

Preservation Techniques of Plums – A Review

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Abstract

Postharvest losses of fruits and vegetables are a serious problem during handling, transport and storage. In order to overcome that issues, synthetic preservation and food additives are added to prolong the shelf life of fruits and vegetables, but it causes some allergies. Alternative methods of bio preservatives using Aloe Vera edible coatings over fruits are used to improve their quality and shelf-life. It is composed mainly of polysaccharides and acts as a natural barrier to moisture and oxygen. Aloe Vera gel has the ability to prolong shelf life of the fruits and vegetables by reducing the rate of respiration and maintaining quality like color, flavor etc. Aloe Vera gel is being increasingly studied as edible coating in fruits, which would be an innovative and interesting means for commercial application and an alternative to the use of postharvest chemical treatments leading to the enhancement of shelf life of fruits. This review paper summarizes the different preservation techniques of plums.

Keywords: Plums, shelf life, preservation, edible coating

I. INTRODUCTION

Plums (*Prunus domestica* L.) is one of the important fruit crops. Plums is native to Europe and Asia. It prefers full sun and wet soils. It belongs to the family Rosaceae. Fruit appears when the tree is 3 to 4 years old, ripening from August to September. It has both sweet- mucilaginous and acid taste [5]. Useful components of plums are malic acid, sugar, pectin, amygdalin and prunasin. The dried fruits known as prunes is safe, effective laxative and stomachic. Normally shelf life of plums is 3-5 days [10]. During its peak season due to the surplus of fruits in the local market and a substantial quality goes to waste, resulting in heavy post harvest losses. The post-harvest losses in between 35 and 40% and the valued at about \$800 millions / annual [8]. Reducing these problems can not only improve farmers economy but also could encourage more consumption of high nutrients of fruits. Aloe Vera protects the shelf life of fruits and vegetables. Recently researches from Spain identified that Aloe Vera is one of the edible coating that improves shelf life of fresh fruits. This gel provides a barrier to moisture, oxygen and solute movement of the foods. Aloe Vera gel based edible coating materials are applied in fruits and vegetables. It is tasteless, colorless and odorless. Natural products are safe for food and environmentally friendly alternative method of synthetic preservation such as sulfur dioxide. It has been one of the best edible coating for different types of foods because of its film forming properties, antimicrobial actions, biodegradability and biochemical properties. This coating prevents microbial spoilage [11]. Bio preservation is the use of natural or controlled micro biota or antimicrobials as a way of preserving fruits by extending plums shelf life [7].

II. SPOILAGE

A small information is available for relationships between key storage parameters, such as temperature or relative humidity, product storage life and safety. Apart from spoilage concerns, the microbiological quality to produce including plums also has an important food safety component [9]. Pathogenic bacteria such as *E.coli*, *Listeria monocytogenes*, *Yersinia enterocolitica* and *Aeromonas* species have been identified as the bacteria affects fruits. The molds are breakdown in fruits texture and the generation off flavors [12]. It is estimated that about 20% of all fruits and vegetables produced is lost each year due to spoilage. The microbiological spoilage of fruit and vegetable products that are organized in three categories, fresh whole fruits, cut fruits and fermented or acidified vegetable products [7]. The characteristics of spoilage microorganisms associated with each of these fruits

and vegetables categories including spoilage mechanisms, spoilage defects, prevention, control of spoilage and methods for detecting spoilage microorganisms [1].

III. FOOD PRESERVATIVES

The food preservatives are two types: Natural preservatives and Synthetic preservatives

IV. CLASSIFICATION OF FOOD PRESERVATION

Some preservation methods require the food to be sealed after treatment because to prevent recontamination with microbes and others to allow food for drying to be stored for long periods [13]. Drying, spray drying, freeze drying, freezing, vacuum packing, canning, preserving in syrup, sugar crystallization, food irradiation and adding preservatives or inert gases such as carbon dioxide are included by applying the common method. Other methods do not only help to preserve food, but also add flavor, include pickling, salting, smoking, preserving in syrup or alcohol, sugar crystallization and curing. Food preservation processes include:

- Denature of micro-organisms (e.g. boiling)
- Oxidation (e.g. use of sulfur dioxide)
- Toxic inhibition (e.g. Use of carbon dioxide, vinegar, alcohol etc.)
- Dehydration (drying)
- Osmotic inhibition (e.g. use of syrups)
- Low temperature inactivation (e.g. freezing)
- Ultra-high-water pressure (e.g. a kind of “cold” pasteurization, the pressure kills naturally occurring pathogens, which cause food deterioration and affect food safety) [2].

V. SYNTHETIC PRESERVATION

Organic foods are made with organic standards set by national governments and international organizations. In the majority of human history, agriculture can be described as organic. Synthetic chemicals are introduced in 20th century was a large supply to the food industry [11]. This modern style of production is referred to as “conventional.” Under organic production, the use of conventional non-organic pesticide includes insecticides, fungicides, and herbicides [3].

VI. CAUSE OF SYNTHETIC PRESERVATION

Many varieties of foods by using sulfites are common preservatives to cause a variety of symptoms. Nitrates and Nitrites -These additives are used as curing agents in meat products. Few reports of reactions are urticaria, itching and anaphylaxis. Benzoates - antimicrobial preservatives responsible for worsening asthma, allergic rhinitis, chronic urticaria and flushing in some people [16].

VII. EFFECTS OF FOOD PRESERVATIVES

Different types of preservative food products are available in market. These preservatives can give rise to certain health problems. Food preservatives are used to inhibit the growth of bacteria, molds and yeasts in the food. Some food additives are manufactured from the natural products such as corn, beet, soybean and some food additives are manufactured from the artificial sources, man-made [5]. Many people are affected allergic to certain food additives or colors. Few people will be allergic to synthetic preservative foods after eating. Unfortunately, some people do not have a sudden reaction until a day or two later, so it is difficult. The test measures the level of allergy antibodies in the blood that are present. Such test for synthetic additives is not reliable [8]. Thus, people have to go on an elimination diet. It is best to eat a preservative-free diet. Nuclear radiation when used for preservation does not make foods radioactive, but may cause changes in food color or texture [6].

VIII. NATURAL PRESERVATION

Fruits, vegetables, seafood and meats have a very short shelf life, so that using for preservation techniques to extend their shelf life. Many of them have made use of chemical and synthetic preservatives because they are low cost and easily available [17]. However, nowadays, the natural preservatives are replaced by products as close to the natural ones due to the adverse effects that synthetic chemical preservatives can cause to consumers’ health, even though these products are allowed in some countries. Currently, researchers have been focused for preservative agents considered natural, those that are derived preferentially from plants [1]. These preservatives should act at extending the shelf life. Among the most widely used synthetic preservatives are nitrates, benzoates, sulphites, sorbates and formaldehyde which despite the benefits conferred on food, such as the safety and quality of products that reach the consumers. Plant extracts have the advantage of being consumed by humans for thousands of years, and in addition to the antimicrobial action, several plants are being used in different areas of human health, such as traditional medicine, functional foods, food supplements and production of recombinant protein [7].

IX. FOOD PRESERVATION METHODS

Foods are preserved since ancient times. The preservation process will restrain the development of microbial such as bacteria and fungi. The aims of food preservations include,

- Maintains food taste, texture, flavor, quality and nutritional value
- Reduce the wastage of excess food
- Maintain products accessibility for a longer time, even in places it is not being produced
- Preserve the food materials during transport and
- Ease the handling of food materials [17].

X. APPLICATION OF ALOE VERA

Aloe Vera gel derived from the pulp has become a big industry worldwide due to its application in the food industry. Gel was utilized in functional foods specific for the preparation of health drinks with no laxative effects. It is also used as flavoring components [6]. The efficient processing technique needs to improve the products quality and safety by preserving the bioactive chemicals naturally present in Aloe Vera gel. It is environmentally friendly. Aloe Vera plant gel are applied by various steps of filtrations and stabilization. Preserving the biological integrity of active ingredient to exert the reported physiological effect upon ingestion or topical application [4].

XI. EDIBLE COATING TECHNIQUE

It is another preservation method which can be used to maintain the food condition. This method has been broadly considered for preservation of fruits and vegetables. This increases the public demands in the development of edible coatings which will replace the synthetic waxes for maintaining the quality of postharvest fruits [15]. Edible substances such as protein, polysaccharides and lipids will be enforced on the surface of the product to form a thin layer. Edible coating is an ecologically well-disposed innovation that has been applied on numerous products to control moisture transfer, exchange gases or the oxidation process. Nevertheless, edible coating is able to prolong the shelf life by reducing the respiration and conserve their organoleptic properties. Nowadays, edible coating technique has been applied with the additional of food additives in the coating formation. Furthermore, the addition of food additives will help to extend the shelf life of food [3].

XII. APPLICATION OF NATURAL PRESERVATION IN FOOD

The deterioration of these foods causes the development of undesirable odors, alteration in the nutritional value and can consequently influence the acceptance of the product by the consumers. The use of natural preservatives in food has been widely accepted by consumers who are increasingly looking for natural and healthy products, free of synthetic additives [4].

XIII. CONCLUSION

Preservatives are used to increase the shelf life of food and to maintain the quality for longer time. It has been reported that chemicals which are used as preservatives have side effects. The reaction of preservatives can be very mild to life-threatening. It is best to eat a preservative-free diet if at all possible.

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