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Export competitiveness of Indian mushroom Industry: Present status and future prospects

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ABSTRACT

Mushrooms are increasingly considered as a high value crop, and consumer demand for mushrooms markedly expanded in the recent years. Although requiring different conditions and practices compared with traditional field crops, mushrooms are a viable option for the small and marginal scale growers. A mushroom farming business can be a mean of big profit in just a few weeks with considerably low startup capital investment. A person who has basic knowledge in the cultivation techniques of mushroom growing, and has an own growing yards, mushroom farming will be the perfect option for him to gain the higher profits. Realizing the health promoting benefits of mushrooms and economic returns offered by its cultivation, many new generation farmers started venturing into its business. As mushroom production is increasing constantly, more people are looking for the information on export potential of mushrooms from India. We made an attempt to collect the information from the APEDA and FAO stat to study the export competitiveness of mushrooms produced in India and discussed our observations in this paper.

Keywords: Comparative advantage, global trade, Indian mushroom industry

Mushrooms form a significant form of new generation food as it is rich in protein, vitamin-D, antioxidants, and has been recorded for their therapeutic effects across the globe (Gupta *et al.,* 2018). Mushrooms always catch the attention due to its multidimensional usage such as eradicating malnutrition, residue recycling, environment protection and generating employment. In the process, we have been able to use the huge quantities of agro-wastes (> 700 million MT) that are generated through our farming practices and make them useful for cultivation of mushrooms. Once recycled, they become the source of organic matter that could viably be incorporated into the soil as well enabling productivity of the soil. There is a wide spread concern during the viral pandemic that, reverse migration may leads to higher incidence of rural poverty in India. Mushroom being the high labour intensive agricultural activity; it has the potential to absorb the excess rural labour into a productive activity and can reduce the disguised unemployment. Further, the process of mushroom cultivation has been a cottage industry providing employment opportunities to the educated youth in their areas. While we dwell upon varieties of mushrooms that can fetch good yield, it is also essential that we should have holistic package of practice and innovations thereof to boost this sector not only as a production activity, but also as a social sector enabling food and nutritional security in the country (Shirur *et al.,* 2016).

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Extensive elucidations focusing on the efficient health promoting properties and high nutritional values of mushrooms have been expanded dynamically from the past few decades. Due to its high quality of proteins, polysaccharides, unsaturated fatty acids, mineral substances, and secondary metabolites, mushrooms have always been appreciated for their vital role in protecting and curing various health problems (Sharma and Annepu, 2018). The recent spurt in nutraceutical significance of mushrooms and their usefulness in health care, the socio economic status of mushrooms has scaled significant heights the world over. Though mushroom production is of recent origin in India, it ranked 6th in the world mushroom production with a total production of 1,82,000 MT of mushrooms accounting for 1.53% of the total world mushroom production (FAO Stat, 2019). China ranked 1st with 75% of the world mushroom production during the same year which followed by Japan, USA, Poland, Netherland and other countries (Fig.1)

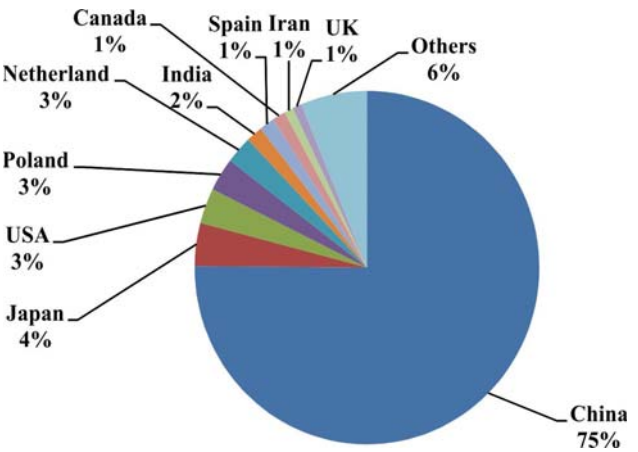

Fig. 1. Global status of mushroom production, 2019 (Source: data used for the graph is from APEDA)

There are three types of mushrooms cultivated in India at commercial scale *viz.,* white mushroom, paddy straw mushrooms, and oyster mushroom (Sharma *et al.,* 2017). White button mushroom is the most popular and accounts for 35-40% of the total mushroom cultivated around the world and >75% of the mushroom produce at national level. Uttar Pradesh, Tripura, and Kerala are major mushroom producing states in India. Odisha is the highest producer of mushroom in India for the year 2020-21 accounting for 10 per cent of the country's total mushroom production, which is followed by the states like Maharashtra, Bihar, Haryana, Punjab, Rajasthan, Himachal Pradesh, Gujarat and Uttrakhand. In terms of growth rate, Madhya Pradesh, Chhattisgarh, Jharkhand, Rajasthan and Assam witnessed highest growth in mushroom production in last 5 years. The total mushroom production in India increased at the rate of 14.86 per cent during the period. Around 10 states in the country has the growth rate more than the national average growth rate of 14.86 per cent showing that the states have the potential in mushroom production and policies should focus on the necessary infrastructure, supply chain and market facilities in these states.

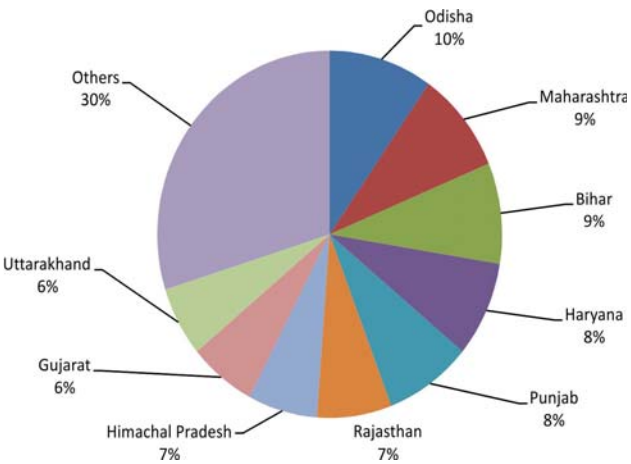

Fig. 2. State wise share of total mushroom production in India, 2020-21

Mushroom trade and export trends

The total mushroom exports including the processed, preserved, fresh mushrooms and mushroom spawn have increased by 26 per cent and the imports has reduced by 43 per cent during 2020-21 compared to its previous year trade of 2019-20. This shows, despite COVID-19 restrictions imposed on trade of commodities by several countries, India has extended its exports of mushroom to various countries like Bhutan, Nepal, Tanzania, Canada,

Table 1. State wise compound annual growth rate of mushroom production (metric tons) (2016-2021)

State	CAGR (%)
Andhra Pradesh	0.95
Arunachal Pradesh	23.25
Assam	76.02
Bihar	66.70
Chhattisgarh	139.93
Delhi	1.04
Goa	10.97
Gujarat	6.11
Haryana	5.91
Himachal Pradesh	12.65
Jammu and Kashmir	32.30
Jharkhand	99.72
Karnataka	1.45
Kerala	2.99
Madhya Pradesh	140.28
Maharashtra	13.86
Manipur	3.93
Meghalaya	6.70
Mizoram	6.78
Nagaland	6.75
Odisha	8.31
Punjab	0.69
Rajasthan	86.71
Sikkim	18.92
Tamil Nadu	4.18
Tripura	10.67
Uttar Pradesh	13.78
Uttarakhand	7.99
West Bengal	35.94
Total	14.86

Germany, France, Hong Kong in case of dried or preserved mushrooms. Fresh mushrooms are exported to the countries Nepal, France and Bhutan, whereas mushroom spawn is exported to mainly Nepal, Bhutan and Sri Lanka. Some dried/preserved mushroom is imported from China and mushroom spawn is imported mainly from Netherland and France. The quantity of preserved mushroom exports has reduced to the extent of 89 per cent compared to the previous year of 2019-20, it may be because of the COVID – 19 restrictions imposed on the trade between the countries in terms of safety, tariffs, restricted and safe operation of flights etc. Whereas, the exports of fresh mushrooms has been increased by 250 per cent compared to the previous year.

Analyzing the growth rates and its instability for the period from 2016 to 2021 for different categories of mushroom showed that fresh/chilled mushrooms and mushroom spawn has highest significant growth rate along with less instability index for export from India. Whereas, the processed mushroom exports witnessed insignificant negative growth associated with high instability index. The export policies should favor fresh mushroom and mushroom spawn exports.

Revealed Comparative Advantage (RCA)

The Revealed Comparative Advantage is given by the formula give below,

$$Rij = (Xij / Xit) / (Xwj / Xwt)$$

Where,

Rij = Revealed comparative advantage ratio for India in product,

Xij = India's exports of product j,

Xit = Total exports of India,

Xwj = World exports of product j,

Xwt = Total world exports.

The RCA ratio is the share of a given product in a country's exports to its share in world exports. A country is said to have the revealed comparative advantage in the product if the ratio is greater than one. The RCA ratio less than one implies a disadvantage. The ratio is influenced by the individual countries' internal and external trade policies like

Table 2. Compound growth rate (%) and Instability index of mushroom exports (2016-2021)

Category of mushroom	Growth Rate (%)		Instability Index	
	Q (ton)	Value (Rs. Lakh)	Q (ton)	Value (Rs. Lakh)
Mushrooms of the Genus *Agaricus*, Provisionally Preserved	-9.74	-29.2	103.2	104.4
Mushrooms of the Genus Agaricus, Dried But Not Further Prepared	-88.1	-95.9	22.1	24.7
Mushrooms of the Genus *Agaricus*, Fresh/Chilled	132.2**	278.9 **	40.1	54.7
Mushrooms of the Genus *Agaricus*, Prepared/Preserved Otherwise Than By Vinegar/Acetic Acid	- 39.2 *	-25.3	79.3	117.7
Mushroom Spawn	80.8*	151.1 *	43.6	36.8
Total	606.7	- 89.0 **	32.1	29.6

Source: Author's calculation using the data from APEDA, 2021

government interventions, import restrictions, subsidies and high tariffs, etc. Thus, a disadvantage may not be a true picture of the comparative status, but it may also indicate that the trade policies are not in favour of the exports of the produce.

Table 3. India's export potential of fresh and canned mushroom

Parameters/ years	2015	2016	2017	2018	2019
RCA	0.21	0.15	0.06	0.01	0.01
RSCA	-0.65	-0.73	-0.88	-0.98	-0.98

Source: Author's calculation using the data from FAO stat, 2019

Revealed Symmetric Comparative Advantage

This is an extension of RCA using which RSCA index is calculated, RSCA = RCA-1/ RCA+1. If RSCA index obtained is less than zero, then commodity has a disadvantage in its export or if the RSCA index is greater than zero, then the commodity has revealed symmetric comparative advantage in exporting the commodity. The Revealed Comparative Advantage (RCA) and Revealed Symmetric Comparative Advantage (RSCA) values for mushroom (fresh & canned) exports from India was less than one for the period 2016-2021, showing that India has export policies in favor of domestic markets. There is a need to focus on the export competitiveness to boost its mushroom exports in future.

CONCLUSION AND FUTURE PERSPECTIVES

The current situation presents a huge opportunity to move away from the traditional marketing channels and explore direct to consumer models. Moreover, since life after the pandemic would revolve around becoming self sufficient and self employed due to shrinkage of income generating opportunities, it is pertinent that youth transition smoothly from education to economic activity; making the most of the now available smart farming tools, supply chain management, processing of farm produce, and allied activities such as mushroom cultivation for steady income. There is a tremendous scope for reviving the lost mushroom capacity & cut the imports & boost the exports to North America & EU & further diversifying mushroom exports by including other mushroom species like medicinal mushrooms. Major export destinations for Indian mushrooms are European countries, USA and Hon Kong. Button mushroom accounts for approximately 95 per cent of whatever small volume of mushrooms being exported as of now. Although the current share of India in world exports is minuscule at less than 1 percent, India has a great export potential. European Union and the United States are the biggest markets; Poland and China are the biggest competitors for Indian mushrooms. The countries in Middle East & Southeast Asia can emerge as potential markets for

Indian mushrooms. International trade promotion support can be extended to large scale mushroom production units to revive and further boosting of exports

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