

Factors Influencing Consumption Patterns and Choices for Mushrooms in “Mushroom City of India”, Solan (HP)

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Abstract

Purpose of the present research work is to study mushroom as a popular food & nutrient option in post COVID-19 era; further the work aim to understand the factors that influence the choices and consumption patterns of mushroom consumers. The responses of a sample of 102 respondents have been recorded using a structured questionnaire. These respondents consisted of the visitors to the points of sales for mushrooms in comprising Municipal Corporation area, Solan, (HP). Percentage, Chi-Square and Pearson correlation method were used to analyse the quantitative data collected. The study clearly indicated that mushroom as vegetable is popular among respondents in the study area. White button mushroom is the first preference followed by oyster and Gucchi for respondents. Shape and size followed by price and color acted as the evaluation criteria for mushroom purchase. Education level had a significant positive Correlation with the mushroom consumption frequency. ‘Good for health’ followed by ‘to add variety to diet’ and ‘medicinal value/prosperities’ are the main reasons for mushroom consumption among respondents. The non availability of fresh mushrooms on regular basis in local market led to mushrooms not being purchased.

Keywords: Consumer behavior; Mushroom Consumption; Food markets in India; Purchasing behavior; Mushroom; Mushroom as super food.

Introduction

Increasing population and shrinking availability of agriculture land is the biggest concern for the future generations. Problem of malnutrition is threatening the food security to be provided to the population worldwide. Goal two in United Nations’ agenda 2030 targeted to end hunger, achieve food security, improved nutrition and to promote sustainable agriculture; goal three mentioned to ensure healthy lives and well-being promotion for all as main focus, (UN, Agenda 2030). According to Bringye, B et al.

(2021) the UN agendas are related to the potential benefits of producing and consuming mushrooms and further extended it to goal twelve of UN agenda which targeted to ensure sustainability in consumption and production patterns. The population in countries of developing world like India heavily depends on cereals and more on meat as sources of protein. Such a predicament is forcing the stakeholders to work on nutritious vegetables with higher productivity per unit land. According to Bringye, B et al. (2021) mushrooms may provide answer to above mentioned challenges that humankind is facing today; Kumar, H et al. (2021) and Jegadeesh Raman et al. (2020) mushroom is a rich source of important compounds due to their nutritional and functional properties; Aniket Kadam and Roshan Deshmukh (2021) mushrooms are expected to be considered as “super foods” in the future; Das, A.K. et al. (2021) referred mushroom as next-generation healthy food components due to low content of fat, high-quality proteins, dietary fiber and the nutraceuticals present in it, they are preferred as low-caloric functional foods too.

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Jannatul Ferdousi et al. (2019) reported mushroom as nutritious and dietary supplement and also as an income opportunity to farmers with small land holdings, limited capital and technical knowledge. The importance of mushroom cultivation and consumption has been raised further as the evidences form very recent studies supported its antiviral possibilities against the pandemics i.e. SARS-Cov-2 and COVID-19 (Rangsinth P et al. 2021; Hetland G et al. 2020; Shahzad et al. 2020; Murphy EJ et al. 2020; Jayawardena R et al. 2020; Thota S M et al. 2020; Rahman M M et al. 2020; Yanuck S F et al. 2020). Industry ARC (2021) forecasted the Global Market size of mushrooms for period 2020-2025 and suggested that it is growing at a CAGR of 9.7% and will touch \$49.7 Billion by 2025.

According to Raman J et al. (2018) India has a strategic geographic location for mushroom production and it produced approximately 0.13 million tons showing a CAGR of 4.3% for a period between 2010 - 2017, production of white button mushroom was at the highest i.e. 73% of the total production. K. P. Mohana Priya, et al. (2021) studied the growth of mushroom production for global and Indian context for the period between 2000-01 and 2018-19 and reported growth of 5.55% at global level and 6.13% for India. Fortune Business Insight (2021) valued global mushroom market at 12.74 million ton (MT), 10.25 million ton in Asia Pacific in 2018 and projected to reach 20.84 million ton (MT) by 2026, exhibited a CAGR of 6.41% in the forecast period. Aniket Kadam and Roshan Deshmukh (2021) the mushroom market size was valued at \$33,553.0 million in 2019, and is estimated to reach \$53,342.0 million by 2027, registering a CAGR of 9.3% from 2021 to 2027.

Wakchaure G.C. (2011) reminded that efforts to increase the production without solving its marketing problems would be counter productive and the marketing activities would determine the future of mushroom industry in India. He further said that in India there has not been any serious effort to promote the product.

Classical economist Adam Smith had said once that "Consumption is the sole end and purpose of production" hence the role of consumption got noticed by the researcher Boulding, Kenneth E (1945). On the other hand developing economies are still behaving hesitant in mushroom production as lacking the understanding of consumption patterns/trends/preferences and even the choices of mushrooms consumers, the reason to be quoted is that very few studies has been conducted considering these parameters particularly in Indian

context. The Pligrim's Model (1957) presented food acceptance as a dependent variable of perceptions. It further described the perception as function of three factors i.e. (i) physiological food effects (ii) perception of sensory attributes, and (iii) environment influences. The model also incorporated the time factor with external influences. The basic stimulus response model of consumer behavior by Kotler (1997), mentioned that individual as consumer exposed to market stimuli (product, price, place and promotion), environment stimuli (economic, political, technological and cultural aspects).

The buyer's mental processes visualization has been referred as Black box and the decision for buying included product choice, brand choice, dealer choice, purchase quantity and purchase timing. As far as the consumption of mushroom is concerned according to the studies such as Elizabeth Adegbenjo et al. (2020) recognized the influence of education and income as an important factor on consumers for their choice regarding food. Bernadett Bringye et al. (2021) indicated that educational levels significantly influenced the consumers' consumption for mushroom.

Anwesha Chakrabarti et al. (2019) find that consumers have no preference for special varieties of mushrooms such Shiitake as compared to traditional mushrooms, and consumers only valued the "locally grown" or "organic" labels while purchasing the same. According to Adejo and Ademu (2018) a highest number of people consumed mushroom as a close substitute to meat or fish and for its medicinal purposes; Gurgen et al. (2018) cultivated mushrooms were preferred over its wild varieties due risk of poisoning. Elisa Boin and João Nunes (2018) age, household size, educational levels, and gender were the factors that influenced mushroom consumption.

Gurgen et al. (2018) stated that shape of mushrooms has influenced its purchase the most. Yuan Jiang et al. (2017) recorded that decisions to participate or not to participate in the market and consumption frequency are like freshness of available mushroom and awareness about its health benefits. Mohd Zaffrie Mat Amin et al. (2017) presented the factors such as product attributes, health benefits related information, product quality certification and perception of products having great influence on consumers' purchase of mushroom-based products. Sharma et al. (2017); Raman et al. (2017) reported that white button mushroom holds the maximum share of market. Qiulin Wen et al. (2016) reported low purchase frequency and

volume at Beijing; found that smells, residues of pesticide, extent of product understanding, information given by friends and relatives and packaging influence purchase frequency and volume of edible mushroom significantly; purchase frequency was further influenced significantly by health and safety concerns, place of purchase, degree of brand comprehension, presence/absence of kids in the family similarly volume of purchase influenced by family size and color of the product. Boin and Nunes (2016) referred that white button mushrooms were the most preferred mushroom variety and income was least influencing factor in Portugal.

Further the lack of awareness about the other mushroom species like King Oyster, Oyster and Chanterelle mushrooms was reported as significant. Zhang et al. (2016) indicated that consumers' purchase frequency and volume of edible mushroom are generally low in Beijing. The degrees of understanding about mushrooms, family size, colour of the mushrooms and their packaging have significant influence on consumers to choose mushroom.

Yuan Jiang et al. (2015) reported consumption of fresh mushrooms is higher than processed mushrooms, further the factors such as income, household size, race, age, awareness of health benefits mushrooms, physiological attributes of mushroom's were presented as significant determinants of the mushroom consumption among consumers. Shirur et al. (2014) conducted a study in India (Solan, Town) and concluded that mushroom consumption was relatively less, the white button mushroom again proved its dominance as was most preferred variety, and factors such as colour, shape and size have influenced the purchasing of mushrooms in the market.

Nutritional qualities and addition of more variety in diet were important consideration for consumers during mushroom purchase. Further the awareness of mushroom benefits influenced the consumers' choice for mushroom. In addition to the information presented in above paragraph and review Chenarides L et al. (2020) mentioned in their research that consumer shopping behavior has shown significant changes since the COVID-19 outbreak in early 2020 but the consumption patterns for food seems to stay the same.

In India, there are five mushroom species in commercial cultivation i.e. white button mushroom (*Agaricus bisporus*), oyster (*Pleurotus spp.*), paddy straw (*Volvariella volvacea*), milky (*Calocybe indica*) and shiitake (*Lentinula edodes*). Commercial

markets are dominated by white button mushroom, oyster and paddy straw varieties as these three mushrooms are contributing about 96% of total mushroom produced in India. Himachal Pradesh has started working on mushrooms during the mid of sixties when Dr. E. F. K. Mental from Germany reached Solan as a FAO consultant and developed the modern spawn laboratory in Himachal Pradesh and introduced the button mushroom cultivation.

In 1961, Indian Council of Agricultural Research (ICAR), New Delhi, started first cultivation of the button mushroom (white button mushroom) at Solan, Himachal Pradesh. Now-a-days Solan city is known as the “Mushroom City of India”. In addition the market of Solan is attractive due to high average urban literacy i.e. (90.41%, Census, 2011) and per capita of Rs 3, 94,102 in District Solan (HP Govt. 2018). The review of the literature has highlighted a gap regarding the choice, consumption patterns and factors influencing consumption of different mushroom recipes and types of mushroom among ultimate consumers in general and particularly in study area.

Even no study has been found for last five years which taken into consideration, the factors influencing the consumers behavior towards different recipes of mushrooms. Further in light of the above discussion it is imperative that consumption of Mushrooms in a high potential market like Solan must be revisited in the post-pandemic context, which has seen incomes fall. The insights from study undertaken will help address the challenges of food/ nutritional security from the stand point of marketing/consumer orientation, as it has been observed in literature reviewed above Pligrim's Model (1957), Wakchaure G.C. (2011). Thus, the objectives emanating from the review are:

- To study the frequency of consumption of different mushroom recipes among respondents.
- To identify the most preferred variety of mushroom among respondents.
- To examine the association of income and education levels with the frequency of mushroom consumption.

These translated into the following alternate hypothesis:

H₁: There is a significant difference in the frequency with which different recipes of mushroom are consumed.

H₂: There is difference in the preferences for types of mushroom varieties.

H₃: Higher education among consumers leads to higher frequency of mushroom consumption.

H₄: Higher income among consumers leads to higher frequency of mushroom consumption.

Research Methodology

To establish the research gap and context review of literature has been conducted above. The studies were located from Google Scholar, Research Gate and open access research paper available in databases of Taylor & Francis, Wiley open library and Emerald. The research papers with key words consumer behavior, mushroom consumption, food markets in India and food consumption behavior were reviewed. To locate literature snowball tactic has been used i.e. one research paper was downloaded and the references were searched on the Google Scholar to reach even more studies. The research papers selected for review were those published in English language only. The review of literature included the studies of six years i.e. 2015 to 2021.

This study has been conducted at "Mushroom City of India" in Solan town of Himachal Pradesh as it is a good representative of high potential markets for mushroom given the high literacy rate and high per capita income (Census, 2011) (HP Govt. 2018). The consumers of the town were the research population.

The researcher targeted visitors to the points of sale for mushroom in the city. Convenient sampling has been used to select the sample consisting of hundred and two [102 (64 males and 38 females)] respondents as this study was proposed to be an exploratory study.

The targeted sample was of (100) so structured questionnaires have been administered to (110) respondents. This resulted in 102 complete responses from the respondents hence it was decided to include all in the analysis. The researchers have also tried to introduce the concept of consumer behavior through some earliest theory and model consumption in relation to production and food products.

The gender wise distribution of the sample comprises of more percentage of males (62.75%) as compared to females (37.25%), data reflected that most of the buyers who have visited retailers to purchase mushroom were males as FAO, (2012) reported that male and female both participate in small and big household decisions which affect the welfare of the entire family.

Results and Discussion

Table 1: Demographic Profile of the Respondents.

Demographic Variables	Frequency	Percentage
Gender		
Male	64	62.75
Female	38	37.25
Age		
Below 20 years	6	5.88
20-30	29	28.43
30-40	17	16.67
40-50	34	33.33
50 and above	16	15.69
Marital Status		
Married	67	65.69
Unmarried	35	34.31
Education		
10 th std or below	12	11.76
Higher Secondary	15	14.71
Graduation	52	50.98
Post Graduation	20	19.61
PhD and others	3	2.94
Family Type		
Nuclear	84	82.35
Joint	18	17.65
Monthly Income		
Rs. 10,000-25,000	17	16.67
Rs. 25,000-50,000	35	34.32
Rs. 50,000-1,00,000	38	37.25
Rs. 1,00,000 and above	12	11.76

The age group between 40-50 years was the group to represent the highest parentage (33.33%) in selected sample. The majority of the respondents were married (65.69%) and male respondents comprised of (62.75%), while females were (37.25%). Most of the respondents (50.98%) participated in the study were graduates and for (82.35%) the family type was nuclear. The selected sample consisted of almost equal representation for the 25,000 to 50,000 and 50,000 – 100,000 rupees income groups that is (34.32%) and (37.25%) respectively.

The chi-square statistic is 98.1462. The p-value is < 0.00001. The result is significant at $p < .05$, which means that there is a significant variation in the frequency of consumption as per recipes.

Table 2: Recipes and Frequency of Mushroom Consumption.

Mushroom recipes	Never or Very rarely	Rarely	Occasionally	Most Frequently Or Frequently	Total
Mushroom vegetable	6 (5.88%)	7 (6.86%)	30 (29.41%)	59 (57.85%)	102 -100
Mushroom curry	23 (22.55%)	29 (28.43%)	38 (37.26%)	12 (11.76%)	102 -100
Mushroom Soup	23(22.55%)	20(19.61%)	33(32.36%)	26(25.49%)	102 -100
Pickle or salad	32 (31.37%)	32(31.37%)	14 (13.73%)	24(23.53%)	102 -100
Other recipe	35 (34.31%)	25(24.51%)	21(20.59%)	21(20.58%)	102 -100

The majority of responses for mushroom vegetable are accumulated between frequently to most frequently (57.85%) whereas accumulated responses between very rarely to occasionally for mushroom curry are (76.5%) followed by mushroom soup (72.45%), other recipe (64.71%) and by pickle or salad (62.75%). This shows that mushroom vegetable is the only recipe which is consumed frequently/regular basis by the respondents. For all the five listed classes of mushroom recipe, the “most frequently” has received relatively lesser score, this indicates that apart from mushroom vegetable, other forms of mushroom recipes are not popular among populace and frequency of mushroom consumption is also on the lower side. Though, mushroom is an exotic vegetable, its popularity has been rising ever since its introduction of commercial cultivation in India starting from early 1980’s. However it is yet to find regular place in commoner’s kitchen.

Table 3: Preferred variety of mushroom among respondents.

Varieties available	1st Preference	2nd Preference
White button mushroom	83 (81.37%)	12 (11.76%)
Oyster mushroom	13 (12.75%)	60 (58.82%)
Paddy straw mushroom	1 (.98%)	7 (6.86%)
Shitake mushroom	3 (2.94%)	7 (6.86%)
Other mushroom	2 (1.96%)	16 (15.69%)

Preferences of respondents for different mushroom varieties (expressed as percentage).

The chi-square statistic is 100.3123. The p-value is < 0.00001. The result is significant at p<.05. The table above depicts the preferences of respondents for different mushroom varieties. The (81.37%)

respondents said white button mushroom is their first choice while only (accumulated score, 18.63 %) preferred other varieties as their first choice. Among other preferred varieties as first choice, oyster mushroom received highest response (12.75 %) followed by shitake mushroom (2.94 %). Paddy straw and other mushroom were preferred by very few respondents as first preference. Among the “Other” category, the most preferred mushroom is the one available in local market; which includes Guccchi (Morchella) the naturally grown mushroom. Oyster mushroom scored the highest frequency percentage (58.82%) as the second preference followed by other mushroom such as shiitake mushroom and paddy straw mushroom in that order. Mayett et al. (2006) and Shirur et al. (2014) reported that, white button mushroom was widely consumed.

Table 4: Educational Qualification and Mushroom Consumption Frequency.

Variables		Educational Qualification	Mushroom Consumption Frequency
Educational Qualification	Pearson Correlation	1	0.32*
	(Two Tailed) Sig. (P Value)		0.001
Mushroom Consumption Frequency	Pearson Correlation (Two Tailed) Sig. (P Value)	0.32*	1
		0.001	

*p<0.01, **p<0.05

Above table shows the association of educational levels of respondents with their mushroom

consumption. The value of correlation coefficient is 0.32 which means there is a positive correlation between educational qualification and mushroom consumption. The p value is 0.001, from which it can be concluded that there is a significant positive association between the education qualification and mushroom consumption. Boin and Nunes (2016) had received the same results for their study. This is implying that it is once again found that higher education level among consumers' results in more frequent consumption of mushrooms.

Table 5: Association between Income and Mushroom Consumption Frequency.

Variables		Income	Mushroom Consumption
Income	Pearson Correlation	1.00	0.17
	(Two Tailed) Sig. (P Value)		0.087
Mushroom Consumption	Pearson Correlation	0.17	1.00
	(Two Tailed) Sig. (P Value)	0.087	

*p<0.01, **p<0.05

Table above shows the association of income level of respondents with their mushroom consumption. The value of correlation coefficient is 0.17 which denotes that there is a weak positive correlation between income levels the mushroom consumption. The p value is 0.087 from which it can be concluded that it is not significant.

Conclusion

The study concluded that the mushroom consumption among the respondents is on lower side and it is most frequently consumed as vegetable and other recipes are not that popular, alternate hypotheses (H_1) has been accepted as the different recipes of mushroom are consumed with a significant difference of frequency. The reason behind may be the lack in promotional activities. It is further found that white button is the first choice followed by oyster mushroom for maximum of the respondents; hence hypotheses (H_2) got accepted with its significance.

Research hypotheses (H_3) has also been accepted which assumed that higher education among consumer's leads to higher frequency of mushroom consumption; as the relationship between the two variables was positive and significant. Research hypotheses (H_4) assumed that higher income among consumers leads to higher frequency of mushroom consumption got rejected as income had shown a positive but weak correlation for the tested variables.

Practical Implications: The results will definitely help the mushroom growers, food processors, retailers and small entrepreneurs to make efforts towards popularising the different recipes of mushroom beyond its use as vegetable only. The varieties other than white button mushroom are also needed some specific attention of policy makers, mushroom growers, food processors, retailers and small entrepreneurs in terms of promotional strategies. 'Good for health' followed by 'to add variety to diet' and 'medicinal value/prosperities' can be used as promotional campaign theses to make it interesting and memorable for the consumers.

The positive correlation between educational qualification and mushroom consumption will help the entrepreneurs to decide the target market. All thorough the study reported a weak correlation between incomes levels the mushroom consumption but it is positive, which may be provide a lead to the future researchers in the field and can be used as the second variable for market segmentation and further research.

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