



# Mushroom Production in Ethiopia and Its Significance in Ethiopian Food Access: A Review Paper

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## Abstract

*This review mainly aims at the importance of mushroom production in Ethiopia for nutrition security and for alleviation of poverty. It promotes mushroom cultivation in Ethiopia instead of looking at fungi in forests, as we will no longer hunt future possibilities within the forests that grow naturally. The production of horticultural crops like mushrooms is economically valuable in this international conversion. From the overall evaluation of the test, mushroom production in Ethiopia is extremely crucial to achieve meals and dietary safety, clinical value, organic density, and soil fertility. The production of mushrooms has become more important for Ethiopia because it has favorable agro-climatic areas that deserve its production, and its production substrate is certainly waste agriculture products with the aid of merchandise. On the other hand, the use of waste-utilizing merchandise as mushroom substrates is considered a protective environmental pollutant.*

**Keywords:** Bio-conservation, Edible fungi, Medicinal value, Nutrition security

## 1. Introduction

Mushrooms are the fleshy, spore-bearing fruiting bodies of fungi, often found above ground on soil, other food sources, decaying plants, or sometimes on live plants.

Mushrooms are one of the most cherished items due to their benefits and distinct tastes (Ramamurti and Getalakshmi 2015). Mushrooms are a special group of macro-fungi that possess distinctive sporocarp, which are typically produced as either

epigeous (above ground) or hypogeous (underground) and are large enough to be seen with the naked eye and to be picked by hand (Cheung, 2008). It can be consumed in various forms, like fresh, pickled, dried, powdered, canned, etc. Its farming has picked up a fast pace among contemporary entrepreneurs owing to its nutritional and medicinal benefits and low-cost input with high output. Mushrooms are fleshy fungi (Basidiomycota, Agaricomycetes) having a stem, cap, and gills underneath the cap (Ramamurthi and Geethalakshmi 2015). They can be edible, and some of them can be toxic, too. It contains more than 90% water and less than 1% fat, is loaded with Vitamin B, copper, and selenium, and is low in sodium (Ramamurthi and Geethalakshmi 2015).

Mushroom is a delicious food consumed throughout the world. It is also called the future vegetable, as it guarantees food security, solves malnutrition problems, and has medicinal value. The world production of mushrooms is growing and now exceeds three million tons, worth a market value of 10 billion USD. Major mushroom producers China, the USA, and the Netherlands share 47%, 11%, and 7% of the world supply, respectively. The remaining about 35% of the total production was from Italy, France, Poland, Ireland, the United Kingdom, Canada, and India (Harsh and Joshi, 2008). Nowadays, mushroom farming is being practiced in more than 100 countries, and the production of mushrooms reached 23 million metric tons, and the production is increasing at the rate of 7 percent per annum. The world market for the mushroom industry in 2014 was valued at over \$59

billion, where China as the leading producer and exporter. Global per capita consumption of mushrooms is reported to range from 9 to 14 kg per year, Europeans, Americans, and Asians being the leading consumers (Mekuria *et al.*, 2023).

In the world, it is estimated that a minimum of 14,000 species of fungi can be considered mushrooms (Lu *et al.*, 2020; Boa, 2004). From the above estimation, at least 2000 species are edible (Lu *et al.*, 2020). In Ethiopia, there are many varieties of mushrooms grow especially in forests, but the consumption habits of mushrooms and the practices of humans in one-of-a-kind elements of Ethiopia have not been well documented until this period (Sitotaw *et al.*, 2020). Even if Ethiopia becomes rich in mushrooms, it no longer reap the same significant benefits as other world nations. In Ethiopia, mushrooms are widely known as Ye-Jib Tilla (የጅብ ጥላ) to mean Hyena's Umbrella, Ye-abahoy fes (የአባሆይ ፈስ) to mean fart of Monk, and Dem Astefy (ደም አስተፈ) to point to the causes of vomiting of blood. The mushroom collections widely come from wild forests, although in the past few decades, there have been flourishing efforts to grow exotic mushroom species and marketing both local and few volumes of exports by private sectors. The earlier research and capacity-building efforts of Doctor Dawit Abate of Addis Ababa University, later other public universities, and research organizations played a pivotal role in advancing mushroom farming to reach its current levels (Abate, 1995; Mekuria *et al.*, 2023).

Now, the growing hobby has evolved over the last decade in assessing the mushroom and human interaction amongst exceptional regions in Ethiopia (Abate, 1995; Kalkidan, 2010; Sitotaw et al., 2020). Therefore, this review is initiated to show the great role of mushrooms in improving food self-sufficiency, nutrition security, reduction of malnutrition and poverty and enhancing the bio-economy in Ethiopia.

## **2. The Start of Mushroom Production in Ethiopia**

The presence of inadequate food supplies then the coming of diminishing quality of health and living standards, and increasing environmental deterioration in a certain parts of the country are the key underlying problems that affect the future well-being of humanity in the area. The magnitude of these problems seems to be increasing as the world's population continues to grow. For this matter, the continuous effort of needing a solution becomes a main concern of the country.

Ethiopian food is mainly based on cereals like maize, sorghum, wheat, and teff, which are low in their protein content. The addition of a mushroom recipe to the Ethiopian food diet will close the protein gap and improve the overall health of the economy and economically disadvantaged communities. In the past, mushrooms were considered an important vegetable and were popular with wealthy people for cooking purposes. Currently, most ordinary people consider mushrooms as a quality food because of their health benefits (Das, 2014).

Mushroom cultivation has almost a new activity in Ethiopia in the last decades. As well as being a method of bioconversion of non-edible plant biomass into nutritious food, mushrooms are a cash crop, the market for which is growing worldwide (Abate, 1995). This being a new activity for Ethiopia, she has a lot of opportunities for mushroom cultivation. Among those opportunities, there is a favorable climate, comparatively abundant land and labor, as well as reasonably good water resources that created ample opportunities for mushroom production (Kiflemariam, 2008).

However, the cultivation of mushrooms in Ethiopia is not sustainable as people who joined the business are continuously flowing out of the market, and in turn, the level of product to be supplied is declining year to year. As a result, Ethiopia is not benefiting from mushrooms as the rest of the world is (Kalkidan, 2010). While wild mushrooms are harvested in forests in Ethiopia during the rainy season, they are not a staple part of the diet and were not cultivated previously. Research on mushroom cultivation in Ethiopia started in 1993 at the Department of Biology, Addis Ababa University (Abate, 1995).

Currently, mushroom production in Ethiopia is in increasing manner because they contain many essential amino acids and are thus good sources of protein, and some unsaturated fatty acids; provide several vitamins (B vitamins, and vitamin D) as well as the minerals potassium, phosphorus, calcium, and magnesium (Abena *et al.*, 2023)

### **3. Current Status of Mushroom Production in Ethiopia**

In Ethiopia, there is no huge commercial mushroom farm that can reach the demand of large cities and towns. According to the market survey conducted in 2006/07 in Addis Ababa, the supply of fresh mushrooms is close to zero. Currently, some small-scale producers sell their products to large-scale producers. Large-scale producers produce, buy, process, and export mushrooms. These show that the Cultivation and business of mushrooms is an untouched and wholly vacant business sector in Ethiopia. Therefore, research and training support is critically needed at all stages (Abena *et al.*, 2023). Despite the growing demand, the Ethiopian supply is generally poor, and local companies import most mushrooms from China: while cottage farmers sprang up to fill the demand, they lacked training, and types of equipment such as storage, and contamination often ravaged their production was common to lose 30-40% of a crop to mold and bacteria (Kalkidan, 2010). To put a clear line on the current status of mushroom production in Ethiopia, it is too difficult because it increases in some years and decreases in others (Alem, 2021).

### **4. Significance of Mushroom Production in Ethiopia**

#### **4.1. Income Generation**

Research results showed that between the years 1997-2016, Ethiopia exported mushrooms to a total of twelve countries (Alem, 2021). The country exported an average of 68.3 tons of mushrooms per year,

and from this, she earned an average of 1,042,889.49 Ethiopian birrs and which was equivalent to USD 23,530.9 per year from the exported mushrooms. This implies that the country can generate income from the production of mushrooms, which in turn can be used to satisfy other food choices. On the other hand, there are producers, especially in Addis Ababa, who directly sell to Hotels and Restaurants for local consumption. The Population growth of Ethiopia is increasing drastically, so a non-green alternative called mushroom cultivation is one of the best ways to address this challenge (mushroom cultivation as a source of income generation) because mushrooms grow on litter without needing extra soil (Asfaw, 2022). Finally, the production mushroom needs a little labor; therefore, used as an employment opportunity at the same time.

#### **4.2. Food Value**

Nowadays, mushrooms are popular and valuable food worldwide because they contain many essential amino acids and are thus good sources of protein, and some unsaturated fatty acids; provide several vitamins (B vitamins, and vitamin D) as well as the minerals potassium, phosphorus, calcium, and magnesium (Abena *et al.*, 2023). Wild mushrooms were rich in carbohydrate and protein content and were low in fat content (Weldekiros *et al.*, 2017). Mushrooms have been used as food in Ethiopia, particularly in the southwestern part of the country. Mushrooms are locally called by different names in different regions of the country, and the habit of mushroom consumption differs from region to region. Some studies indicated that wild

edible mushrooms gathered from the natural forests and utilized as a food source in southern Ethiopia. For example, hunting wild mushrooms is a traditional and cultural practice in Kaffa ethnic groups (Abate, 2014).

The importance of mushroom cultivation for food and nutrition security is high. The great benefits of mushroom-derived dietary supplements, medicines, and new foods are already available in the global markets (Abena *et al.*, 2023). Mushrooms are nutritious food source, being rich in protein, vitamins, and minerals. They are also known to contain substances that enhance the immune system, fight infectious diseases, and lower blood pressure and cholesterol levels (Dawit, 1998). Different ethnic groups in Ethiopia have good traditional knowledge and practices in the utilization of wild edible mushrooms. The Ethiopian population is increasing at an alarming rate, which can directly influence the livelihood of the communities as a whole by increasing the demand for food. Thus, domestication and cultivation of indigenous varieties of mushrooms by using cheap agricultural wastes can be taken as a solution for food insecurity, environmental pollution, and unemployment (Abena *et al.*, 2023).

#### 4.3. Medicinal Value

Mushrooms can be used as medicine for compromised health, and their crude extract products can mainly be used as dietary supplements (Abena *et al.*, 2023). In addition, they contain various bioactive molecules such as polysaccharides, terpenoids, glycoprotein, antimicrobial compounds, antioxidants, etc. can play a

significant role in the treatment of many ailments, such as improving the immune system, lowering the level of cancer in the body, and lowering blood sugar (Asfaw, 2022). Moreover, it has been found that few mushrooms produce various bioactive phenolic compounds, such as pyrogallol, polysaccharides, flavones, ascorbic acid, and carotenoid compounds, which can be used to control multiple diseases, including antitumor, antimicrobial, antioxidant, and antihypertensive, hypocholesterolemic, and hepatoprotective activities (Asfaw, 2022).

#### 4.4. Bio-conservation

The production of indigenous varieties of mushrooms by using cheap agricultural wastes for this matter mushroom production is considered a solution for food insecurity, environmental pollution, and unemployment (Abena *et al.*, 2023). Mushrooms, along with some bacteria, are valued for their ability to degrade lignin, organic matter on the forest floor (Antonella *et al.*, 2013). Lignin is a polymer and hence very strong and found in tree tissues, responsible for strength, keeping trees upright in high winds and gravity, and hard to break down.

Mushroom secretes extracellular enzymes and acids that break down lignin into simpler molecules, then utilized for their growth and metabolism, consequently as humus, rich in nutrients (Semwal *et al.*, 2014). Moreover, according to Semwal *et al* mushrooms form a mycorrhizal association with tree roots, and with the mutual association, the host plant gains more mineral nutrients (Nitrogen, Phosphorus, and Potassium), increasing tolerance to stresses and the fungi receive carbon

compounds from the tree and optimized environment to grow and survive well.

## 5. Challenges of Mushroom Production in Ethiopia

The production of mushrooms in Ethiopia has been considered among small and large-scale farmers in the last years. Even if the production of mushrooms gets this opportunity, some problems still affect mushroom production in Ethiopia. Mushroom cultivation is a new activity in Ethiopia (Abate, 1995). The present study shows that some districts like Menge are rich in wild mushroom diversity and associated indigenous knowledge. However, anthropogenic factors, together with the loss of indigenous knowledge and very poor conservation efforts, threaten the survival of economically and ecologically important mushrooms in the area (Sitotaw *et al.*, 2020). While wild mushrooms were harvested in forests in Ethiopia during the rainy season, they are not a staple part of the diet and were not cultivated previously. This makes the growth of mushroom production more or less slow.

In Ethiopia, mushrooms are widely known as Ye-Jib Tilla (የጅብ ጥላ) to mean Hyena's Umbrella, Ye-abahoy fes (የአባሆይ ፈስ), to mean fart of Monk and Dem Astefy (ደም አስተፈ) to mean to the causes of vomiting of blood (Mekuria *et al.*, 2023). This different naming of mushrooms in the society has negative implications to fasten mushroom production in Ethiopia, as these local names have negative meanings in the society.

The other challenges of mushroom production in Ethiopia are the lack of an institutionalized sector for mushroom cultivation and utilization, lack of the availability of quality spawn, limitation of skills and experience among mushroom cultivators, lack of marketing system and there is no national quality control mechanisms and safety assurance (Abena *et al.*, 2023). On the other hand, it clearly stated that the major constraint to mushroom production in Ethiopia, was the lack of spawn vegetative seed of mushrooms (Abate, 1995). Some of the constraints beyond the capacity of mushroom producers include the high cost of spawn and substrate, a lack of quality spawn, extension services, and market access (Woldemedhin *et al.*, 2016).

It is known that Ethiopia has a favorable agro-climate, topography, relatively low-cost labor, and rich fungal biodiversity. However, the government of Ethiopia has a poor response to mushroom production, and hence, currently, a huge amount of mushrooms is imported into the country (Tensaye *et al.*, 2022). There are still some gaps in training and awareness programs of technology transfer to the farmers or local population regarding mushroom utilization and cultivation (Teferi *et al.*, 2013; Kalkidan, 2010; Woldemedhin *et al.*, 2016). A review of existing literature on mushroom studies of the country indicated that the fungal resource of the country is poorly studied, documented, and not properly utilized (Ayana, 2021). Even if the mushroom is abundant in the country, the practice of cultivation is very poor, and if

present, it is mostly restricted to urban areas (Abate, 2014; Weldekiros *et al.*, 2017).

## 6. Opportunities for Mushroom Production in Ethiopia

It is obvious that Ethiopia has a positive agro-climate (characterized by having tropical, subtropical and temperate agro-climatic regions), topography, easy trainable and cheap labor source, and rich fungal biodiversity (Tensaye *et al.*, 2022) and the desired uncooked materials to grow mushrooms are abundant in Ethiopia (Abate, 1995). Agro-commercial waste like cereal straw, grass straw, cotton waste, corn cobs, coffee pulps, sawdust, animal dung, chicken manure, and brewers' spent, is produced in huge amounts and it becomes an exciting substrate, due to its industrial exploitation, as well as related environmental problems (Silva *et al.*, 2012). The societies of Ethiopia are often considered smooth trainable societies. Consequently, farmers are willing to be involved as key participants in sustainable programs if they are compensated for their work in cash by long contracts; they prefer that the collection site is not very far from their homes and to collect mushrooms in groups. Urban consumers want to buy and pay for Ethiopian wild mushrooms and are interested in the sustainable production of mushrooms (Agúndez *et al.*, 2022). The most common opportunities include the availability of spawn and substrate and increasing local consumers' awareness about the nutritional value of mushrooms. In addition, special attention given by the government to urban agriculture in general

and to mushrooms in particular provides the opportunity for mushroom producers to expand their business (Woldemedhin *et al.*, 2016).

## 7. Conclusion

The formal and commercial cultivation of mushrooms in Ethiopia was very late rather to the hunting and eating of wild mushroom varieties from the forests nearby the surrounding. Mushroom cultivation has great importance for food and nutrition security, income generation, medicines, bio-conservation and soil fertility. Having such importance and available agro-climatic conditions for its production, the production of mushrooms in Ethiopia is still very fraction. This is clearly shown in large cities like Addis Ababa the supply and demand doesn't match, and owners of hotels, supermarkets and restaurants import for their foreigners, visitors, and Diaspora customers. Moreover, the population of Ethiopia is increasing greatly, which needs to increase the demand for food to satisfy nutrition security. Thus, domestication, preparing training, and giving awareness to the society to increase the cultivation of indigenous varieties of mushrooms by using cheap agricultural wastes can be taken as a solution for nutrition insecurity, environmental pollution, and unemployment.

## 8. References

- Abate, D. (1995). Cultivation of the Mushroom in Ethiopia: Department of Biology, Addis Ababa University, P. O. Box 1176, Addis Ababa, Ethiopia

- Abate D. (2014). Wild mushrooms and mushroom cultivation efforts in Ethiopia. *WSMBMP Bulletin*, 11. Environmental Science, Agricultural and Food Sciences
- Abena T, et al.(2023). The Nutritious Food Mushroom: Cultivation, Benefits and its Diversity and Utilization in Prospective of Ethiopia. *Food Sci & Nutri Tech* 2023, 8(3): 000306
- Agúndez, D; Tadesse, W; Dejene, T; Martín-Pinto, P; Soliño, M (2022). Wild mushroom potential in Ethiopia: An analysis based on supplier and consumer preferences. *Forest Systems*, Volume 31, Issue 2, e006. <https://doi.org/10.5424/fs/2022312-18934>
- Alem S. (2021). Trends of Mushroom Trade in Ethiopia. *Global Journal of Agricultural Economics, Extension and Rural Development*: Available Online at [www.globalscienceresearchjournals.org](http://www.globalscienceresearchjournals.org)
- Antonella A., Valeria, T & Giovanna, C.V. 2013. The Bioremediation Potential of Different Ecophysiological Groups of Fungi. In: E.M. Goltapeh, Y.R. Danesh and A. Varma (eds.), *Fungi as Bioremediation*, *Soil Biology* 32, Springer-Verlag Berlin Heidelberg, pp. 29-49 (doi: 10.1007/978-3-642-33811-3\_2)
- Asfaw MD (2022) Wilde Mushrooms: the Neglected Plant in Ethiopia. *J Nutr Food Sci*. 12.874.
- Ayana, D. A. (2021). Fungal communities associated with forests in the Afromontane region of Ethiopia (Doctoral dissertation, Universidad de Valladolid).
- Boa E. (2004). Wild Edible Fungi: A Global Overview of Their Use and Importance to People. *Non-wood Forest Products*. *Env Sci*. 2004.
- Cheung, PCK (2008). *Mushrooms as Functional Foods*. A John Wiley & Sons, Inc., Hoboken, New Jersey. 280p.
- Das D(2014) Commercial Utilization of Mushroom Cultivation: The Case of Assam. *Int J of Soc Sci*. 2014;2(12):58-66.
- Harsh, N.S.K. and Joshi, K., (2008). *Mushrooms: The vegetable of the future. Science and technology for rural India and inclusive growth: Science and Technology*, India.
- Kalkidan S. (2010). Analyzing the mushroom market in Ethiopia. Unpublished master's thesis, Addis Ababa University, Addis Ababa, Ethiopia.
- Kiflemariam Y. (2010). Contribution of small-scale mushroom cultivation for food security in the Amhara region, Ethiopia. *Amhara Region Food Security Network*, 26-27 th August, Bahir Dar, Ethiopia.
- Lu, H., H. Lou, J. Hu, Z. Liu and Q. Chen (2020). Macrofungi: A review of cultivation strategies, bioactivity, and application of mushrooms. *Comprehensive Reviews in Food Science and Food Safety*. 19:2333–2356. DOI: 10.1111/1541-4337.12602
- Mekuria Tadesse, Melaku Alemu, Dawit Abate, Nega Nigussie, Tilahun Zegeye, ShashoMegersa, Birhanu Gizaw, Zerihun Tsegaye, Tadessa Daba, Dina Ermias, Esaya Tena, Alene Admas,

- Fantahun Woldesenbet, Mulatu Workie, Dejene Girma, Fekadu Gurmu, Leta Tulu, Tefera Tadesse, Betemariam Kebede, Tesfaye Disasa, Firew Mekbib, SisayFeleke, Mulissa Jida, Tesfaye Alemu, Diriba Muleta and Ibsa Fite. (2023). Atlas of Mushrooms: Global versus Ethiopia. Volume I, First Edition, EIAR, Addis Ababa, Ethiopia. 80p. (PDF) *Atlas of mushrooms: global versus Ethiopia*. Available from: [https://www.researchgate.net/publication/374743753\\_ATLAS\\_OF\\_MUSHROOMS\\_GLOBAL\\_VERSUS\\_ETHIOPIA](https://www.researchgate.net/publication/374743753_ATLAS_OF_MUSHROOMS_GLOBAL_VERSUS_ETHIOPIA) [accessed Apr 29, 2024].
- Ramamurthi K, Geethalakshmi. R. (2015). TNAU Agritech Portal Nutrition. Food: Nutritive Value; Health Benefits of Mushroom: Available from: [http://agritech.tnau.ac.in/nutrition/nutri\\_health\\_mushroom.htm](http://agritech.tnau.ac.in/nutrition/nutri_health_mushroom.htm)
- Semwal K.C., Hayal, L., Anurag, D., Gabru, E, and Solomon, A. (2014). Mushroom: Nature's Treasure: Short Communication in Ethiopia (MEJS) Volume 6(2):138-147, 2014
- Silva S, Martins S, Karmali A, Rosa E (2012) Production, Purification and Characterisation of Polysaccharides from *Pleurotus Ostreatus* with Antitumour Activity. *J Sci Food Agric* 92(9): 1826-1832.
- Sitotaw, R., Lulekal, E. & Abate, D(2020). Ethnomycological study of edible and medicinal mushrooms in Menge District, Asossa Zone, Benshangul Gumuz Region, Ethiopia. *J Ethnobiology Ethnomedicine* 16, 11 (2020). <https://doi.org/10.1186/s13002-020-00361-9>
- Teferi Yenealem, Muleta, D & Woyessa, D. (2013). Mushroom consumption habits of Wacha Kebele residents, southwestern Ethiopia. *Global Research Journal of Agricultural and Biological Sciences*, i4 (1): 6-66.
- Tensaye A, Gonche G, Shiferaw A. (2022). Evidence Regarding Ethiopia's Import-Export of Mushrooms. *INDONESIAN JOURNAL OF SOCIAL AND ENVIRONMENTAL ISSUES (IJSEI)*. Journal Homepage: <https://ojs.literacyinstitute.org/index.php/ijsei>. ISSN: 2722-1369 (Online). Research Article
- Weldekiros M, Birhane E, Zeweld W, Teweldebirhan S. (2017). Characterization, Nutritional Value, and Consumption Habit of Wild Mushroom in Tigray, Northern Ethiopia. *ANADOLU Journal of AARI*, i27 (2): i97 i– i115.
- Woldemedhin D, Seifu L, Wassie A. (2016). Mushroom value chain analysis in Addis Ababa, Ethiopia. *Journal of Agricultural Extension and Rural Development*. Full-Length Research Paper