cow dung and soil  c) Sand and lime  d) All of the above | 57 | 47.50 |

Results presented in Table 5 indicate that more than half of the respondents had knowledge about various aspects of mushroom cultivation, including types of mushrooms (71.66%), spawn (57.50%), pasteurization (54.16%), incubation (53.33%), harvesting (51.66%), climatic requirements (55.00%), and compost preparation (52.50%). These findings are in contrast with those of Upamanya *et al.* (2020), who reported that in the pre-intervention phase, respondents demonstrated limited knowledge about pasteurization (18.33%), types of mushrooms (30.00%), climatic requirements (36.67%), and incubation (6.67%). This distinction might be attributed to the fact that respondents in the present study area had already received some exposure to mushroom cultivation through training programs conducted by various institutions such as CPGS-AS, CAU(I), ICAR, the State Government, ATMA and others. In addition, informal learning from fellow farmers actively practicing mushroom cultivation, along with increased exposure to information shared on social media platforms, may have further contributed to their existing knowledge.

Respondents in the present study exhibited limited knowledge regarding mushroom diseases and pests (30.00%) and the nutritional value of mushrooms (38.33%). This aligns with the findings of Koodagi *et al.* (2021), who reported that, based on pre-training knowledge scores, only 12.01% of respondents were aware of the nutritional value of mushrooms and just 4.95% had knowledge about diseases and pests affecting mushrooms. Additionally, only 39.16% of respondents had knowledge about the indication of maturity of the fruiting body of oyster mushrooms, which is in line with the findings of Upamanya *et al.* (2020).

**Table 6: Distribution of the respondents according to their knowledge level on various aspects of mushroom and its cultivation (n=120)**

|  |  |  |
| --- | --- | --- |
| **Categories** | **Frequency** | **Percentage** |
| Low level of Knowledge (<Mean-S.D)  Medium level of knowledge (between Mean ± S.D)  High level of knowledge (>Mean+S.D) | 18  80  22 | 15.00  66.67  18.34 |
| Total | 120 | 100.00 |
| Mean | 9.46 | |
| Standard deviation | 2.94 | |

It is evident from Table 6 that 18.34% of the respondents had a high level of knowledge, while the majority (66.67%) demonstrated a medium level of knowledge in mushroom cultivation. This may be attributed to the information gained through various training programs attended by the respondents. Additionally, around 15% of respondents exhibited a low level of knowledge, possibly due to limited access to training opportunities or insufficient exposure to relevant information.

Similar findings were reported by Rajgolkar *et al.* (2021), where the majority (63.33%) of respondents had a medium level of knowledge, followed by 30% with low and only 6.67% with high knowledge levels. Upamanya *et al.* (2020) also observed that, in their pre-intervention knowledge test, 50% of respondents were in the medium category and the remaining 50 % in the low category. They concluded that the majority of respondents possessed a medium level of knowledge about mushroom production technology, primarily due to information obtained from training institutes, the internet, and other sources.

These findings underscore the importance of ongoing training and capacity-building initiatives to enhance the knowledge levels of mushroom growers. Targeted interventions should focus on bridging knowledge gaps, especially among those with lower levels of understanding, to improve cultivation practices and overall productivity.

**Conclusion**

Mushroom cultivation is increasingly being promoted as a viable and sustainable agri-business venture, particularly for small and marginal farmers seeking to enhance their income and livelihood opportunities. With the expansion of capacity development interventions, it is crucial to assess the current knowledge levels of both prospective and practicing mushroom growers. Ensuring that they possess adequate knowledge about various aspects of mushrooms and its cultivation is essential for the success of different interventions. The knowledge test constructed in the study will serve as a valuable tool that could be used by researchers for evaluating the existing knowledge levels of mushroom growers. The test attempted to cover various aspects of mushroom and its cultivation. The application of the developed knowledge test among mushroom growers in Meghalaya revealed a significant knowledge gap. This can further guide different stakeholders involved in capacity building to design effective strategies for bridging those gaps. The knowledge test highlights the need for continuous training and targeted interventions that are essential to bridge knowledge gaps and enhance mushroom cultivation practices among growers.

**Disclaimer (Artificial intelligence)**

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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