



Research Article

Analysis of Consumer Perceptions Regarding Mushroom Consumption in Their Regular Diet: A Case of Western-India (Gujarat)

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Abstract | Mushrooms have high nutritional value. They are a rich source of protein and fiber and have very low calories and low cholesterol. Days are not far when mushrooms will be a regular alternative to vegetables for many vegetarians. India is having a favorable environmental condition to grow mushrooms. Hence various varieties of mushrooms are grown in different regions of India. However, the per capita consumption of mushroom in India is very less as compared to other countries though mushroom has many health benefits as compared to other regular diets a normal Indian consumes. Gujarat is one of the states of India where the consumption of mushrooms is less. The paper concentrates on finding out the probable reasons for the people of Gujarat who are not consuming mushrooms regularly in their diets. The survey was conducted targeting the majority of youngsters *i.e.*, Generation Z as the eating habits of present youngsters will define the mushroom market in the future. However, to know the perspective of millennials as well as baby boomers, people from those age groups were also included in the survey. There were 213 responses on the questionnaire which contained 14 questions. The survey results show that 16% of the people consider mushrooms as non-vegetarian, about 14% of the people were not cleared whether they have consumed mushrooms in their lifetime. Among those who are regular mushroom eaters, 50% preferred eating button mushrooms and almost 32% of the people preferred Oyster mushrooms. Through the results, it can be concluded that people have a misconception regarding mushrooms as almost 16% considered mushrooms as non-vegetarian. The result will enable many young mushroom entrepreneurs to develop the relevant marketing strategy by understanding the consumer perception regarding mushroom consumption in their regular diet.

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Introduction

The population of India is increasing, with this increase, there is a rise in the burden on the agricultural supply. Malnutrition is also one of the biggest problems which India as a nation face. Such challenges need to be highlighted with a newly structured way of Agri-business. High-quality

mushrooms can be an alternative to normal agriculture products and eventually decrease the burden on such products. Mushrooms can be considered as a future vegetable as it has high nutritional value, they are a rich source of protein, they add very fewer calories after consumption. India produced around 12,97,82 metric tons of mushrooms, of which Gujarat state alone contributes around 8.6% of the production

(ICAR-DMR, 2016). However, if we see the per capita consumption of mushrooms in India, it is comparatively very less as compared to the other countries of the world like the USA, UK, *etc.*

Consumption of mushrooms has also been limited among people especially those who are vegetarians due to certain myths associated with it. There are certain instances, where people still consider mushrooms as non-vegetarian food. Mushroom doesn't come under the animal kingdom. They are not associated or derived from animals hence mushrooms can be considered as vegetables and even can be consumed by vegans. However, this knowledge is not transferred to the people. Moreover, many of the consumers, who are looking for mushrooms in the market are not getting them at the right time as the availability and visibility of packed mushrooms is very less in the market. In the later part of the paper, all the probable reasons for the people not consuming or buying mushrooms often, have been covered in a detailed manner.

Scientifically, mushrooms are the fruiting body of the fungi which represents its short life cycle (Das, 2010). Mushrooms neither come under the animal kingdom nor directly or indirectly derived from animals, hence they cannot be considered non-vegetarian. The total mushroom variety on earth is estimated at around 1,40,000. Among all the species only 10% of species are known to mankind which is around 14,000. If among the unknown species of mushrooms, only 5% of the beneficial species are found which is around 6300 species, it will provide ample benefit to humans (Hawksworth, 2001). However, in India, the total number of known species of mushrooms is approximately 850 (Deshmukh, 2004). The Scientific research and research as well as the collection of them started in the 19th century in India and is going to date as every year new species of mushrooms are found with their new kind of medical use (Kaul, 2002).

Mushrooms can be considered as very healthy food. They are a rich source of protein with very few calories, fats. Moreover, mushrooms are gluten-free and low in sodium. Mushrooms have high digestibility and are considered a potential source of muscle protein (Kalač, 2009). Moreover, a lesser-known fact regarding mushroom is that it is a rich source of Vitamin-D which is not present in any other food supplement (Pehrsson *et al.*, 2003). The increased amount of mushroom consumption can

save India from malnutrition as mushrooms provide prompt protein to the body (Raman *et al.*, 2018). The low protein consumption in Indians leads to the problems of fatigue, laziness, low, slow release of brain hormones, and poor immunity. As far as the proximate composition of the mushrooms is concerned, mushrooms have high protein, however, the protein content in mushrooms depends upon the species, harvesting time, the composition of substratum, and pileus size (Bano, 1982) (Pileus is the horizontal portion of the mushroom which bears the tubes, gills, *etc.*). The protein content ranges from 8.9% to 38.7% in *Pleurotus* species of mushroom on a dry weight basis (Bano, 1982). The fats which are present in the mushrooms are unsaturated fatty acid. The majority of the mushrooms have fats ranges from 2% to 3%. The crude fat ranges between 1.08% to 9.4% with an average crude protein in *Pleurotus* species at 2.85% (Bano, 1982). Apart from high protein and fewer fats, mushrooms are also a high source of vitamins. Mushrooms are a rich source of Vitamin B (Mattila, 2000). Moreover, mushrooms also have high mineral composition. The minerals like Na, K, Ca, Mg, S, P, and other microelements like As, Cr, Cd, Cu, Fe, Mo, Co, Mn, Ni, Pb, Se, Zn are also present (Bano, 1982).

Mushrooms are also used as medicines for a very long time. They have been used as medicines since the Neolithic and Palaeolithic ages (Samorini, 2001). It has been reported that in ancient times mushrooms were used to cure some of the skin diseases in old age people. Moreover, mushrooms are also been used as medicines during pandemics like AIDS. Mushrooms have antimicrobial, anti-inflammatory, antitumor, and immunomodulatory properties (Singdevsachan, 2014).

The global mushroom market was USD 50,034.12 in 2019 which was USD 29,427.92 in 2013. Hence for six years, there was an increase in the market of around USD 20,606.20. Global exports of canned mushrooms accounted for 4,58,137 tons in 2008 which was 3,65,967 tons in 2004, with China leading and contributing about 87% in volume basis in total exports (Karthick and Hamsalakshmi, 2017).

Mainly five types of mushrooms are mass-produced in India. Among the total production, 70% of the mushroom produced is exported, which shows less domestic consumption of it. The five types of mushrooms grown are White button mushroom,

Oyster mushroom, Paddy straw mushroom, Milky mushroom, Shiitake mushroom (Raman *et al.*, 2018). These different types are grown in different regions of India as they required a specific type of environmental condition to grow favorably. Among all the five types of mushrooms, the white button mushroom holds the maximum share *i.e.* 73% of total mushroom production in India, while the Oyster mushroom holds a 16% share (Sharma *et al.*, 2017). Till the 1980s the growing of mushrooms was restricted to the then state of Jammu and Kashmir and the northern part of Himachal Pradesh. However, due to constant research and development and also changing eating habits it has spread across the north-eastern and west Bengal region of India (Chadha, 1994). Paddy straw mushrooms were grown first time in India by Thomas and his associates in Coimbatore, India (Karthick and Hamsalakshmi, 2017). Rajasthan and Gujarat mainly grow Oyster mushrooms. Gujarat contributes around 8.6% of the total mushroom production of India. One of the mushroom units in Vadnagar in Gujarat called Himalaya International Private Limited has a capacity of 10,000 tons per annum. There are mainly two types of mushroom growers in India, they are seasonal growers and others are the growers who are growing mushrooms round the year in uncontrolled conditions. The total white button mushroom grown from seasonal and high tech cultivation unit is around 94676 unit metric ton among which 8500 metric ton is button mushroom grown from Punjab and Haryana which accounts for 9% of the total national production (Sharma *et al.*, 2017).

Although mushrooms have huge medicinal and health benefits as mentioned in the above paragraphs, the per capita consumption of mushrooms in India is very less as compared to other countries of the world. Over the years, even though the consumption of fresh mushrooms has increased in India but comparing to the other countries as Indian per capita mushroom consumption is around 90 grams per year which is 1.49 Kgs in the USA, 1.16 Kgs in China (Raman *et al.*, 2018). The consumption of mushrooms in Gujarat is comparably less due to the myths associated among the people as well as the Gujarati cuisine is mainly Vegetarian with a sweet tinge in it. If we closely observe the Gujarati cuisine, desserts and sweets are an essential part of it with dairy products contributing their major share in the daily meal (Lakhani, 2018). Hence mushroom is very less consumed as a daily or regular food among the people of Gujarat. However,

proper marketing and passing the relevant information about the health benefits of mushrooms among the youths can be an initial step, where mushrooms can enter into their daily diets.

Materials and Methods

The research was conducted by floating a detailed questionnaire to the people of Gujarat. The people who participated in the online survey were either people residing in Gujarat or belong to Gujarat. The survey was conducted keeping in mind to target the majority of generation Z. The survey was distributed through the snowball method, which means that initially, the survey form was given to five people. Among them, three belong to generation Z, one belongs to generation X and the remaining one belongs to generation Y. Initially, the two people from generation X and Y were kept just to make sure that in the end, the survey results should have representation from that age group also. A total 213 people responded to the online survey and filled the questionnaire. As the method of floating the survey form was a snowball, hence there was no control of maintaining the proportion of representation of a single age group. However, as the initial form was given to the majority of generation Z. Hence, the final responses have the majority of generation Z.

The analysis was done using Microsoft excel. According to the data, the percentage was calculated and the most important factors contributing while buying the mushrooms were determined. Similarly, the most common reasons for not buying or consuming mushrooms were determined, and according to which the strategy was determined for the marketer to market the brand of the mushroom in the domestic market.

Results and Discussion

The study concentrates to find out the touchpoints where the marketers who are involved in the domestic business of mushrooms can concentrate to develop their marketing strategy and increase the domestic mushroom consumption in Gujarat. As mentioned earlier the study focuses on finding out the main factors influencing while buying the mushrooms, identifying the main reasons of the people of Gujarat not often buying or consuming the mushrooms, finding certain myths associated with the consumption of them,

and finally through the analysis, developing the key strategies which marketers can use to market the mushrooms domestically in Gujarat as well as other parts of India. Similar kinds of efforts were made by Lucier *et al.* (2003). Moreover, Mayett *et al.* (2006) Mexico observed that though there was a steady increase in production and consumption of the mushrooms there was no proper consumer behavioral analysis on this subject.

Table 1: Profile characters of all the respondents who participated in the survey.

Criteria	Category	No. of respondents	Percentage (%)
Age (years)	Generation Z	151	69.27
	Generation Y	19	8.72
	Generation X	48	22.02
	Baby boomers	0	0
Gender	Male	134	61.47
	Female	84	38.53
Education	Higher School or less	9	4.13
	Higher secondary	17	7.80
	Graduation	128	58.72
	Post-Graduation	64	29.36
Marital status	Single	153	70.18
	Married	65	29.82
Gross family monthly income (INR)	<10,000	10	4.59
	10,000-25,000	36	16.51
	25,001-50,000	28	12.84
	50,001-75,000	31	14.22
	75,001-1,00,000	11	05.05
	>1,00,000	30	13.76
	Prefer not to share	72	33.03

Profile characters of the respondents

As mentioned earlier, a total of 218 people participated in the survey. Among the total survey participants, as mentioned in Table 1, there were the majority of people from the youngest generation i.e. from Generation Z. The generation group was categorized as per the standard generation age breakdown. According to it, people born in and after 1996 will be under generation Z, those who are born between 1977-1995 will be generation Y, born between 1965-1976 will be under generation X, born in between 1946-1964 will be under baby boomers. They were 151 out of 218, which is 69.27%. The next group of people was from generation X, which was 48 i.e. around 22.02%. And the remaining 8.72% belong to generation Y.

There was no one from the baby boomer generation. Among the respondents, 61.47% were male and the rest were female. Moreover, the majority of the people were graduates. Almost 58.72% of the respondents were graduates while 29.36% of the people were post-graduates. It was observed that income and education level shows a positive correlation with mushroom consumption, which means as the income and education level of a person increases, the mushroom consumption will also increase (Shirur *et al.*, 2014). In the survey taken, the majority of the people have preferred not to share their income. However, among those who have shared their monthly gross income, the majority of the people fall in the category of Rs 10,000-25,000 monthly gross family income. Moreover, a majority of our respondents fall under generation Z, hence 70.18% of total respondents are single.

Have you ever consumed mushrooms?

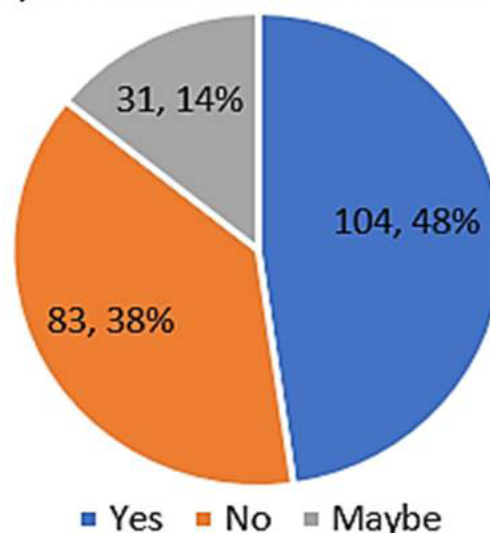


Figure 1: Mushroom consumption by the respondents according to the survey results.

Certain myths and lack of awareness among the people of Gujarat regarding mushroom

To get a better understanding, whether the respondents have previously consumed mushrooms, a question was asked which was aimed just to know how clear they are about their consumption of the mushrooms. The result was surprising, almost 14% of all the respondents were not clear whether they have consumed the mushrooms before in their life or not. About 31 people i.e. 14% of the people have opted for the 'maybe' option given in the form which clearly shows their lack of clarity. This also gives an indirect message that maybe they would have never seen mushrooms in their lifetime, hence though they

would have consumed them while having pizza or any Punjabi cuisine, but they might not be aware of consuming mushrooms with it. Moreover, almost 38% of people have never consumed mushrooms. Figure 1 shows the details of the mushroom consumption of the respondents.

A question was included in the survey asking respondents their perspective on whether they consider mushrooms as vegetarian food or non-vegetarian food. As discussed in the above part of the paper, the mushrooms are fungus and they don't come under the animal kingdom nor they derived from animals, hence they are not non-veg. Even it will be not wrong to consider mushrooms as vegan food. However, the survey results show some myths associated with the Gujarat people regarding the mushroom. According to Figure 2, almost 16% of the respondents still believes that mushroom is the non-vegetarian food. This shows the misconception the people of Gujarat carry regarding the mushrooms. Somewhere, the communication by the companies or the players who are involved in this sector has not been efficient and clear enough. To increase the domestic consumption of the mushroom, it is essential that such myths among the people can be broken. And such myths can only be broken through proper communication by using different media channels and innovative ways of marketing.

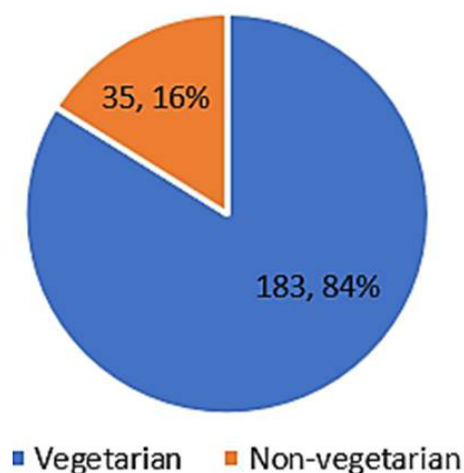


Figure 2: Veg or non-veg consideration of mushrooms by the respondents according to the survey results.

The mushrooms have high nutritional value, they are a rich source of protein, they have low fats, lacks calories, a rich source of vitamin B, minerals and have medicinal value. Though mushrooms have high benefits, and they are worth consuming, but the question is are

the common people aware of these benefits the mushroom provides. The survey which was conducted had a question asking people whether they are aware of the nutritional value that mushroom brings after consuming it. Among all the respondents 22% of the respondents were unaware of the nutritional values of the mushrooms as shown in Figure 3. Though the education level of the respondents in this survey is high as the majority of them are graduates, however, the low awareness regarding the nutritional aspects of mushrooms within them was shocking. Moreover, proper communication through appropriate channels to the right audience can help increase awareness regarding the nutritional aspect.

Table 2: Preference for different varieties of mushrooms by the respondents.

Mushroom variety preference	No. of respondents	Percentage (%)
White button mushroom	110	50.50
Oyster mushroom	69	31.70
Paddy straw mushroom	38	17.40
Milky mushroom	44	20.20
Shiitake mushroom	14	6.40
Others	16	7.30

Preference for different variety of mushrooms

In the USA 94% of the people prefer white button mushrooms followed by portabella mushrooms (Patterson, 2003). Mayett *et al.* (2006) reported that the white button mushroom was the most widely consumed *i.e.* 77% while the mushrooms like *Pleurotus* and shiitake mushroom were consumed about 22.1% and 0.2%, respectively. Table 2 shows the results of the survey which displays the interest and preference of the mushroom varieties by the respondents. About 50% of the people have chosen white button mushroom as their most preferred mushroom variety for consumption. This was also quite expected as white button mushroom is the most grown mushroom variety in India and can be easily available in the Indian market. Moreover, the next preferred variety is Oyster mushroom with 31.70% of the respondents opting for it. In Gujarat, oyster mushrooms are mainly grown as the environmental condition of the state supports the growth of it. The oyster mushroom is then followed by the paddy straw mushroom, milky mushroom, and shiitake mushroom with 17.40%, 20.20%, and 6.40%, respectively.

Table 3: Probable reasons for not consuming mushrooms by the respondents.

Reasons	No. of responses	Percentage (%)
My family members/children don't like a mushroom to eat	107	49.10
Mushrooms are not often available in the market	96	44.00
I don't know to make different recipes of mushroom at home	88	40.40
Higher prices of mushrooms as compared to the available vegetables in the market	47	21.60
I am doubtful whether mushrooms will be poisonous	42	19.30
I am not aware of the nutritional value of the mushrooms; hence I don't consume	41	18.80
I am unaware/unsure from where to buy the mushrooms	41	18.80
Mushrooms are fungus, and I will never eat a fungus	38	17.40
Mushrooms that are available in the market are not fresh	36	16.50
Different varieties of mushrooms which I require are not available in the market	36	16.50
I think mushrooms are not tasty	25	11.50
Mushrooms cannot be stored for longer period	16	7.30
Mushrooms are grown in compost; I find disgusting to eat them	15	6.90
Others	8	3.66

Reasons for not consuming / buying mushrooms

It is very important to know the important reasons behind the less buying or consumption of the mushrooms. Finding out the reasons would help us to develop the strategy accordingly and eventually the consumption of the mushrooms among the common people can be increased. In the survey, thirteen different reasons were given to the respondents as a choice. They were allowed to choose more than one option. Table 3 shows the detailed results.

As per Table 3, almost 50% of the people do not consume mushrooms because their family members or their children do not like mushrooms. This means the products or the end product of the mushroom is not attractive enough that is demanded by the children of the house. This can be an opportunity in disguise. The second most rated reason behind not buying the

mushrooms so often is their non-availability in the market. Shopkeepers with the fear of their mushroom will get spoil due to the less demand that is not at all keeping them in the shops. This creates a negative effect by disappointing people who are in need to buy the mushrooms. Shopkeepers can use their existing cold storage infrastructure to store mushrooms so that the customers who are coming genuinely looking for it, their demand can be fulfilled. The third most rated reason is the lack of knowledge regarding the different recipes that are made by using mushrooms. Around 40.40% of the total respondents feel that they do not know any specific recipes to make different dishes from mushrooms. About one-fourth of the total respondents were worried about the price of the mushroom which is higher than that of the normal vegetables available in the market. While 20% of the total respondents said that they are fearful of consuming mushrooms as sometimes mushrooms can be poisonous. For such people, awareness regarding white button mushrooms, the oyster mushroom should be made which are not poisonous. Once the people will be out of fear, they will start consuming mushrooms regularly. There are other various reasons like they are not aware of the nutritional value of the mushrooms, lack of awareness regarding the place to buy the mushrooms, mushrooms are fungus hence they would not consume them, fresh mushrooms are not available in the market, different varieties of mushrooms are not available in the market, mushroom lacks taste, mushrooms cannot be stored for a longer time, mushrooms are grown in compost and they find disgusting to eat them apart from the other main rated reasons. About 3.66% of the total respondents also opted for other reasons which included lack of storage facility at home, no habit of eating mushrooms, etc.

Factors influencing the buying decision

To know the factors which influence the buying decisions of the mushrooms, the survey included the options to rate the given factors as important, neutral, not important. The results of the responses have been displayed in table 4. As per the results, taste is one of the important factors which influence the buying decisions of people. The taste factor got about 53.67% of the vote as an important factor. This means that people will buy mushrooms if at all it is tasty. Hence, it is very necessary to spread awareness regarding the tasty dishes that are made out of mushrooms. Another important factor after taste is the Brand which has

received 45.41% of the rates. The role of a brand plays a very important role in food and beverages. Branding the mushrooms will give a sense of trust to the consumers and hence people will be more oriented to buy them. Looking at the present scenario, in the Gujarat market, there are very few companies that are selling mushrooms under the name of a specific brand. The packaging is the third important factor with almost 44.50% of the total respondents consider it as important.

Table 4: Factors influencing the buying decisions while buying mushrooms.

Factor	Criteria	No. of responses	Percentage (%)
Taste	Important	117	53.67
	Neutral	48	22.02
	Not important	53	24.31
Brand	Important	99	45.41
	Neutral	52	23.85
	Not important	67	30.73
Packaging	Important	97	44.50
	Neutral	62	28.44
	Not important	59	27.06
Variety to diet	Important	97	44.50
	Neutral	52	23.85
	Not important	69	31.65
Making restaurant type of food	Important	97	44.50
	Neutral	52	23.85
	Not important	69	31.65
Shape and size	Important	79	36.24
	Neutral	61	27.98
	Not important	78	35.78
Colour	Important	72	33.03
	Neutral	62	28.44
	Not important	84	38.53
Price	Important	53	24.31
	Neutral	55	25.23
	Not important	110	50.46

Mushrooms are perishable, moreover, people are not aware of the proper procedure of storing mushrooms at their houses. Hence, looking at such constraints packaging of the mushrooms is one of the important factors and could be a unique selling proposition of any company that is looking forward to increasing their domestic reach. The next two important factors are adding variety to the diet and making restaurant-type food at home with each one getting the same

rating of about 44.50%. The interesting thing is the factor which is least considered is the Price. The price factor received 24.31% of the total respondents. Moreover, almost half of the respondents don't consider price as an important factor while buying mushrooms. Hence, the previously mentioned fact about the positive correlation between income and mushroom consumption is correct.

Do you know mushroom has high nutritional value?

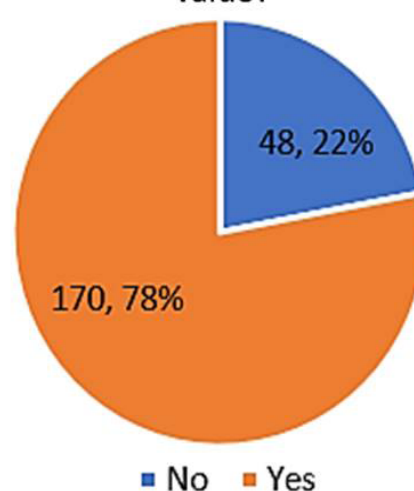


Figure 3: Awareness regarding the nutritional value of mushrooms among respondents according to survey results.

Strategies for the marketers

After knowing the various reasons of the people behind not often buying the mushroom for their consumption as well as finding out the most rated factors which influence the buying decision of the customers, a marketing strategy can be developed. A sales funnel can be developed and according to which awareness can be spread to the people. Some of the points are highlighted below, which marketers can consider while developing their marketing strategy to increase the reach and consumption of mushrooms domestically. The points are: (i) promoting mushrooms specifically with their interesting tasty recipes would be a key strategy to lure people to buy them. As 40.40% of the people who participated in the survey said that the lack of knowledge regarding the recipes of mushrooms doesn't motivate them to buy the mushrooms. Hence providing them new recipes will motivate them to buy; (ii) creating a brand name in the market can help in increasing sales. Branding a product gives a sense of trust to the consumers. Moreover, the brand plays an important role as one of the factors influencing the buying decision (45.41%); (iii) introducing some unique products like ready-to-

make or ready-to-cook items made up of mushrooms can be a path-breaking idea. It has been observed that India is going to be an emerging market for such ready-to-cook food items, entrepreneurs can see this as an opportunity and introduce mushroom products in this segment. This will also lead to the demand from the family members and children and eventually, the major reason for not buying or consuming mushrooms can be solved; (iv) stressing on market visibility and availability of mushrooms by the shopkeepers. Visibility is a very important factor for any product irrespective of whether they are available at a modern trade outlet or general trade outlet; and (v) spreading awareness regarding the mushroom is one of the most important criteria. The awareness is required regarding the myths associated with it as still mushrooms are considered as non-veg food, they are considered unhealthy as they are fungus. Such kind of myths should be eradicated. Moreover, communicating their nutritional benefits to humans can motivate people to buy mushrooms more often. Such communications can be carried through social media campaigns by posting relevant ads, posts, and video content.

Conclusions and Recommendations

Out of the total production of mushrooms in India, about 70% of the produce is exported. This is because the domestic consumption of mushrooms is very less. As compared to other countries the per capita consumption of mushrooms in India is very less. This doesn't mean that there is no potential in the domestic market. The purpose of the paper was to find out the points knowing the typical behavior of the consumer of the Gujarat state while buying the mushrooms and eventually knowing the potential of the domestic market. Hence, the factors influencing the buying decision, the reasons for the people not buying or consuming the mushrooms often, preference of different mushroom variety, the myths associated with it as well as the certain points regarding the unawareness of the nutritional aspects were analyzed. The results depict that certain points can be considered by marketers or entrepreneurs who are exploring to disrupt the domestic market while developing the marketing strategy to increase the domestic reach of the mushroom. There are huge potentials in the domestic markets for mushrooms but the needs of the consumers should be closely analyzed first and accordingly the communication for the product should be carried out.

Novelty Statement

According to the author's knowledge there is no comprehensive work and published research on analysing the consumer perception regarding the mushroom consumption for the western part of India i.e., Gujarat State.

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