



ENHANCEMENT OF SHELF LIFE AND QUALITY MAINTENANCE OF FRUIT AND VEGETABLE USING HERBAL PRODUCTS BASED ON ANTIMICROBIAL COATING

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ABSTRACT:

As per consumer demand enhancement of shelf life and quality maintenance of fruits and vegetables. Many natural and artificial preservatives are available in this market but many preservative shows harmful effect to the body that's why used some natural preservatives like aloe vera gel and Neem oil and Neem leaf extracts. Thus Aloe vera gel and neem oil, neem leaf extracts based antimicrobial edible coatings has been identified as a suitable method to extend the shelf life of fruits and vegetables. Treatment has given satisfactory result was recorded until three months in intervals of one week and two week. Combination of aloe vera and neem oil, neem leaf extract edible coating was proved to be efficient as preservative and nutritive value of fruits and vegetables.

Key words: - Herbal edible coatings, Shelf life, Antimicrobial coatings, Neem oil, Aloe vera gel

INTRODUCTION:

Fruits are important sources of many nutrients, they are really essential to the body and also everybody to eat fruit and vegetables. Fruits and green vegetables are little in calories and fat and are a basis of sugars, fiber, and vitamins, which are vital for our health. Fruits present in soluble nutritional fiber, which help to reduce low cholesterol and low fats from the body. Fruits compose of many antioxidants such as polyphenolic flavonoids, vitamin-C and anthocyanin but fruits and vegetables are a serious problem because of rapid deterioration during handling, transport and storage, that's why use of same herbal coatings like Aloe Vera gel, Neem extract, Neem oil, To improve their quality and self-life enhancement of shelf life and quality maintenance fruits and vegetable.

Herbal edible coatings:

Herbal coating is a new method for food manufacturing. It is completed from herbs or mixture of herbs, most general herbs used in edible coatings like Aloe Vera gel, Neem, Lemon grass, Marigold leaf, and Cluster beans, Tulsi and Turmeric. Herbs have antimicrobial property, it

consists vitamins, antioxidants and essential minerals (M. Douglas, J. Heys & B. Smallfield, 2005). Beneficial for health act as a nutraceutical and medicines.

Aloe Vera

Aloe vera gel is use in herbal edible coating of food industries because of its antimicrobial properties. Aloe Vera is semi-tropical plant with some medicinal properties. "Aloin and Aloe-emodin" are the major components of aloe vera extract. This extract has antifungal, anti-bacterial, anti-inflammatory properties. It also consists of components like glycoproteins, polysaccharides, salicylic acids, phenolic compounds, lignins, amino acids, vitamins and enzymes. It can suppress respiration and can reduce microbial growth, thus can improve the shelf life of fruits and vegetables. Aloe vera is a tropical and subtropical plant. Aloe vera contains medicinal and therapeutic properties and has been used for centuries (Eshun 2004). Aloe vera gel is used as edible coating for fruit and vegetables. It has antifungal properties (Saks 1995). Aloe vera gel based edible coatings prevent moisture loss and retains firmness, decreases respiration rate,

delays oxidative browning and reduces the growth of microorganisms in table grapes (Valverde 2005).

Neem

Neem is considered as the holiest, therapeutic and a non-lethal plant, which has antifungal, antimicrobial properties. Neem extracts act against pathogens like Salmonella, Staphylococcus, E. coli, Vibrio and other microorganisms. Nimbidin are the major components of neem extract. These components can act as an antimicrobial property. They improve the external and internal quality characteristics of diverse commodities. Coatings can reduce dehydration and oxidation as well as the resulting undesirable changes in color, flavor, and texture. Waxes and other coatings delay ripening and senescence of fresh produce and can increase the microbial stability of lightly processed fruits, vegetables, and some processed products. Coatings show promise as environment friendly treatments. Most coating materials are produced from renewable, edible resources and can even be manufactured from waste products that represent disposal problems for other industries. According to this review, Edible Coatings extends shelf life, reduce water and moisture loss, delayed ripening process and also prevent microbial growth specifically in fresh fruits and vegetables (Akilandeswari, P., & Pradeep, B.V. (2016).

Edible coating characteristics

Edible coating should not contain any toxic, allergic substance and should be digestible liable to mechanical damage during handling, display and transportation have good adhesion property have good water barrier properties provide semi permeability to maintain internal equilibrium of gases which is involved during anaerobic and aerobic respiration, thus retarding senescence not affect the nutritional and organoleptic properties of fruit and vegetable be capable of being used as a carrier for desirable additives

such as flavor, nutrients, coloring and vitamin have antimicrobial and antibacterial properties be easily manufactured and economically viable.

MATERIALS AND METHOD:

Preparation of Aloe Vera gel

Matured leaves of Aloe Vera plant were harvested from a nearby botanical garden. The leaves were then wash with a gentle chlorine solution of 25% or distilled water. The leaves skins were peeled and the outer cortex. The colorless hydroparenchyma removed in leaves and was blended. The liquid obtain constitute fresh Aloe Vera gel. It was stored in glass bottle.



Preparation of Neem leaf extract

The extract of Neem leaf, was prepared by drying of under shade till they are completely dried with no moisture content. A fine powder by blender. Solution was prepared by different concentration of gel.



Neem oil

Neem oil bottle was purchased from a local medical shop. The solution of neem oil was prepared by mixing of oil with distilled water, with leaf extract on a percentage wise.

Collection of fruits

Fresh fruits were purchased from local market of Chandrapur and transferred to laboratory in sterile conditions. Fruits were washed with sterile distilled water and alcohol to remove the dirt followed by air dried. On the basis of size, shape, colour and absence of any external injuries.

The fruits used in this experiment were divided into groups. Control, Only aloe vera, only neem oil extracts and combination with Aloe vera and neem extracts. The fruit were stored in box and basket.



APPLYING METHOD:

Herbal coatings can be applied fruits by the methods of dipping, spreading, and spraying. Dipping is one of the most frequently used methods for applying the herble coating in fruits and vegetables. Optimization was carried out by storage temperature and pH and observes different time intervals. Comparative study of different types of fruits, vegetables and different herbal coatings.

EXPERIMENT AND RESULT:

In the present study was different type of fruits were collected from market such as Apple, Chikoo, Guava, Grapes, Banana. Fruits were further processed for experiment in microbiology laboratory. It was observed that the fruits coated with sample. Control fruits were spoiled within one week. Some edible coated fruits good after three months but some fruits were spoiling within 30 days.

DISCUSSION :

In present study, was carried out by enhancement of shelf life and quality maintenance of fruit and vegetable using herbal products based on antimicrobial coating. Decay is one of the most important postharvest factors in reducing quality fruits and vegetables of horticultural crops. The present study was given by different type of fruit were collected from market such as Apple, Banana, Chikoo, Guava,

Grapes etc. The fruits were processed for experimentation in labortary. It was divided into some categories Contol, Aloe vera, Aloe vera and neem leaf extract and neem oil.

It was observed that the experimental fruit like Apple, Chikoo etc. After that colour was observe in long duration. It was not change in any quality of fruit. The fruit become shriveled and wrinkled. This gel treatment was effective as a physical barrier.

The control fruit was observed in short time period was decay as compare to coated fruits. Coating had shown the maximum effect of self life and maintaining the quality of the fruit.

The results revealed that the changes in colour and physical changes of control showed within some fruit 20 to 25 days but Apple and pears was observe in best for the 3 month, No colour change and outer surface or no external injury . It can be observed that coating had shown the maximum effect of self life and maintaining the quality of the fruits.

CONCLUSION

The result have proved the ability of the various coatings used in the present study to enhancement of shelf life and quality maintenance of fruit and vegetable using herbal products based on antimicrobial coating of different type of fruit such as Apple, Guava, Banana, Chikoo, Grapes etc.

It can be observed that Neem leaf extracts and Aloe vera was found to be best as the decay was too less on comparing with the other treatment in different samples. Coating with Aloe vera and neem oil or in combination of both had a positive impact increasing the shelf life of fruit and maintaining the quality of fruit. In future, these treatments may also be applied in other fruit and vegetables to prevent post harvest losses.

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Fig. 1: Experimental Apple for (After 3 Month)



Fig.2:experimental Banana after 1 week



Fig. 3: Experimental Chikoo for After 30 day

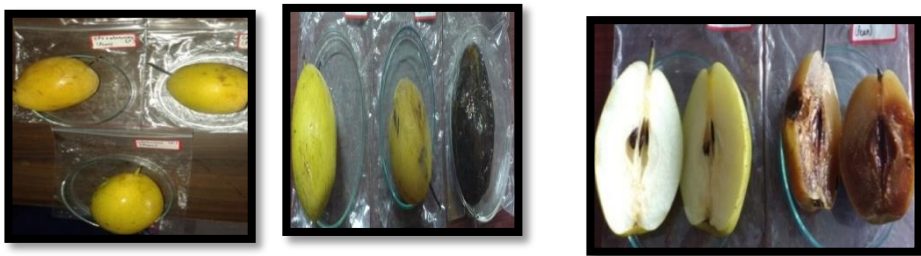


Fig. 4: Experimental Pear for (After 3 Month)



Fig. 5: Experimental Grapes for two weeks