

Medicinal, Nutritional Role of *Agaricus bisporus* in Combating Diabetes: A Functional Food Perspective

Shweta Chandel¹, Nikita Chaudhary², Sanakaru Rymbai¹ and Indu Sharma¹

¹Nims Institute of Allied Medical Science and Technology
NIMS University, Rajasthan, Jaipur 303121, Rajasthan (India)

²Department of Dietetics, Nims Hospital, NIMS University, Rajasthan, Jaipur 303121, Rajasthan (India)

Corresponding Author:

The majority of ailments arise when civilization develops as a result of eating unhealthily. An alarming number of non-communicable illnesses are on the rise globally, including diabetes. According to projections, diabetes will rank as the seventh most common cause of death globally by 2030. Diabetes affects a sizable portion of people, and by 2045, the number of cases is predicted to rise sharply. In response to these increasing risks, lifestyle modifications and food-based programs have been used to prevent diabetes, as evidenced by studies including many dietary plants. *Agaricus* mushroom is a very popular mushroom due to their stability in their morphological character like; in cap, stem. *Agaricus bisporus* belongs to class Agariomycetes and order Agaricales.

The white button mushroom, or *Agaricus bisporus*, has a special blend of bioactive components that make it a valuable medicinal and nutritional tool for diabetes management. A basidiomycete fungus indigenous to grasslands in North America and Eurasia, *Agaricus bisporus* is also referred to as the cultivated mushroom. Raw white mushrooms are a great source of 20 percent or more of the Daily Value, DV, of the B vitamins riboflavin, niacin, and pantothenic acid (table) and give 93 kilojoules (22 kilocalories) of dietary energy per 100 grams. Additionally, fresh mushrooms are an excellent source of the dietary elements potassium and phosphorus (10–19% DV).

For millennia, people have utilized mushrooms as food and medicine to treat a variety of ailments. Culinary medicinal mushrooms have shown promise as a possible treatment for a variety of degenerative neurological conditions related to aging, including Parkinson's and Alzheimer's diseases, however research on this topic is still in its early stages. As an additional food item that is also abundant in nutrients, mushrooms have been a part of many different societies' normal meals since ancient times. Many synthetic hypoglycemic drugs for diabetes don't work because of side effects. Scientists are currently focusing on mushrooms since they are known to have naturally occurring bioactive substances that may have

anti-diabetic properties. Extracts from mushrooms, which boost immunity and combat cancer, are growing in popularity. Functional foods and dietary supplements made from mushrooms can help treat pre-existing conditions and postpone the onset of potentially fatal diseases. This helps prevent and treat type 2 diabetes, which is limited to the suppression of intestinal glucosidase and the breakdown of complex polysaccharides by pancreatic amylase.

The mushroom's strong antioxidants, including ergothioneine and phenolic compounds, fight oxidative stress, a major factor in the development of diabetes, while its polysaccharides, especially β -glucans, improve glucose metabolism and lower insulin resistance. Furthermore, *A. bisporus* has anti-inflammatory qualities that aid in reducing long-term inflammation linked to insulin resistance and consequences from diabetes. Its prebiotic fibres further promote glucose homeostasis by supporting the gut bacteria. By adding this fungus to the diet as a functional food or creating therapeutic extracts, diabetes can be managed naturally and effectively, possibly lowering the need for artificial drugs. Mushrooms as a functional food with anti-diabetic properties. Filamentous fungus rich in nutrients, mushrooms have fruiting bodies that are heavy in carbs and protein. They also include important amino acids that the body needs to function correctly, vitamins like B and D, and minerals like potassium, phosphorus, magnesium, selenium, copper, and magnesium. Because of their potential health advantages, such as their antibacterial, antioxidant, antiviral, anticancer, and hypocholesterolemic properties, mushrooms have long been a part of human diets. Although there are many different kinds of mushrooms in nature, only a small number are used and cultivated for food. Diabetics must follow a nutritious diet that aids in blood glucose control since elevated blood glucose levels are an indication of diabetes.

Nutritional Medicinal Properties

Agaricus mushroom have many nutritional and medicinal properties. Also, *Agaricus* mushroom have

used as anticancer, anti-diabetic, in high cholesterol, liver disease etc. Medicinal mushroom research has indicated possible cardiovascular, antiparasitic, anticancer, antiviral, and antibacterial, anti-inflammatory; hepatoprotective and antidiabetic activities. Some mushroom materials, including polysaccharide, glycoprotein and proteoglycans, modulate immune system responses and inhibit tumor growth. Mushrooms have a high percentage of water (93-95%) as compared to fresh vegetable (92%). They also contain valuable minerals such as iron, potassium, phosphorus, calcium. Carbohydrate (56%), Protein (30%), Fat (2%), Ash (10%) on dry weight basis. They are also rich in Vitamin B and Vitamin D.

Nutritional Benefits of Button Mushrooms (Per 100 Gm)

Excellent Nutrient Profile and Amazing Addition to a Nutritious and Well-Balanced Meal.

Principal	Nutrient value	Percent Of DV
Energy	22 kcal	1%
Carbohydrates	3.26gm	2.5%
Protein	2.18gm	4 %
Total Fat	0.34gm	1%
Dietary Fibre	1 gm	3%

VITAMINS

VITAMIN	NUTRIENT VALUE	PERCENT OF DV
FOLATE	17 µG	4%
NIACIN (VITA.B3)	3.607 MG	23%
PANTOTHENIC ACID	1.497 MG	27%
PYRIDOXIN (VIT.B6)	0.104 MG	8%
RIBOFLAVIN (VIT.B2)	0.402MG	31%
THIAMINE (VIT.B1)	0.081MG	7%
VITAMIN A	0 lµ	0%
VITAMIN C	2.1MG	3.5%
VITAMIN D	7 lµ	1%
VITAMIN E	0 MG	0%
VITAMIN K	0 µG	0%

ELECTROLYTES

Electrolyte	Nutrient Value	Percent of DV
SODIUM	5 MG	0.5%
POTTASIAM	318 MG	7%

MINERALS

MINERAL	NUTRIENT VALUE	PERCENT OF DV
CALCIUM	3 MG	<1%
COPPER	0.318 MG	35%
IRON	0.50 MG	6%
MAGNESIUM	9 MG	2%
MANGANESE	0.047 MG	<1%
PHOSPHORUS	86 MG	12%
SELENIUM	9.3 µG	17%
ZINC	0.52 MG	15%

Mushrooms are categorized as a healthy food because they are low in calories and fat, but rich in proteins, dietary fiber (chitin, hemicellulose, mannans, and β-glucans), and minerals. Value can be added to the mushrooms at various levels, right from grading to the ready-made snacks or the main-course items. Real value-added product in the Indian market is the mushroom soup powder. Some of the other food value can be made from mushroom is chip, readymade mushroom curry, mushroom soup etc.

Health Benefits of Button Mushrooms

Strengthens the immune system, supports bone health, support chronic disease prevention, helps in managing weight, Reduce the risk of neurodegenerative disease, helps in blood glucose control, promote digestive health and a balanced gut microbiome, Helps in cardiovascular disease prevention.

A Powerhouse of Nutrition

Agaricus bisporus is perfect for diabetic-friendly diets because it is minimal in calories and carbs. It has a lot of fiber, especially beta-glucans, which inhibit the absorption of glucose and help control blood sugar levels. In addition, this mushroom contains protein, vitamins D and B-complex, and key minerals like potassium and selenium, all of which are important for good health.

Combining Functional Food with Culinary Versatility

The adaptability of *Agaricus bisporus* in the kitchen is one of its best qualities. It gives your food a distinctive texture and a delicious umami taste that you can use in stir-fries, soups, and baked goods. It's easy to include in your diet, either as a supplement to other superfoods or as a stand-alone component.

An Eco-Friendly Option

Selecting *Agaricus bisporus* promotes sustainability in addition to health. It uses few

resources, develops rapidly, and minimizes food waste because almost all of the mushrooms is edible. This makes it an excellent option for those that care about the environment.

Future Prospects

The pharmaceutical and nutraceutical sectors are investigating methods to utilize *Agaricus bisporus*'s antidiabetic qualities as research progresses. By offering accessible and natural substitutes for pharmaceutical medications, functional mushroom supplements and extracts have the potential to completely transform the treatment of diabetes.

Challenges

More clinical research, including in vitro enzyme inhibition assays (amylase, glucosidase, pancreatic lipase, and DPP4-dipeptidyl peptidase 4), human trials, pilot studies, prospective and retrospective studies, and in vivo animal studies, is required for the meaningful establishment of mushroom-based diabetes prevention and treatment. These medicines made from mushrooms are also

affordable and entirely natural, which makes them available to the general people.

In conclusion

Agaricus bisporus is a nutritional and medicinal wonder that is more than simply a mushroom. It merits a prominent place on every plate because of its capacity to enhance general health, aid in the control of diabetes, and provide unparalleled taste to meals. This mushroom may be your tasty buddy on the path to wellness, regardless of whether you have diabetes or are just health-conscious. Particular attention must also be paid to vitamin D and insulin resistance, taking into account their possible impact via an enzymatic assay. Moreover, it is challenging to reach a judgment without carrying out in-depth investigation. This is why finding more knowledge through clinical research is so important. We may conclude from the available data that mushrooms are beneficial and offer a great deal of promise for treating noncommunicable illnesses like diabetes.

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