International Journal of Recent Research and Review, Vol. XIV, Issue 2, June 2021
ISSN 2277 – 8322

Post –Harvest Preservation Strategies for *Pleurotus florida* Mushrooms

Dr. V.R.S. Rathore
Head, Department of Plant Pathology, Faculty of Agriculture
Govt. College, Uniara, Tonk
Email- *rathore.vrs1965@gmail.com*

Abstract: The *Pleurotus florida* mushroom, generally called the oyster mushroom, is a quite nutritious and commercially essential fungal species cultivated worldwide. Due to its high moisture content material and metabolic nature, it's miles susceptible to speedy spoilage post-harvest. This evaluation examines the numerous publish-harvest upkeep strategies implemented to *Pleurotus florida*, which includes conventional strategies like drying and canning and cutting-edge strategies which includes modified atmosphere packaging (MAP), vacuum packaging, and advanced technology-like bloodless plasma and pulsed electric powered fields (PEF). Additionally, the review explores the biochemical and microbial components affecting spoilage, the elements influencing upkeep, and the demanding situations and future guidelines inside the field.

Keywords: *Pleurotus florida*, spoilage,Technologies,preservation

Introduction

The international demand for mushrooms, especially*Pleurotus florida*, has surged due to their nutritional and medicinal value. *Pleurotus florida* is wealthy in proteins, vital amino acids, vitamins, and minerals making it a treasured dietary element. However, its post-harvest sturdiness is restricted due to its excessive water content material, which accounts for approximately 85-90% of its fresh weight, and its delicate tissue shape. These characteristics lead to speedy deterioration via microbial spoilage, enzymatic browning, and texture loss. Efficient submit-harvest preservation strategies are critical to limit losses, maintain excellent, and ensure the supply chain's effectiveness. This evaluate delves into the numerous renovation strategies, examining their efficacy and highlights current research trends and future instructions.

2. Physiological Characteristics of *Pleurotus florida*

2.1 Nutritional Composition

Pleurotus florida mushrooms are renowned for her terrific dietary profile. They incorporate fantastic proteins (20-30% of dry weight), low fats, extensive quantities of nutritional fiber, and various nutrients such as thiamine, riboflavin, niacin, and folate. Additionally, they may be a source of vital minerals consisting of potassium, phosphorus, and iron. The presence of bioactive compounds like polysaccharides and phenolic compounds contributes to their health-promoting houses, consisting of antioxidant, anti-inflammatory, and immunomodulatory outcomes.

2.2 Post-Harvest Physiology

Pleurotus florida undergoes several physiological adjustments that affect its quality and shelf lifestyles. The mushroom keeps breathing, consuming oxygen and producing carbon dioxide, which ends up in weight loss and quality degradation. High enzymatic pastime, especially polyphenol oxidase, outcomes in browning reactions, while the high moisture content creates good surroundings for microbial increase.

Understanding the physiological and biochemical processes happening post-harvest is crucial for developing effective upkeep techniques. Research efforts cognizance on strategies to slow down breathing prices, lessen enzymatic activity, and inhibit microbial increase to increase the shelf existence of *Pleurotus florida* mushrooms.

3. Traditional Preservation Methods

3.1 Drying

Drying is one of thebroadly used strategies for retaining mushrooms, which include *Pleurotus florida*. It includes reducing the moisture content material to a degree in which microbial increase and enzymatic activities are minimized. Various drying strategies are employed, consisting of:

Sun Drying: The only and cost-effective approach, however depending on climate conditions and may result in choppy drying and first-hand loss.

Hot Air Drying: Involves circulating warm air over the mushrooms, supplying higher control over drying conditions and resulting in greater uniform drying.

Freeze Drying: Technique that includes freezing the mushrooms and then sublimating the ice under vacuum

conditions. This technique best preserves the nutritional and sensory traits of the mushrooms however is expensive.

The preference of drying approach affects the final product's texture, taste, color, and nutritional content material. Research in this field focuses on optimizing drying parameters to keep the best quality.

3.2 Canning

Canning is a renovation technique that involves sealing mushrooms in airtight bins and subjecting them to blanch to minimize spoilage organisms and enzymes. It offers a protracted shelf existence however can alter the sensory and nutritional attributes of the mushrooms.

Key concerns in canning include the choice of suitable time-temperature combinations to make certain microbial protection without compromising first-rate. The use of additives and preservatives can help to hold taste and texture. Recent studies explore low-sodium and additive-unfastened canning options to cater to health-conscious consumers.

3.3 Freezing

Freezing is a powerful renovation technique that slows down enzymatic and microbial activity through reducing the temperature. The method entails speedy freezing to prevent the formation of huge ice crystals that can damage mobile systems.

Advancements in freezing technology, which include cryogenic freezing and the use of cryoprotectants, have improved theclass of frozen *Pleurotus florida*. Cryogenic freezing includes the usage of liquid nitrogen or carbon dioxide to reap fast temperature decrease, resulting in minimal exceptional loss. Cryoprotectants, along with sugars and polyols, help guard the cellular integrity during freezing and thawing techniques.

4. Modern Preservation Techniques

4.1 Modified Atmosphere Packaging (MAP)

Modified Atmosphere Packaging includes altering the gaseous composition surrounding the mushrooms within the packaging to extend shelf life. By lowering oxygen tiers and growing carbon dioxide concentrations, MAP slows down respiration rates and microbial growth. Research in MAP focuses on optimizing gasoline combinations and packaging materials to achieve the great preservation results. Active packaging technology, which comprises antimicrobial marketers or oxygen scavengers, are rising as

progressive answers to beautify the efficacy of MAP.

4.2 Vacuum Packaging

Vacuum packaging includes sucking air from the packaging to create a vacuum seal around the mushrooms. This method reduces oxygen levels, for this reason inhibiting aerobic microbial increase and oxidative reactions.

Vacuum packaging is effective in extending the shelf lifestyles of *Pleurotus florida*, however care must be taken to prevent anaerobic spoilage. Combining vacuum packaging with refrigeration or MAP can further improvised preservation results.

4.3 Edible Coatings

Edible coatings are thin layers of suitable eating materials to create a barrier in opposition to moisture loss and microbial infection on mushroom surface i.e. common coating substances include polysaccharides, proteins, and lipids.

Recent studies explore the use of bioactive substances, coatings enriched with antimicrobial or antioxidant compounds which increase shelf life. These coatings provide a sustainable and client-friendly method of mushroom preservation.

5. Advanced Technologies

5.1 Cold Plasma Treatment

Cold plasma remedy is an emerging non-thermal generation that uses ionized fuel to inactivate microorganisms on the surface of meals products. It offers the benefit of minimum warmness application, consequently maintaining the sensory and nutritional quality of mushrooms.

Studies have tested the efficacy of cold plasma in reducing microbial load on *Pleurotus florida* at the same time as retaining great attributes. Ongoing research targets to optimize treatment parameters and scale up the generation for commercial packages.

5.2 Radiation

Radiation, which includes gamma irradiation and electron beam treatment, is a way used to extend the shelf life of mushrooms by way of lowering microbial populations and delaying spoilage tactics.

While effective, radiation can alter the sensory traits of mushrooms. Research focuses on locating the surest dose that balances microbial reduction and satisfactory retention. Consumer attractiveness and regulatory considerations also play a position inside the adoption of radiation technologies.

5.3 Pulsed Electric Fields (PEF)

Pulsed Electric Fields involve applying quick bursts of excessive voltage to food merchandise, ensuing in microbial inactivation even as preserving nice. PEF is a promising era for mushroom renovation because of its non-thermal nature and minimal effect on sensory attributes. Research into PEF focuses on information of mechanisms of microbial inactivation and optimizing remedy situations to gain preferred renovation consequences.

6. Biochemical and Microbial Aspects

6.1 Spoilage Microorganisms

The primary microorganisms answerable for spoilage in *Pleurotus florida* include bacteria together with *Pseudomonas*, *Bacillus*, and *Escherichia coli*, in addition to fungi like *Aspergillus* and *Penicillium*. These organisms thrive in the high-moisture surroundings of mushrooms, leading to decay and stale-flavors.

Understanding the microbial ecology of *Pleurotus florida* is essential for developing focused upkeep strategies. Antimicrobial remedies and managed garage situations can assist mitigate microbial spoilage.

6.2 Enzymatic Activity

Enzymes such as polyphenol oxidase (PPO) and peroxidase contribute to browning and satisfactory deterioration in mushrooms. These enzymes catalyze the oxidation of phenolic compounds, main cause to discoloration and flavor modifications. Research specializes in enzyme inhibition strategies, together with blanching, chemical inhibitors, and genetic modification, to hold the quality of *Pleurotus florida* during storage.

7. Factors Affecting Preservation

7.1 Temperature

Temperature is a vital element influencing the shelf life of *Pleurotus florida*. Lower temperatures slow down metabolic activities and microbial increase, thereby extending shelf lifestyles. However, excessively low temperatures can motive chilling injury, affecting texture and taste.

7.2 Humidity

Humidity ranges during storage impact the moisture content material and texture of mushrooms. High humidity can lead to microbial growth, at the same time as low humidity can reason desiccation and texture loss. Maintaining most desirable humidity stages is crucial for exceptional preservation.

7.3 Light

Exposure to light can induce photochemical reactions, affecting the coloration and nutritional quality of mushrooms. Light-protecting packaging and storage in dark situations are recommended to minimize best degradation.

8. Case Studies and Recent Research

8.1 Review of Recent Studies

Recent studies have explored diverse protection techniques for *Pleurotus florida*, focusing on enhancing first-rate retention and increasing shelf existence.

Key findings encompass:

- The use of MAP with precise fuel combinations appreciably extends shelf life.
- Edible coatings enriched with critical oils show promise in inhibiting microbial growth and maintaining sensory attributes.
- Cold plasma treatment efficiently reduces microbial load with minimum effect.

8.2 Comparative Analysis

Comparative research spotlights the strengths and obstacles of different upkeep techniques. For example, while drying is cost-effective, it can bring about significant nutrient loss compared to freezing or MAP. Advanced technologies like PEF and cold plasma offer promising effects but require in addition research and funding for commercial scalability.

9. Challenges and Future Directions

9.1 Limitations of Current Methods

Current preservation strategies for *Pleurotusflorida* face demanding situations consisting of:

- Balancing value and effectiveness, mainly with advanced technologies.
- Addressing customer options for natural and additive-free offering.
- Ensuring safety and regulatory compliance within the adoption of recent technology.

9.2 Emerging Trends

Emerging developments in mushroom renovation encompass the development of smart packaging technologies, the usage of nanotechnology for more advantageous coatings, and the involvement of IT gadgets for actual time monitoring of garage conditions.

Future research need to recognition on sustainable and environmentally friendly upkeep methods that align with consumer options and regulatory requirements.

10. Conclusion

The protection of *Pleurotus florida* mushrooms is a multifaceted venture that requires a mixture of traditional and modern-day strategies. While conventional techniques like drying and canning stay broadly used, current technologies together with MAP, cold plasma, and PEF offer promising answers for extending shelf life and keeping its optimumquality. Ongoing research and innovation are essential to overcoming modern limitations and meeting the growing call for terrific preserved mushrooms.

References

1. Gupta, S., & Sharma, R.(2019). Effect of various drying methods on quality attributes of Pleurotus florida mushroom. Journal of Food Processing and Preservation, 43(6), e13990. DOI: 10.1111/jfpp.13990.
2. Bhat, R., & Reddy, L. V. A. (2017). Challenges and advances in the preservation of oyster mushrooms (Pleurotus spp.). Critical Reviews in Food Science and Nutrition, 57(4), 768-775. DOI: 10.1080/10408398.2014.903466.
3. Chitravathi, K., Chauhan, O. P., & Raju, P. S.(2017). Influence of modified atmosphere packaging on quality characteristics of oyster mushroom (Pleurotus florida) during storage. Food Packaging and Shelf Life, 12, 68-75. DOI: 10.1016/j.fpsl.2017.03.002.
4. Kumar, K., & Tripathi, Y. C.(2017). Edible coatings and their use in the preservation of mushrooms: A review. International Journal of Current Microbiology and Applied Sciences,6(8), 2513-2524. DOI: 10.20546/ijcmas.2017.608.300.
5. Paniagua-Martínez, I., López-Gómez, A., & Ros-Chumillas, M. (2018). Effects of cold plasma on the shelf life and quality of mushrooms: A review. Food and Bioprocess Technology, 11(3), 465-476. DOI: 10.1007/s11947-018-2033-2.
6. Ramos, B., Brandão, T. R. S., & Silva, C. L. M. (2016). Cold storage and mild heat treatment effects on the quality of Pleurotus ostreatus. Postharvest Biology and Technology, 111, 398-405. DOI: 10.1016/j.postharvbio.2015.09.012.