

Mushroom

Mushrooms are fruit bodies of macroscopic, filamentous and epigeal fungi. They are made up of hyphae which forms interwoven web of tissues known as mycelium. Mushrooms are an odd looking group that goes by the name of 'Fungi' pronounced, Fun gee or Fun gay. Essentially it is neither a plant nor an animal, it is a fungus.

Lists of edible mushrooms

- Button mushroom
- St Georges mushroom
- Chicken of the woods
- Oyster mushrooms
- Chanterelles

Mushrooms, brown, Italian, or Criminal, raw	
Nutritional value per 100g	
Energy	113KJ (27Kcal)
Carbohydrates	4.1g
Fat	0.1g
Protein	2.5g
Thiamine (Vit B ₁)	0.1mg
Riboflavin (Vit B ₂)	0.5mg
Niacin (Vit B ₃)	3.8mg
Pantothenic acid (Vit B ₅)	1.5mg
Vitamin C	0mg
Calcium	18mg
Phosphorus	120mg
Potassium	448mg
Sodium	6ng
Zinc	1.1mg

Why edible mushrooms are called nutritious or delicious food? (in terms of their nutrition they contain)

➤ **Protein:**

- Most mushrooms have high protein content, usually around 20-30% by their dry weight.
- This can be useful for vegetarians or anyone looking to increase the protein content in their diet.

➤ **Fiber:**

- Helps to lower cholesterol and is important for the digestive system.

➤ **Niacin and other B-vitamins:**

- Certain B vitamins are found in animal tissue but not in plants.
- This can be another good source or supplements for vegetarians.

➤ **Vitamin D:**

- Essential for absorption of calcium.

➤ **Copper:**

- Aids in helping the body absorb oxygen & create red blood cells.

➤ **Selenium:**

- Helps to neutralize free radicals
- Preventing cell damage
- Reducing risk of cancers and other diseases.

➤ **Potassium:**

- Important minerals that regulates blood pressure & Keeps cell functioning properly.
- A large Portobello mushroom is said to have more potassium than banana.

➤ **Other important minerals:**

- Such as phosphorus, zinc and magnesium.

➤ **Low levels of fat, calories and sodium**

➤ **Low cholesterol**

Types of mushroom & their health benefit

1. **White mushroom:**

- Maintain blood sugar level
- These mushrooms are high in selenium, which aids in weight loss & is showing positive effects on prostate cancer.
- 3 ounces per day for 4-6 weeks is recommended.

2. **Shiitake mushroom:**

- These mushrooms contain **Lentinan**, which is a natural anti-tumor compound, developed by Japanese and it is used for anti-cancer treatment.
- It is an excellent source of vitamin-D and fighting infection.
- 4-5 ounces per day is recommended.

3. **Reishi mushroom:**

- It has following properties such as anti-cancer, anti-oxidant, anti-bacterial, anti-fungal & anti-viral.
- It contains **Gandedermic acid**, which helps to reduce cholesterol and lower the high blood pressure.
- A few ounces per day are recommended.

4. **Maitake mushroom:**

- A half of a cup per day of maitake mushrooms is said to be able to sweep the system, find abnormal cells and cause them to self-destruct.

5. **Oysters mushroom:**

- It has possible defense against HIV.
- Due to its high anti-oxidant compounds, these mushrooms can be a lifesaving ingredient.

6. **Chanterelle mushroom:**

- It has anti-microbial, anti-bacterial and anti-fungal properties.
- They are also high in vitamin C, D and potassium.

7. **Porcini mushroom:**

- It has been used as a successful anti-inflammatory agent.
- It contains the compound **Ergosterol**, which is capable of cytotoxicity which is possible of attacking enemy cells.

8. **Shimeji mushroom:**

- It is a successful remedy for retarding and destroying growing tumors in Japan.
- It can also help in diabetes, asthma and certain allergies.

Conservation method of mushrooms

- A. A method for small producers
- B. Methods for industrial presentation

Description of Methods for industrial presentation

The methods described below deal with the large-scale preservation of *Agaricus bisporus*. Obviously, the same methods may be used for other species such as *Pleurotus ostreatus* or others having water content similar to that of *A. hisporus*.

1. Canning:

Canning is the still most important conservation technique for *Agaricus*, *Volvariella* and *Pleurotus cystidiosus* / *abalonus*. *Agaricus bitorquiosis* less suitable for canning in whole pieces, therefore it is usually sliced before canning. The usual canning procedures are as follows:

a. Cleaning:

- The mushrooms are graded and stored.
- Spots and blemishes are cut off.
- The water for washing contains 0.1% citric acid or 0.3% sodium metabisulphate.
- These prevent the mushrooms from turning brown.

b. Blanching:

- The mushrooms are cooked in water at 95-100⁰C containing 1% sodium chloride or citric acid, for 5 minutes after the water has come to boiling.

c. Canning:

- Blanched mushrooms are canned with a brine solution (150-200gm salt in 1 litre of water).
- The cans are then sealed.

d. Sterilization: two methods may be applied.

- (i). A continuous process with gas burners under the conveyor belt with the cans.

(ii). A batch process in an autoclave.

e. Cleaning: Process over cooking.

f. Labeling and packing:

When the temperature has dropped to 35-40⁰C, the labels can be put on the cans or glasses. About 40% of the dry weight of mushrooms is lost in canning. Metals cans are also used for canning. Glass is heavy and its use is thus limited to local consumption. Many consumers feel the product looks nicer when put in glass. Therefore, usually the cheapest grades are canned and not packed in glass.

2. Brining:

Brining is a conservation method based on the principle of limiting water. The high concentration of salt in the solution prevents the growth of micro-organisms. Spores cannot germinate, because no water is available for them, although there is water all around them. The salt solution should be around 18%. For one litre of water 180-250 gm salt must be added. The quantity of this brine solution should be half of the containers. The water is brought to a boil, and then stirred until the salt is dissolved. The brine has to cool down before it is used. The mushrooms have to be cleaned as described for canning. They should be blanched in a 5% salt solution for minutes.

Advantages of brining:

- The method is easy to perform.
- The original shape and texture of the mushrooms are reasonably kept.
- The method can be used for all mushrooms.
- Mushrooms in brine bring lower prices than canned ones.
- A long period of desalting is required.

3. Drying:

Drying is based on the principle of limited free water availability. Drying has several advantages; it is easy, quick and safe. Mushrooms can be stored for a long time. However, drying can \not be used for all species. There are many wild mushrooms that are commonly sold in dried forms among which *Beletus edulis*, all kinds (Morchella species) and black chanterelles are important.

- The oldest conservation technique is mostly used for *Lentinus*.
- The Shiitake mushrooms become tastier after the drying process.

- Oyster mushrooms also become tastier.

While drying following points should be kept in mind. These are:

- The mushrooms should not touch each other.
- Air circulation is very important, put the mushrooms on a grill rack or a metal screen.
- The area around the drying oven should be well ventilated in order to provide fresh dry air, while the moist air can flow out.

a. Artificial drying:

Revolving dryers are suitable for mass production. The temperature for **Shiitake** should start at 30⁰C and increase every hour by 1⁰ or 2⁰ centigrade. In 12 to 13 hours the temperature should be 50⁰C. Finally, the mushrooms are heated up to 60⁰C for 1hour to increase the lustre of the cap.

b. Drying in sun:

The quality of sun-dried Shiitake is generally inferior. The moisture content is higher. The mushrooms can be kept less duration than the artificially dried Shiitake. Volvariella can be sun dried by cutting them longitudinally into two halves and drying them on a concrete floor in the sun.

4. Freezing:

Freezing is a good way to preserve taste, flavor and consistency. It requires good transport lines with cooled containers. The mushrooms can be kept at least for three months. The mushrooms are transported through a tunnel where they are cooled with nitrogen vapor to (-)25⁰C.

5. Freeze-drying:

The freeze-drying process consumes large amounts of energy but there is no need for cooling the mushrooms during transport. Taste and flavor are well kept, but high investment is needed for the equipment. The energy costs determine whether freeze-drying is profitable. The mushrooms have to be cleaned and frozen in a closed container at (-)20⁰C.