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Review Article

Review Article on Methods which are Right from Home, for Improving Self Life of Tomato (*Lycopersicon esculentum)* and Sapota (*Manilkara zapota*)

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A B S T R A C T

The present review paper is mainly focused on improving self-life of vegetables (Tomato and Sapota). As we all know vegetables are main sources for many essential vitamins and proteins. Their self-life period is too short and in some rural areas and in Villages people won't have any modern new technology like refrigerator or cold storage etc. In most of the cases they will be storing their yield in a traditional mud houses and in bricks house and that will not increase their self-life at all. In them with the available conditions (Moisture, Temperature, protection from rodents) the fruits mainly make their way and prone to destroy or decay. So, using these methods may increase the self-life of the vegetables (Tomato, Sapota). So, I had followed different methods to improve self-life of these vegetables by coating them with unharmful and useful (which tries to act like a cover to the fruit from outer environment) plant extracts, or by drowning them in a particular solution or spraying the extracted plant extracts (liquid) on them and later they may turn into coating.

Keywords

Self-life, Coating, plant extracts, Drowning, Rodents, Mud houses, Brick houses, Extracting

Introduction

Since there is an increase in demand for the food products because of the increase in the population there will be a problem in storing them. Traditional and regular methods like cold storage, mud houses and brick houses are not sufficient and aren't suitable for storing the vegetables that are maintained with zero care and without following proper micro-environment conditions. People suffering from budget problems won't prefer to rent a cold storage which may or may not be nearer to their production place. Tomato is one of the very perishable fruit and it changes continuously after harvesting. Depending on the humidity and temperature it ripens very soon, ultimately resulted in poor quality as the fruit become soft and unacceptable (Ullah, 2009). Water comprises 90% of the fresh weight of tomato fruit and the size of the fruit is influenced by the availability of water to the plant. The large amount of water also makes the fruit perishable. Also, quality of most fruits and vegetables is affected by water loss during storage, which depends on the temperature and relative humidity conditions (Perez et al., 2003). Tomato fruit kept within sealed packages resulted in an atmosphere with high CO2 and low O2 content. These conditions retained flesh firmness, low acidity and soluble solids concentration and delayed fruit lycopene (Sabir and Agar, 2011). So, improving self life of fruits and vegetables is compulsory for us. The quality of fresh tomatoes is mainly determined by appearance (colour, visual

aspects), firmness, flavour and nutritive value (Giovannoni, 2001). Coating them with the desired and safe extracts that may or may not help in increasing the self-life of them.

Coating definition

Edible coatings can be defined as a thin layer of material which can be consumed and also acts as a barrier for gaseous exchange, microbes of external source, moisture that damage the product. In edible coating a semi permeable is present and is aimed to extend shelf life by not allowing the moisture, solute migration, gases exchange, oxidative reactions and respiration as well as to reduce physiological disorders on fresh cut fruits. (Baldwin, 1996 and Park, 1999).

Health benefits

Tomato

Reduce risk of heart diseases
Source of Lycopene which is a type of carotene which boosts our immune system
Helps in smooth digestion
Antioxidants
Cancer prevention
(livescience.com, consumerreports.org)

Sapota

Rich in calcium
Rich in iron and phosphorus
Strengthen the bones
Contains Antioxidants
Having Vitamins A, C, E
(m.timesofindia.com)

Ingredients used

Onion juice extract (onion juice solution = Onion juice + water), Aloe vera gel for tomato (Athmaselvi *et al.*, (2013) and aloe vera juice for Sapota (Padmja and Basco, (2014). Mostly trying not to use chemical preservatives and to use cost-effective materials.

An awareness among the consumers regarding their health made them to use the natural products and plant extracts as natural preservatives (Bhat *et al.*, 2011).

Post harvest loss of fruits and vegetables is a threat because of speedy and brisk deterioration during handling, transport and storage (Yahia, 1998).

The characteristics of the materials that are used in coating

Edible
Cost effective
Non-chemical extracts
That helps the fruit to cut contact with the environment
Home made with easily available products
Easily washable
Eco-friendly

Classification of coating

The edible coatings are mainly divided into three classes these are following:

Coatings can be in a mixed form of polysaccharides-based, protein-based or combination of both of them to improve their function (Warriner *et al.*, 2009).

Hydrocolloids: e.g: polysaccharides, proteins and alginate.

Polysaccharides are made up of polymer chain, which are having excellent gaseous exchange restriction properties, that modifies the atmosphere and increase the shelf life of the fruits and vegetables without anaerobic

conditions. (E.A. Baldwin, M.O. Nesperos-Carriedo and R.A. pp. 509-552 (1995)).

Lipids: e.g: fatty acids, acryl glycerides and waxes.

Lipids are having good water barrier capacity (Morillon *et al.,* 2002). Wax coatings contain very good moisture barrier properties as compare to other lipid based coating and non-lipid coating. Oil, fat and wax based coatings are not easily applied to the surface of fruits and vegetables because of its greasiness and thickness and it gives rancid flavour (Robertson, 2009).

Composites: *e.g:* protein/protein, polysaccharides/ protein, lipid/ polysaccharides (Donhowe and Fennema, 1993).

Fresh fruits and vegetables are highly perishable and almost 50% fresh produce are damaged during harvest, handling, transportation and storage. But when we use edible coatings we can protect them from damage. Edible Coatings are applied on fresh un-cut and fresh-cut fruits and vegetables. (Dhall, 2013; Youssef and Emam, 2015). Edible coating materials are made up of polysaccharides, proteins and lipids (Pascall and Lin, 2013). Edible coating can be used on:

Fruits: Edible coated fruits are Orange, Apple, Grapefruit, Papaya, Mango, Peach etc. and fresh-cut Apple, fresh-cut Peach, fresh-cut Pear etc.

Vegetables: Tomato, Cucumber, Capsicum and minimally processed Carrot, fresh-cut Potato, fresh-cut Tomato slices, fresh-cut Onion, Lettuce.

Table.1

Coating material	Purpose	Reference
Guar Gum	Antimicrobial	Mahajan, Caleb, Singh, Geyer et al.,2014
Soya bean gum	Overall quality	Mahajan, Caleb, Singh, Geyer et al.,2014
Aloe Vera gel	Overall quality	Mahajan, Caleb, Singh, Geyer et al.,2014
Chitosan	Overall quality	Mahajan, Caleb, Singh, Geyer et al.,2014

List of some coating materials

Uses of coating

It helps the product not to get in contact with the outer environment

Almost all the micro organisms and the chemicals they release will not be in contact with the product

Edible coatings have good properties to water, moisture, O2, CO2, and ethylene.

It improves the appearance, handling and color of Fruits and Vegetables.

This coating contains active components like antioxidants, vitamins they will increase the nutritional composition of Fruits and Vegetables without affecting the product quality.

These coatings provide a protective covering on Fruits and Vegetables and

helps in increase and improving their shelf life.

(Arvanitoyanni and L.G.M. Gorris, pp. 357-371, 1999, press Boca Raton, Florida)

Advantages of coating

(S. Guilbert and B. Biquet, New York, (1996)), (M.O. Nesperos- Carriedo, E.A. Baldwin and P.E. Shaw, pp. 122-125 (1992b)) and (H.J. Park, pp. 250-260 (1999)).

Edible coatings helps in no change in acids, colour, flavour and sugar.

Maintains the quality of fruits and vegetables during their storage.

It will reduces loss of weight and loss of firmness.

Decrease plastic packaging and usage.

Edible coatings can be eaten along with fruits and vegetables, they do not cause harm to our body.

The main advantages of edible coating are its edibility, non-harmfull nature, eco-friendly and less cost as compared to other synthetic coating (N. Prasad and E. Batra, pp. 2231-2560 (2015)

Disadvantages of coating

(El-Ghaouth, J. Arul, R. Ponnampalam and M. Boulet, Chitosan pp. 1618-1620 (1991a)) and (J.W. Park, R.F. Testin, H.J. Rank, P.I. Vergano and C.I. Wlter, pp. 916-919 (1994)).

Thick coating will not allow gaseous exchange, which changes the flavor of the fruit development.

Edible and thick coatings have good gas barrier properties which makes the surrounding environment anaerobic due to this ripening process is altered in fruits and also in vegetables.

Even some edible coatings will absorb moisture from surrounding environment, which helps to increase fungal growth.

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