



Processing and Safety measures in Preservation of Mushrooms



- Dr. Suvarna, V. Chavannavar
- Prof.(Retd.), Microbiology,
- 94810 35152 ; suvarnavc@gmail.com
- 21.05.2025

Is Processing Needed for Mushrooms?

It is very essential, because -

- It is a perishable food - moisture and nutrients.
- Some mushrooms are seasonal.
- Some are confined to specific regions, hence they need to be transported.

Natural calamities -floods, wars, landslides, earthquakes

Which are the different methods of preservation?

- Using low temperature - Refrigeration
Chilling
Freezing
- Using High temperature- Sterilization
Pasteurization
Canning
Blanching
- Radiations - Infra Red; Ultra violet, Gamma
- Membrane Filtration
- Drying / Dehydration
- Chemicals
- Bio-preservation



Drying

- **Clean mushrooms:** use a brush / dry paper towel to wipe dirt. Wipe with dry towel to ensure no moisture should be left behind.
- **Cut / Slice :** Cut mushrooms into slices approximately 1/8 inch thick.
- **Place mushrooms on baking sheet:** Mushrooms should lay flat and side by side. Mushrooms should not overlap, as drying may not be perfect.
- **Preheat Oven to 65°C.** Once temperature reaches 65°C, place baking sheet with mushrooms in oven. Leave for 1 h.
- **Take mushrooms out after 1 h. :** Blot moisture using paper towel / dry cloth to remove moisture.
- **Place mushrooms back in oven.:** Bake for 1 h / completely dried.
- **Continue the same until fully dry.** Repeat baking and removing moisture process till mushrooms totally dry.

Dehydration

- **Drying:** No control over temperature, air flow and humidity
- **Dehydration** :Temperature, Air flow, RH are controlled.
- Wash mushrooms
- Blanch in 0.2% citric acid (boiling for 3 min)
- Dip in 600 ppm KMS for 5 minutes
- Dip in 800 ppm salt for 5 minutes
- Dry in oven between 50-60°C (till 5 % moisture or 1/8th of initial volume is retained)
- Seal in Tin cans
- Store at low temperature(3-5°C)



Freezing(Button Mushrooms)

- Pre cool to 2-4°C
- Wash in 100 ppm salt.
- Blanch in 0.2 % citric acid (boiling solution) for 3 min.
- Pack in polythene bags
- Freeze at -65°C to -40°C for 1h in a freezer
- Store at -20°C(throughout) till material is used for cooking.



Canning (Button Mushrooms)



- Wash & Cut stalk close to the button
- Blanch in boiling water with 0.2% citric acid for 3-5 min.
- Fill in plain cans (200 g /450 g can)
- Fill hot 2 % salt+2 % sugar +0.3 % citric acid.
- Exhaust at 80°C and seam cans.
- Processing (a)15-20 min at 15 psi for 1lb can
(b) 25-30 min at 10 psi for 1lb can
- Disadvantage: *Clostridium botulinum* may still persist because of low acid sterile conditions.

Vinegar and Oil Pickling

- 50 % vinegar + 50 % water → inch deep in pan + 1 tsp salt - bring this mixture to a rapid boil. (add garlic cloves while boiling).
- Add cleaned one inch chunks of mushroom and boil for 5-10 min.
- Strain Mushrooms and spread on paper towels - Cool for 30-60 min → H₂O is absorbed
- Fill cans- fill the space in between mushrooms with Vegetable oil up to brim and seal tightly.
- Spices can be added.
- Preserved for several years.



Expandable Food Dehydrator

Thermostatically controlled

A single unit can accommodate 30 trays

Advantages:

- Mushrooms dry fast
- Mushrooms dry evenly (without getting burnt to crispy look)
- Flavor, nutrition and texture are preserved.
- Cost : Rs.12,500 to 25,000



Drierite

- High absorbent desiccant, excellent for storage of dried mushrooms.(Anhydrous CaSO_4)
- Absorbs dozens of times its mass in water.
- Blue color indicates dry
- Reddish color indicates saturation /exhaustion.
- Cost Rs. 6700 / for 1lb bottle
- Cost : 40 pounds



Vacuum Mushroom Preservers

- Vacuum pump is built into the top that removes air with manual strokes.
- Rubber, circular ring sealed cover maintains vacuum.
- Release button on top allows air into the container to remove the lid.
- Mushrooms remain crisp and dry.



Freon

- Freon is the safest gas.
- Freon is di-chloro, di-fluoro methane
- Freon is used as refrigerant instead of NH_3
- It is used to dust-off photographic films.

Alternative to Freon are

1. CO_2
 2. Cl_2 / F_2 (Cl_2 is preferred)
- Gas used should be dry.

Steeping Preservation

- **Wash Mushrooms.**
- **Blanch for 5 min in water having 0.1 % citric acid.**
- **Wash them in cold water**
- **Put mushrooms in 15 % salt solution having 0.05% citric acid and 100 ppm SO₂**
- **Mushrooms can be stored for 60 days.**

Products

Duxelles

- French receipe
- Crumbled, semidry paste of finely chopped mushrooms, onions, butter, spices and herbs are cooked slowly on low heat until the water is evaporated.

Recipe

Mushroom-- 1 lb (450 g)

Onion ----- one big

Salt ----- ½ t

Butter ----- 4 T



Processed Mushrooms : Pickles



Mushroom Soup Powder

Ingredients	Parts (%)
Mushroom powder	16
Corn flour	5
Milk powder	50
Refined oil	4
Salt	10
Cumin powder	2
Black pepper	2
Sugar	10
Ajinomoto (MSG)	2



Mushroom Soup

- Mushrooms-50g
 - Onions-1 small
 - Ginger- 10g
 - Garlic-5 g
 - Refined flour-1T
 - Milk- 1 cup
 - Butter -1t
 - Salt, Pepper & sugar –to taste
- Boil cut mushrooms, chopped onions, grate ginger and garlic in 750 mL water.
- Fry refined flour in melted butter and add milk.
- Add sieved decoction of boiled Mixture & boil for 10 min.
- Add spices to taste.

Mushroom Biryani

- Mushrooms-100g
- Rice-200g
- Onions- 2 nos.
- Cardamom-2 nos.
- Cloves- -4nos.
- Bay leaves- 2 nos.
- Cinnamon -5g
- Oil- 1T
- Grind cardamom, cloves, cinnamon coarsely and tie in a muslin cloth.
- Boil cut mushrooms in surplus water along with muslin cloth ingredients for 3min.
- Strain mushrooms and remove cloth
- Boil rice to half cook,
- Heat oil, fry onions with bay leaves and mushrooms.
- Add half cooked rice & steam for 5min.

Mushroom Cutlets

- Mushrooms- 200g
- Green chillies- 6 nos.
- Garlic- 6 cloves
- Gram Flour- 2T
- Ghee- for frying
- Soak horse gram dhal overnight. Boil with all ingredients for 10 min to leave no free water and grind.
- Add green chillies, coriander, salt and pepper to form paste.
- Flatten to round shape and cook the cutlets on the ladle with ghee on slow fire.

Mushroom ketchup

Ingredients	Parts (Per cent)
Mushroom	100 g
Salt	10 g
Sugar	25
Acetic acid	3 mL
Sodium benzoate	0.065
Onion	10
Garlic	0.5
Ginger	3
Cumin	1
Black pepper	0.1
Red chilli powder	1
Ajinomoto	0.2
Arrarote	0.2



Mushroom Curry

Ingredients	Quantity
Onion	500 g
Garlic	250 g
Ginger	200 g
Red chilli powder	150 g
Curry powder	100 g
Green chilli	250 g
Oil	400 mL
Salt	160 g
Water	1000.mL



Method

- Wash & cut mushrooms, tomatoes & onions.
- Chop garlic and ginger
- Heat Ghee, add cumin seeds.
- Fry garlic and onion to golden brown.
- Add spices and salt to taste followed by tomatoes.
- Leave to simmer.
- Add curd /milk.
- Add mushrooms.

Mushroom Pickle

Ingredients	g / Kg
Black mustard seed powder	35
Turmeric powder	20
Red chilli powder	10
Cumin seed powder	1.54
Fennel seed powder	1.5
Carom seed (Ajwain)	10
Nigella (Black cumin)	10
Oil	200 mL
Salt	90



Mushroom Pepper Fry

Ingredients	g
Pepper	15
Fennel	2.5
Cumin	2.5
Coriander seeds	2.5
Salt	2.5
Mustard	5.0
Mushroom	300
Capsicum	75
onion	75



Mushroom *Manchurian*

Ingredients	g
Mushrooms	200
Maida	60
Corn flour	45
Pepper powder	2.5
Red chilli powder	2.5
Salt	2.5
Water	75 mL
Oil	200 mL



Mushroom *Pulav*

Ingredients	Quantity (g)
Button mushrooms	200
Rice	200
Oil	30 mL
Onions	80
Ginger –garlic- green chilli paste	10-5-5
Coriander leaves	15
Fresh coconut gratings	50
Garam <i>Masala</i> powder	10

How to make mushroom pickles:

1. Wash mushrooms & cut them. Blanch the mushroom & let it for shade dry.
2. Saute the mushroom until water is completely drained.
3. Grind roasted jeera, ajwain, saunf and methi seeds to make a paste.
4. Fry chopped garlic, curry leaves & green chillis in 4 tbsp mustard oil.
- . Mushrooms are fried till brown & then mixed with prepared paste.
5. Salt, chilli and turmeric paste are added at last.
6. Store in a jar for 2-3 days before serving.

Cost of producing 1 Kg Pickle.

1) Mushroom- Rs. 250

2) Turmeric powder, Jeera, Ajwain, saunf & methi dana each 4
tbsp – Rs. 25

3) Mustard oil (Approx. 100 mL) – Rs.15

4) Salt, chilli each 8 tbsp – Rs.20

5) Plastic containers – Rs.10

6) Miscellaneous – Rs.10

Total cost – Rs.330

The market price of 250 g pickle – Rs. 200

Benefit-cost ratio for 1 kg production of pickle = Rs. 2.42



Amanita rubescens



THANK YOU

Amanita muscaria

