Harvesting of First Flush of Button Mushrooms: A Critical Stage in Cultivation

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Abstract

The harvesting of the first flush of button mushrooms (*Agaricus bisporus*) is a crucial phase in the mushroom production cycle, significantly influencing yield and quality. The first flush typically appears 12–15 days after casing and is characterized by rapid fruiting body development. Proper harvesting techniques ensure optimal yield, size uniformity, and extended cropping cycles. Mushrooms should be picked at the right maturity stage—when the caps are firm, white, and slightly convex, before veil breakage. Gentle twisting and pulling prevent substrate damage, allowing subsequent flushes to develop efficiently. Factors such as humidity, ventilation, and substrate moisture play a vital role in maintaining post-harvest quality. This article explores best practices, challenges, and the impact of harvesting methods on overall mushroom productivity. Understanding the first flush dynamics helps maximize output and ensures high-quality mushrooms for the market.

Keywords: Button mushroom, first flush, harvesting, casing

Introduction:

Button mushrooms whose scientific name is *Agaricus bisporus* have the biggest share in mushroom production and consumption in India. The strong demand for button mushrooms is anticipated to grow further in the coming years [1]. This variety of mushrooms is popular mostly due to its versatile culinary application, its mild taste and its nutritional value [2,3,4]. Buttonm mushroom contains a good amount of protein mostly lysine

which fulfils the protein requirement in only vegetarian eating population. Mushrooms contain very low calories which makes them an efficient food for obese people. These have a very low amount of cholesterol-free fats, which makes them an ideal food for heart patients. Among these button mushrooms also contain a good amount of vitamins and minerals which include vitamin B complex, iron and folic acid. Finally, mushrooms also contain fibres which are good for health [5,6,7].

To ensure the quality of the button mushroom, it is necessary to follow the correct harvesting method or else the quality and the amount of button mushroom harvested can be significantly less than the ideal production.

1. PREPARATION FOR HARVEST- for harvesting the first flush of mushrooms several key steps need to be taken to ensure successful and productive harvest. Preparation is crucial as this establishes the beginning of the mushroom growth cycle and makes the foundation for subsequent flushes.

a) **Timing of the harvest-** the timing of harvest is very crucial in mushroom production as it affects the quality and yield of the mushroom.

The crop of mushroom is harvested when the cap of the mushroom is fully expanded the thin membrane which glides over the cup called the veil started to break. The mushroom should be harvested before the veil fully breaks, as during this time mushroom is the most flavourful and freshest.

To harvest the button mushroom the first step is to inspect the growing area of the mushroom. This involves checking the mushroom caps for their size, colour and their firmness. As for the mushroom to be harvested, it should be firm at the touch and have a uniform colour.

b) **Sanitation-** for minimizing the risk of contamination the harvesting area, tools and any equipment involved need to be thoroughly cleaned and disinfected. This help in preventing the growth of any infection in subsequent flushes.

c) **Harvesting tools-** before harvesting gather all the required tools which typically include a sharp knife or a pair of scissors, trays and basket for collection along with protective gear such as a face mask, hair net and gloves.

d) **Harvesting technique-** when harvesting the mushrooms many different harvesting techniques can be employed:-

i) **Hand harvesting-** hand picking is one of the most common methods of mushroom harvesting. This technique requires skilled workers who can differentiate between mature and immature mushrooms. In this process, mushrooms are gently twisted or cut at the base using scissors and a sharp knife, while ensuring minimum damage to the growing medium. This method ensures the selective

picking of mature mushrooms while leaving smaller ones to continue growing. This gives the highest quality of mushrooms with minimal damage but also requires manual labour

ii) **Knife harvesting-** a knife is used in this technique. While this technique is similar to hand picking it provides faster and more efficient harvest. This method is mostly employed in large-scale cultivations and when mushrooms are entangled or closely packed. This technique however requires skill and care as it can easily damage the neighbouring mushroom in the bed.

iii) **Scissors harvesting-** scissors harvesting is employed when the mushrooms are hard to reach or separate from the substrate. This technique is similar to knife harvesting but a pair of sterilized scissors is used in place of a knife. It requires greater control and precision

iv) **Whole crop harvesting-** this method of harvesting is employed mostly in commercial setups. In it, the entire crop is harvested once during the first flush. It involves cutting or mowing the entire surface of growing beds close to its substrate level. This method is too time-consuming and requires greater effort, but ensures a complete and uniform harvest.

v) **Continuous harvesting-** this method is mostly used in small-scale cultivations. In it, the mushrooms are harvested as they continue to mature without waiting for the whole first flush to mature. This technique is used to maximize productivity while utilizing the staggered growth pattern of mushrooms. Skilled workers monitor the growing beds and pick the fully mature mushrooms only. It allows a longer harvesting period and an overall higher yield. But it is labour intensive method.

To conclude the topic we know that the first flush of mushroom can be harvested through many techniques. But the choice of technique depends on many factors such as growth pattern, the density of grown mushrooms, and the desired quality of the mushroom.

vi) Late harvest- the life cycle of the fruiting body of button mushroom begins as tiny, undeveloped buttons which grow into small compact fungi with closed caps, and during this stage, the mushroom is harvested as beyond this point the mushroom undergoes physiological and morphological changes.

During the growth of the mushroom, the cap of the mushroom opens up gradually and it enters into open- cap stage. And if the mushroom is not harvested promptly it develops into the fluffy cap stage. From this point, the gills of the mushrooms get exposed and turn dark and its stem losses their firmness. Other changes that occur in this stage are biochemical changes the composition of nutrients and flavours get altered. This transformation is not

desirable as button mushrooms are associated with a delicate and mild taste thus delayed harvested mushrooms do not meet consumer demand leading to a decline in their demand.

Delayed harvest also impacts the nutritional profile of the mushroom. As the mushroom grow its nutrient composition changes. For example- the content of vitamin C decreases and the continent of vitamin B increases. While the total nutritional profile remains high it varies greatly from button stage. Another consequence of delayed harvest is that it increases the chances of microbial spoilage and contamination. As the mushroom grows its protective barrier the veil gets removed fully exposing its gills makes it more susceptible to its surrounding environment that eventually, decreases the shelf life of the mushroom.

vii) Cleaning and trimming- when the mushrooms are harvested they are checked for any kind of defect which can be bruises, damages or any kind of blemishes. Any diseased mushrooms are discarded. After this, any soil or substrate particles which are adhering to the mushrooms are gently brushed and wiped.

2. Common Challenges During the First Flush

a) **Overcrowding:** Ensure mushrooms have enough space to grow without overlapping to maintain shape and quality.

b**) Contamination:** Maintain strict hygiene to prevent diseases or pests that can damage the crop.

c) Environmental Fluctuations: Consistent temperature, humidity, and CO_2 levels are critical for uniform growth.

Conclusion

The first flush of button mushrooms contributes significantly to the total yield. Employing proper harvesting techniques is crucial not only for maximizing this yield but also for preserving the substrate's integrity, which supports subsequent flushes. High-quality harvesting practices further enhance the mushrooms' marketability and consumer appeal. Harvesting the first flush requires meticulous attention to timing, technique, and post-harvest handling. By following best practices, growers can optimize yields, maintain quality, and pave the way for successful future flushes. Advancements in research could focus on automating the harvesting process to reduce labour costs and improve efficiency. Investigating improved substrate formulations and environmental controls may further enhance yield and quality. Additionally, exploring sustainable packaging and storage solutions could minimize post-harvest losses, extend shelf life, and promote eco-friendly practices while boosting market appeal.

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