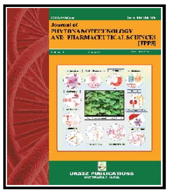
Journal of Phytonanotechnology and Pharmaceutical Sciences 5(2): 34-40, 2025

Online ISSN:2583-0376

http://jpps.ukaazpublications.com

DOI: http://dx.doi.org/10.54085/jpps.2025.5.2.6

Journal of Phytonanotechnology and Pharmaceutical Sciences



Review Article : Open Access

An overview of the phytochemical and therapeutic potential of the white button mushroom (*Agaricus bisporus* (J.E. Lange) Imbach)

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Article Info

Article history
Received 20 April 2025
Revised 27 May 2025
Accepted 28 May 2025
Published Online 30 June 2025

Keywords
Antioxidant properties
Bioactive compounds
Button mushroom
Health benefits
Nutritional composition
Therapeutic potential

Abstract

White button mushrooms (*Agaricus bisporus* (J.E. Lange) Imbach) are widely recognized for their significant nutritional profile and bioactive compounds, making them an important addition to a health-conscious diet. They contain essential minerals, vitamins, and antioxidants, which work together to provide numerous health benefits. *A. bisporus* is rich in phytochemicals, including polyphenols, flavonoids, polysaccharides, terpenoids, sterols, and vital vitamins and minerals. These bioactive components contribute to its strong antioxidant, anti-inflammatory, immunomodulatory, anticancer, antimicrobial, and neuroprotective effects. Their therapeutic potential features antioxidant, antimicrobial, and immune-boosting properties that help reduce the risk of chronic diseases such as diabetes, cardiovascular issues, and cancer. One notable benefit of button mushrooms is their antioxidant activity, mainly due to phenolic compounds and polysaccharides that neutralize free radicals and lower oxidative stress. This is key in preventing chronic illnesses like heart disease, diabetes, and neurodegeneration. Additionally, *A.bisporus* shows considerable anti-inflammatory properties by modulating cytokine production and inhibiting pro-inflammatory enzymes, making it a potential option for managing inflammatory conditions. Their low-fat, high-fiber content further boosts their value as a functional food. Historically, button mushrooms have been appreciated for their medicinal and nutritional properties across various cultures. They have been used in traditional medicine to boost vitality, improve digestion, and strengthen the immune system. In European folk medicine, they were consumed to treat digestive issues, while in some Asian cultures; they were believed to promote longevity and overall health. Ancient herbal texts from China and India mention mushrooms, including *A. bisporus*, as natural tonics that help restore energy and balance within the body. Indigenous communities have also used button mushrooms as natural remedies for infections, wound healing, and inflammatory conditions, underscoring their long-standing role as a functional food. Incorporating button mushrooms into food products offers promising opportunities in nutraceuticals and pharmaceuticals, positioning them as powerful natural remedies for health promotion and disease prevention. *A. bisporus* is a valuable functional food with tremendous phytochemical and therapeutic potential. Its diverse bioactive compounds offer a broad range of health benefits, making it an excellent natural resource for disease prevention and treatment. Including button mushrooms in daily diets or using their extracts in medicinal products could provide a sustainable, holistic approach to improving human health.

1. Introduction

Mushrooms are spore-bearing fruiting bodies of macro fungi categorized as Ascomycetes or Basidiomycetes. Among the most widely consumed edible fungi globally, they are widely used for their culinary versatility, nutritional richness, and unique bioactive properties. These mushrooms, often recognized for their mild flavor and tender texture, have exceeded their role as mere food ingredients to emerge as subjects of scientific and therapeutic interest. Recent scientific research has illuminated the remarkable phytochemicals present in button mushrooms, revealing their potential health benefits and therapeutic applications (Hawksworth, 2011). They predominantly thrive in hilly regions due to their preference for cooler temperatures. Nevertheless, advancements in contemporary cultivation technologies have enabled their seasonal growth in uncontrolled environments and year-round cultivation in environmentally regulated conditions. The chemical composition of white button mushrooms, encompassing moisture, ash, protein, carbohydrates, and total fat, along with their mineral composition-which includes selenium (Se), nickel (Ni), manganese (Mn), copper (Cu), zinc (Zn), sodium (Na), nitrogen (N), iron (Fe), phosphorus (P), calcium (Ca), magnesium (Mg), sulfur (S), and potassium (K). Notably, white button mushrooms exhibit the highest concentrations of potassium (3560 ± 153. 33 mg/kg) and sulfur (2195. 59 ± 1405. 60 mg/kg) when assessed on a fresh weight basis. One of the most remarkable aspects of button mushrooms is their dense nutritional profile. They are low in calories, fat- free, and serve as an excellent source of vital nutrients, including vitamins (particularly B- complex vitamins such as riboflavin and niacin), minerals (selenium, potassium), dietary fiber, and protein. In addition to these macronutrients, button mushrooms contain a range of bioactive

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compounds, such as polysaccharides, antioxidants, phenolic acids, flavonoids, and ergosterol compounds that contribute to their therapeutic properties. These mushrooms are globally esteemed as nutrientdense foods due to their therapeutic and medicinal attributes. They contain glycoproteins and other bioactive substances that enhance the human immune system, including triterpenoids and enzymes (Kumari *et al.,* 2011; Kumari and Atri, 2014). Among various Basidiomycetes, the *Agaricus* genus is particularly noteworthy due to its extensive substrate availability, as well as its substantial nutritional, culinary, and therapeutic benefits (Regina *et al.,* 2008). Bioactive compounds extracted from this genus of mushrooms have the potential to treat numerous prevalent human diseases, including cancer, bacterial and fungal infections, diabetes, cardiovascular disorders, and dermatological issues.

2. Physicochemical and antioxidant characteristics of white button mushroom

The physicochemical and antioxidant characteristics of white button mushroom are presented in Table 1.

2.1 Moisture

Manzi *et al.* (2001) have reported a wide range of moisture content, ranging from 67.2 to 91.5 per cent in fresh button mushroom. Matilla *et al.* (2002) have reported a higher moisture content of 92.0 per cent in button mushroom (*A. bisporus*). Gaur (2005) has also recorded this parameter and reported it as 91.0 per cent. Kumar and Barmanray (2007) have reported the moisture content as 89.75 per cent in white button mushrooms. Saini (2008) observed a moisture content of 90.08 per cent in white button mushrooms, whereas Sharma *et al.* (2015) reported a slightly higher moisture content of 90.17 per cent in the same cultivar. Dhamodharan and Mirunalini (2010) have observed very high moisture content of 92.30 per cent in the white button mushroom. Sinha *et al.*(2021) have reported the moisture content of the same in the range of 87.20 to 92.27 per cent based on fresh weight. Harshavardhini and Sharma (2021) have reported the moisture content as 91.20 per cent in button mushrooms based on fresh weight. Khumlianlal *et al.* (2022) have reported a wide range of moisture content, ranging from 83.84 to 90.44 per cent in fresh button mushrooms. Shams *et al.* (2022) have reported a very low moisture content of 5.09 per cent in dried button mushrooms.

2.2 Total soluble solids

Singh (2013) reported an average TSS content of 5.64 °B in white button mushrooms. A similar TSS range of 5.26 to 5.52 °B was documented in the same species by Mami *et al.* (2013). Adibian and Mami (2015) also noted this parameter, reported it as 5.00 °B. Srivastva *et al.* (2020) recorded a TSS content of 6.80 °B in fresh button mushrooms, while Hassan (2020) reported a notably higher TSS content of 10.75 °B in the same mushroom.

2.3 Sugars

Aletor (1995) reported that mushrooms are likely to contain trehalose (a disaccharide of glucose) sugar. Miles and Chang(1997) have reported a wide range of sugar content, ranging from 17.00 to 47.00 per cent on a dry weight basis, in button mushrooms. Kumar and Barmanray (2007) have reported 0.42 and 0.61 per cent of reducing and total sugar content in white button mushroom. The total sugar and reducing sugar content of 0.62 and 0.43 per cent have been observed in white button mushroom by Saini (2008). Singh (2013) has recorded the same parameter and reported it as 0.63 per cent in the same species. A total soluble sugar content of 14.60 per cent on dry weight basis in button mushroom has been reported by Pei *et al.* (2014).

2.4 Ascorbic acid

Kumar and Barmanray (2007) have reported 7.30 mg/100 g of ascorbic acid content in white button mushroom, whereas slightly similar ascorbic acid content of 7.40 mg/100 g in the same cultivar has been observed by Saini (2008). Dhamodharan and Mirunalini (2010) have observed the ascorbic acid content as 2.10 mg/100 g in white button mushrooms. Mami *et al.* (2013) have reported a very low ascorbic acid content ranging from 2.50 to 2.57 mg/100 g in button mushroom. Harshavardhini and Sharma (2021) have reported a lower ascorbic acid content in mushroom fruit as 0.10 mg/100 g. Shams *et al.* (2022) have observed that freeze-dried mushrooms contain a higher ascorbic content of 19.46 mg/100 g, whereas the same parameter in cabinet-dried mushrooms was reported as 8.13 mg/100 g. Hassan (2020) has recorded an ascorbic acid content of 23.14 mg/100 g in button mushroom, whereas Brahmini *et al.* (2021) have reported a high ascorbic acid content in the range of 14.47 to 22.98 mg/100 g (DW) in button mushroom.

2.5 Fat

Matilla *et al.* (2002) have reported 0.13 to 0.35 per cent fat content in white button mushroom. Kumar and Barmanray (2007) and Saini (2008) have reported slightly similar crude fat content of 0.32 per cent in the same mushroom. A very low crude fat content of 0.19 per cent has been reported in white button mushroom by Sharma *et al.* (2015).

2.6 Fiber

Singh and Sharma (1999) have reported fiber content on fresh weight basis as 0.52 per cent in button mushrooms. A narrow range of the same parameter from 0.34 to 1.13 per cent in the same cultivar has been reported by Choudhary (2000). Matilla *et al.* (2002) have reported very high dietary fiber content of 1.60 per cent in white button mushrooms. The crude fiber content of 0.54 per cent in white button mushrooms has been reported by Duc-Hien (2006). Kumar and Barmanray (2007a) and Saini (2008) have recorded crude fiber content of 0.94 per cent in white button mushrooms. A slightly higher crude fiber content of 1.06 per cent has been reported in white button mushrooms by Sharma *et al.* (2015).

2.7 Protein

White button mushroom on fresh weight basis contains 2.90 to 3.90 per cent protein, whereas on a dry weight basis, the protein content varies from 20 to 35 per cent (Pruthi *et al.,* 1984; Bano and Rajarathanam, 1988; Saxena and Rai, 1990; Sethi *et al.,* 1991; Choudhary, 2000). Singh and Sharma (1999) reported the protein content as 3.79 per cent in white button mushroom. Matilla *et al.* (2002) observed a slightly lower protein content of 2.09 per cent in the same mushroom. Tyagi (2004) reported a protein content of 3.85 per cent, while Kumar and Barmanray (2007a) noted a nearly similar content of 3.68 per cent. This was also supported by Saini (2008), who found a protein content of 3.68 per cent in white button mushrooms. Sharma *et al.* (2015) reported a slightly lower value of 3.26 per cent in fresh white button mushroom, whereas Singh and

Thakur (2016) documented a much higher protein content of 4.82 per cent in the same species.

2.8 Total phenols

Parr and Bolwell (2000) reported that phenols are the most important secondary metabolites under the class of phytochemicals in the plant kingdom, and they represent the largest heterogeneous group of biologically active compounds. Rajarathnam *et al.* (2003) reported that the skin of white button mushroom contains two to three times' higher phenolic content than the flesh. Manzi *et al.* (2001) have reported a very wide range of total phenols, ranging from 51.40 to 403.80 mg/ 100 g in mushrooms. Barros *et al.* (2008) have reported a very high total phenol content of 630.00 mg/100 g (DW) in button mushroom. Mami *et al.* (2013) have reported a total phenol content of 140 mg/100 g in the same mushroom. Zalewskaet *al.* (2018) recorded the phenol content in white button mushrooms as 458 to 948 (DW) mg/100 g. Khumlianlal *et al.* (2022) have observed the total phenol content in mushrooms as 51.40 to 403.40 mg/100 g on a dry weight basis. Hassan (2020) has reported a very high total phenol content of 703.00 mg/100 g (DW) in the same mushroom. Das *et al.* (2023) have reported the total phenol content in button mushrooms in the range of from 194.00 to 452.00 mg/100 g on a dry weight basis.

2.9 Antioxidant activity

Mami *et al.* (2013) have reported antioxidant activity as 2.5 mmol/ kg of weight in button mushroom (*A.bisporus*). Ghahremani and Dashti (2015) have recorded the antioxidant activity ranging from 1.1 to 3.3 mg/ml in 4 strains of button mushroom. Zalewska *et al.* (2017) have reported a very high antioxidant activity of 60.03 per cent in the same species of mushroom. Zalewska *et al.* (2018) have reported a broad range of antioxidant activity in button mushrooms, ranging from 36.48 to 60.03 per cent. Khumlianlal *et al.* (2022) reported a DPPH radical scavenging activity of approximately 90.72 per cent. Chaipoot *et al.* (2023) have observed antioxidant activity in mushrooms with ABTS and FRAP assays yielding values ranging from 0.087 to 0.25 mg/ml, and 184.50 to 287.68 µg $FeSO_2$ /ml, respectively. Das *et al.* (2023) have observed antioxidant activity with DPPH and ABTS values of 7.16 and 4.36 mg/ml, respectively.

2.10 Ash

Saini (2008) has observed ash content as 0.78 per cent (DW) in white button mushrooms. Singh (2013) has also recorded this parameter and reported it as 10.08 per cent on dry weight basis in button mushroom. Harshavardhini and Sharma (2021) have recorded an ash content of button mushrooms as 0.76 per cent on fresh weight basis. Similarly, Sinha *et al.* (2021) have reported an ash content ranging from 0.78 to 1.25 per cent on fresh weight basis. Ucar and Karadag (2019) have reported a very high ash content of 15.18 per cent on dry weight basis. Khumlianlal *et al.* (2022) have observed a wide range of ash content, ranging from 6.80 to 9.90 per cent, while Shams *et al.* (2022) have recorded the ash content as 6.88 per cent on dry weight basis. Das *et al.* (2023) recorded a very high ash content of 10.93 per cent in the same fruit.

Table 1: Physicochemical and antioxidant properties of white button mushroom

Composition	White button mushroom	References
Moisture (%)	5.09% to 92.30%	Manzi *et al.,* 2001; Matilla *et al.,* 2002; Gaur, 2005; Kumar and Barmanray, 2007a; Saini, 2008; Sharma *et al.,* 2015; Dhamodharan and Mirunalini, 2010; Sinha *et al.,* 2021; Harshavardhini and Sharma, 2021; Khumlianlal *et al.,* 2022; Shams *et al.,* 2022
Total soluble solids (°B)	5.00 °B to 10.75 °B	Singh, 2013; Mami *et al*., 2013; Adibian and Mami, 2015; Srivastva *et al*., 2020; Hassan, 2020
Total sugar (%)	0.42% to 47.00%	Aletor, 1995; Miles and Chang, 1997; Kumar and Barmanray, 2007; Saini, 2008; Singh, 2013; Hassan, 2020; Das *et al*., 2023
Ascorbic acid (mg/100 g)	0.10 to 23.14 mg/100 g	Kumar and Barmanray, 2007; Saini, 2008; Dhamodharan and Mirunalini, 2010
Fat (%)	0.13% to 0.35%	Matilla *et al*., 2002; Kumar and Barmanray, 2007; Saini, 2008; Sharma *et al*., 2015
Fiber (%)	0.34% to 1.60%	Singh and Sharma, 1999; Choudhary, 2000; Matilla *et al*., 2002; Kumar and Barmanray, 2007; Saini, 2008; Sharma *et al*., 2015
Protein (%)	2.09%-4.82%	Pruthi *et al*., 1984; Bano and Rajarathanam, 1988; Saxena and Rai, 1990; Sethi *et al*., 1991; Singh and Sharma, 1999; Choudhary, 2000; Mattila *et al*., 2002; Tyagi, 2004; Kumar and Barmanray, 2007; Saini, 2008; Sharma *et al*., 2015; Singh and Thakur, 2016
Total phenols (mg/100 g)	51.40 mg/100 g to 948 mg/100 g	Parr and Bolwell, 2000; Rajarathnam *et al*., 2003; Manzi *et al*., 2004; Barros *et al*., 2008; Mami *et al*., 2013; Zalewska *et al*., 2017; Abdelshafy *et al*., 2022; Hassan, 2020; Das *et al*., 2023
Antioxidant activity (mg/ml)	0.087 mg/ml to 90.72%	Mami *et al*., 2013; Ghahremani and Dashti, 2015; Zalewska *et al*., 2017; Khumlianlal *et al*., 2022; Chaipoot *et al*., 2023; Das *et al*., 2023
Ash content (%)	0.76% to 15.18%	Saini, 2008; Singh, 2013; Harshavardhini and Sharma, 2021; Sinha *et al*., 2021; Ucar and Karadag, 2019; Khumlianlal *et al*., 2022; Shams *et al*., 2022; Das *et al*., 2023

3. Phytochemical and therapeutic potential

Plants and fungi serve as potent sources of bioactive compounds with significant biological actions (Venturella *et al.,* 2021). The increasing interest in discovering novel functional foods with pharmacological benefits has led to extensive research on mushrooms, particularly white button mushrooms, due to their exceptional nutritional and medicinal properties (Valverde *et al.,*2015). White button mushrooms are rich in polyphenols, flavonoids, polysaccharides, sterols, and terpenoids, contributing to their extensive health-promoting effects. These compounds exhibit antioxidant, anti-inflammatory, antimicrobial, and immunomodulatory properties, making them an essential component of a healthy diet. The great potential of bioactive compounds from mushrooms and their by-products in promoting health is driving interest in discovering new products with beneficial pharmacological effects, including antioxidant, anti-inflammatory, immunomodulatory, and neuroprotective properties (Hamid *et al.,* 2021). Nowadays, the consumption of mushrooms has increased due to their role in human health which is primarily due to the presence of phytochemicals with pharmacological potential which helps in the prevention of various diseases (Sharma *et al.,* 2019; Hamid *et al.,* 2022). Polyphenols and flavonoids, including quercetin, catechin, and gallic acid, play a crucial role in neutralizing free radicals, thereby reducing oxidative stress and lowering the risk of chronic diseases such as cardiovascular disorders and cancer (Kashyap *et al.,* 2017; Singh *et al.,* 2022). Polysaccharides (β-glucans and chitin) are known for their immune-boosting and prebiotic properties; these compounds enhance gut health and regulate cholesterol levels. β-glucans, in particular, stimulate the immune response and help in managing conditions like diabetes and metabolic disorders (Wu *et al.,* 2019). Terpenoids and sterols specially (Ergosterol): which is, a precursor of vitamin D_2, supports bone health and immune function, while other terpenoids exhibit potential anticancer and neuroprotective effects (Kalac, 2016). The tannins and lectins: compounds contribute to antimicrobial and anticancer activities. Lectins in *A.bisporus* have been studied for their potential in tumor suppression and gut health improvement (Zhang *et al.,* 2018). Furthermore, other bioactive compounds like rutin, myricetin, and kaempferol found in button mushrooms provide anti-inflammatory, antiobesity, and antitumor effects, as shown in Table 2. Bioactive compounds/nutraceuticals also increase an individual's immune response by acting as immunomodulators and assisting our defense system (Kaushal *et al.,* 2022) Due to their significant role in human health, mainly because of the presence of bioactive phytochemicals with pharmacological potential, the consumption of functional foods like mushrooms has increased in recent years (El-Ramady *et al.,* 2022). White button mushrooms (*A.bisporus*) have been extensively studied for their health benefits, as their bioactive compounds contribute to various therapeutic effects. Recent studies have explored the potential of button mushroom extracts and their bioactive components in improving health outcomes through their antioxidant, anti-inflammatory, antimicrobial, and immunomodulatory properties.

Table 2: Phytochemical and therapeutic potential of the white button mushroom

Phytochemical class	Compounds	Functions	References
Phenolic compounds	Gallic acid, Caffeic acid, p-Coumaric acid, Ferulic acid, Catechin, Quercetin	Antioxidant, anti-inflammatory, antimicrobial	Venturella *et al*., 2021; Ferreira *et al*., 2022
Flavonoids	Myricetin, Kaempferol, Rutin	Antioxidant, cardioprotective, neuroprotective	Tiwari *et al*., 2022; Singh *et al*., 2025
Polysaccharides	β-Glucans, Chitin	Immunomodulatory, prebiotic, cholesterol-lowering	Zhou *et al*., 2020; Yuan *et al*., 2024
Terpenoids	Ergosterol, Triterpenes	Antioxidant, precursor of vitamin D_2, anticancer	Valverde *et al*., 2015; Dasgupta *et al*., 2019
Alkaloids	Hericenones, Erinacines	Neuroprotective, anti-inflammatory	Liu *et al*., 2020; Li *et al*., 2024
Sterols and saponins	Ergosterol	Antioxidant, vitamin D precursor	Kalac, 2016; Itubochi *et al*., 2025
Lectins	*A. bisporus* lectins	Antimicrobial, anticancer	Zhang *et al*., 2018

The studies compiled in Table 3 demonstrate that *A.bisporus* has shown promising effects in managing diabetes, reducing oxidative stress, combating obesity, lowering lipid levels, reducing inflammation, and enhancing immune responses (Goyaland Grewal, 2024; Kaur *et al.,* 2025).The data presented in Table 3 elucidate the pharmacological activities of white button mushrooms, evaluated through various experimental models and methodologies. The antioxidant activity of mushroom extract was assessed at concentrations ranging from 50 to 500 µg/ml utilizing DPPH, ABTS, and FRAP assays, which demonstrated significant free radical scavenging capabilities, thereby indicating its potential to mitigate oxidative stress and prevent oxidative damage within biological systems (Kaur *et al.,* 2025). The anti-inflammatory activity was investigated using carrageenan-induced paw edema models in rats, in which doses of 200 to 400 mg/kg effectively diminished inflammation and inhibited pro-inflammatory cytokines, suggesting a role in the modulation of inflammatory pathways (Tiwari *et al.,* 2022). The antimicrobial potential of *A. bisporus* extract was evaluated at concentrations of 100 to 1000 µg/ml through the agar well diffusion method against *Escherichia coli* and *Staphylococcus aureus*, revealing notable bacterial growth inhibition, attributable to the presence of phenolic compounds, flavonoids, and lectins (Patel *et al.,* 2019). Furthermore, the extract exhibited anticancer properties, as evidenced by MTT assays conducted on human breast cancer (MCF-7) cells, where concentrations ranging from 100 to 500 µg/ml induced apoptosis and reduced cell proliferation, indicating its potential as a natural anticancer agent (Das and Prakash, 2022). In terms of hypoglycemic activity, the administration of 250 to 500 mg/kg of the extract in streptozotocin-induced diabetic rats resulted in a reduction in blood glucose levels, suggesting its antidiabetic potential, likely due to its influence on glucose metabolism and insulin sensitivity (Reddy, 2015).

Table 3: Phytochemical potential of white button mushroom

Property	Dose of extract	Method/Mode used	Results	References
Antioxidant activity	50-500 µg/ml	DPPH, ABTS, FRAP assays	Significant free radical scavenging activity	El-Ramady *et al*., 2022; Khalil *et al*., 2024; Kaur *et al*., 2025
Anti-inflammatory	200-400 mg/kg	Carrageenan-induced paw edema in rats	Reduced inflammation, inhibition of pro-inflammatory cytokines	Tiwari *et al*., 2022; Park *et al*., 2024; Wang *et al*., 2024
Antimicrobial	100-1000 µg/ml	Agar well diffusion method against *E. coli*, *S. aureus*	Inhibited bacterial growth	Patel *et al*., 2019; Al Dbass *et al*., 2022; Sweedan and Majeed, 2023
Anticancer	100-500 µg/ml	MTT assay on human breast cancer (MCF-7) cells	Induced apoptosis, reduced cell proliferation	Das and Prakash, 2022
Hypoglycemic activity	250-500 mg/kg	Streptozotocin-induced diabetic rats	Lowered blood glucose levels	Reddy, 2015
Neuroprotective	100-300 mg/kg	Alzheimer's disease mouse model	Improved cognitive function, reduced oxidative stress	Yadav *et al.,* 2021
Hepatoprotective	200-600 mg/kg	CCl_4-induced liver damage in rats	Reduced liver enzyme levels, improved liver histology	Verma *et al.,* 2023
Immunomodulatory	100-500 µg/ml	*In vitro* lymphocyte proliferation assay	Stimulated immune response	Goyaland Grewal, 2024; Yuan *et al.,* 2024

The neuroprotective activity was appraised in a mouse model of Alzheimer's disease, mouse model in rats, where doses of 200 to 600 mg/kg resulted in lowered liver enzyme levels and improved liver histology, suggesting its potential to safeguard liver function (Verma *et al.,* 2023). Lastly, the immunomodulatory activity was assessed through an *in vitro* lymphocyte proliferation assay, where treatment with 100 to 500 µg/ml of extract stimulated the immune response, indicating its ability to enhance immune function (Goyal and Grewal, 2024).

4. Conclusion

White button mushrooms (*A. bisporus*) is a valuable source of bioactive compounds with significant therapeutic potential. Their rich composition of phenolic acids, flavonoids, polysaccharides (β-glucans), sterols (ergosterol), and terpenoids contributes to their antioxidant, anti-inflammatory, antimicrobial, and immunomodulatory properties. These phytochemicals play a crucial role in neutralizing free radicals, reducing oxidative stress, and lowering the risk of chronic diseases such as cardiovascular disorders, diabetes, and cancer.The presence of α-glucans enhances immune function and gut health, while ergosterol, a precursor to vitamin D_2, supports bone health and metabolic processes. White button mushrooms also exhibit antimicrobial and anticancer properties, helping regulate cholesterol levels and blood glucose metabolism. Their ability to modulate the immune system further enhances their role in disease prevention and health promotion.Additionally, these mushrooms are rich in essential vitamins (B-complex, D_2) and minerals (selenium, potassium, phosphorus), making them an excellent addition to a balanced diet. With their wide-ranging health benefits, white button mushrooms hold immense promise as a functional food and can be effectively utilized in nutraceuticals, pharmaceuticals, and dietary supplements, offering a natural approach to improving overall well-being.

Conflict of interest

The authors declare no conflicts of interest relevant to this article.

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Citation Kritika Kaushal, Manoj Kumar, Abhimanyu Thakur and Tanveen Kaur (2025). An overview of the phytochemical and therapeutic potential of the white button mushroom (*Agaricusbisporus* (J.E.Lange) Imbach). J. Phytonanotech. Pharmaceut. Sci., 5(2):34-40. http://dx.doi.org/10.54085/jpps.2025.5.2.6