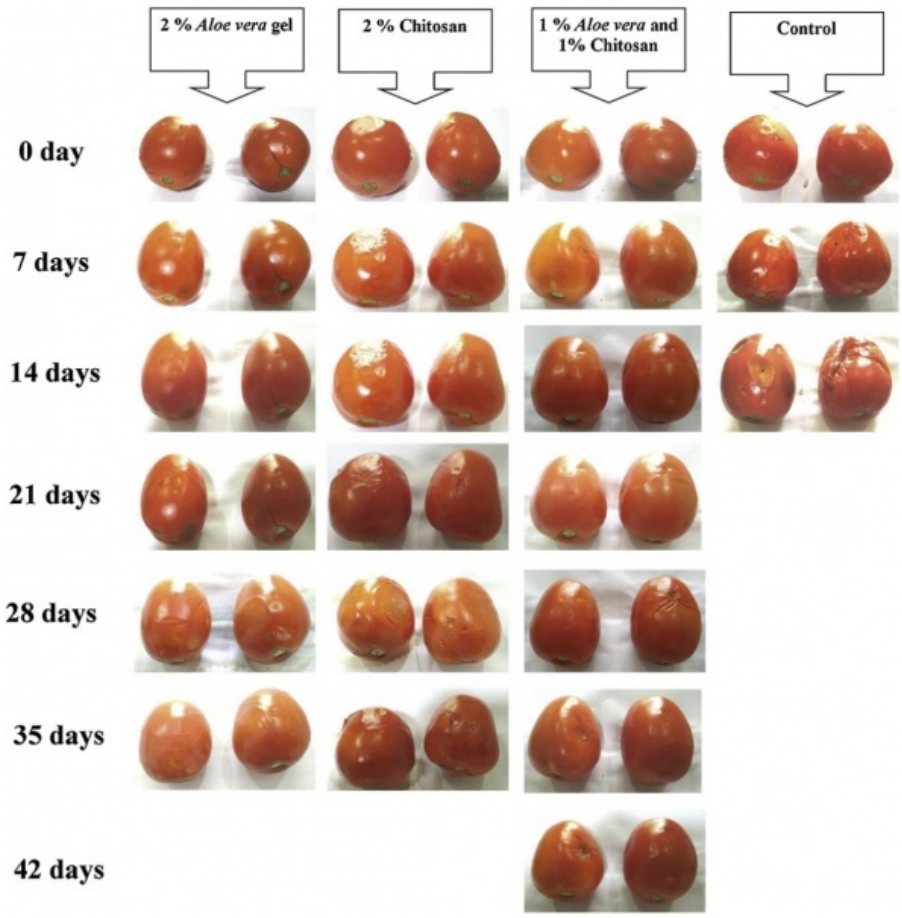
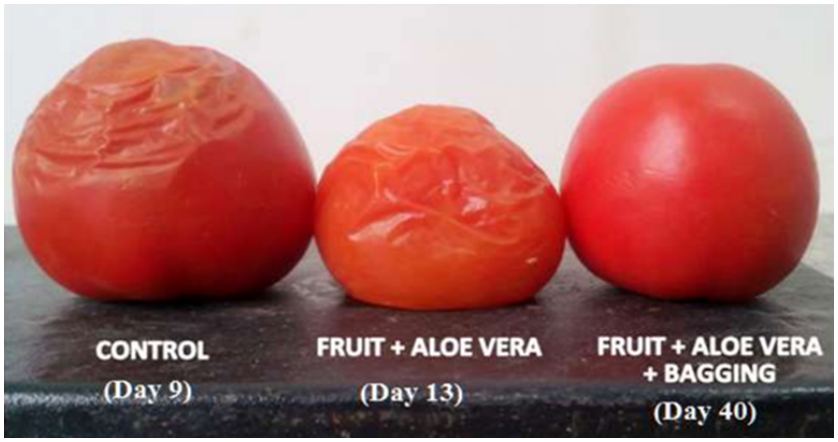
ALOE VERA, Green edible coating: Approach to reduce food loss waste.



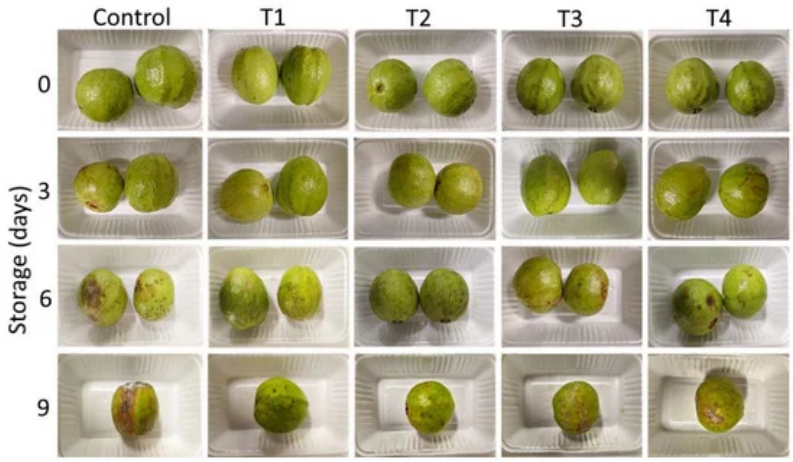

Develop expressions that measure the potential to reduce food waste while improving freshness and on-shelf availability of fresh fruits and vegetables, and convenience. Retail stores need consider a replenishment policy that incorporates instead of use just water in produce shell used aloe vera coating in misting application in refer shell.



## Impact on Retail Operations

Quantitative losses include decreased weight or volume, such as may occur from poor handling, include adversely altered physical condition or characteristics, such as undesirable color changes and reduced nutrient value. While the causes of food loss at the end stages of the supply chain have been well studied, the causes of loss on the farm and in early distribution stages have not. “Food loss” is a subset of postharvest loss and represents the amount of food that is available for consumption at either the retail or the consumer levels but is not consumed; it includes natural shrinkage (e.g., moisture loss), loss from mold, pests or inadequate climate control and food waste. “Food waste” is a subset of food loss. Food loss as it relates to fresh fruits and vegetables is especially challenging because these foods are highly perishable food waste occurs when an edible item goes unconsumed because of human action or inaction and is often the result of a decision made farm-to-fork by businesses, governments, and individual consumers. As an example of food loss, an estimated 8.6% of the retail weight of fresh apples is lost at the retail level and after removing that amount from the food supply, an additional 20% is lost at the consumer level. Some unknown portion of each of these fresh apple loss amounts constitutes food waste, such as apples thrown out by supermarkets because of minor discoloration or soft spots (despite still being edible). Postharvest losses can occur anywhere in the postharvest chain of interconnected phases or associated activities, from the time of harvest on the farm all the way through the food manufacturing, processing, marketing (e.g., retail) and consumption chain to the final decision by the consumer to eat or discard the food. The nature of the activities in the postharvest chain varies considerably according to the type of food (e.g., refrigeration and misting for leafy greens vs. room temperature and a relatively dry atmosphere for sweet potatoes). Despite available cold chain technologies, temperature abuse occurs in a small portion of food held in storage, resulting in faster deterioration and increased potential for microbial growth. Plants wilt and die as a result of losing more water than they can absorb. Plants are unable to absorb water naturally from the ground in supermarkets. They must therefore be sprayed to keep them from wilting. There are a few reasons why fresh vegetables may be sprayed with water at the supermarket. One reason is to help keep the vegetables fresh and hydrated. Vegetables can lose a lot of water through evaporation, so spraying them with a light mist of water can help keep them from drying out. Additionally, water can help to clean the vegetables and remove any dirt or debris that may be on them. Finally, spraying vegetables with water can help to make them look more appealing and inviting to customers. Fresh produce is sprayed with water to keep it hydrated and fresh in grocery stores. It is critical to mist vegetables to prevent them from wilting or losing their crispness. When items sold by the pound are sold with water, the water adds a little residual weight, increasing the store’s profit potential. When you spray water on produce, it looks fresh, tender, and keeps the leaves from being wilted or unappetizing

Retailers may also discard food due to overstocking, improper stock rotation, quality that does not meet the retailer's specifications and additional trimming of edible parts, such as for precut produce. The widespread and growing intolerance of consumers for substandard foods (e.g., undersized or with cosmetic defects) has likely led to an increased rejection rate by both consumers and the food industry, which aims to satisfy consumer demand for a continuous supply of a wide variety of high-quality, fresh foods, including convenience foods, these is a serious matter for retail stores, FAO indicated that about one third of all food produced on the planet and about a half of all fruit and vegetables (F&V) are lost and not consumed. Food loss waste occurs during five key stages of the food supply chain: agricultural production, postharvest handling and storage, processing, distribution, and consumption. Large portions of FLW in developed countries occur during retail and consumption and are largely related to logistic management operations and consumer behaviors. Emerging new technologies for prevention of F&V losses, the rising interest in edible packaging is in part attributable to the trend toward improving food quality with edible barriers and the rising demand among consumers for highly processed, fresh-tasting, and long-lasting foods. Food-safe films and coatings are thin, easily removed layers (0.3 mm) that can be eaten whole or used as a topping. The coatings or films applied to food products must not diminish their flavor or texture. Thin coatings on foods or continuous layers between sections or ingredients of different products are examples of edible packaging.




Reduce Food Loss and waste, for the people, for the planet.

Our food systems cannot be resilient if they are not sustainable, hence the need to focus on the adoption of integrated approaches designed to reduce food loss and waste. Strategies and technologies used to reduce food loss will vary at the different points along the food production, marketing, and consumption chain, such as sophisticated packaging of food sold at retail to reduce spoilage and gleaning (i.e., edible coating by natural biopolymers, as aloe vera). The shared properties of coatings' innovation-based natural polymers can be determined by analyzing the product's unique characteristics and how they change during production, shipping, and depository. Despite a physical barricade, edible coatings on food products must be packaged in non-edible materials due to contamination concerns. By replacing non-edible materials with edible films and coatings, waste and the environmental impact associated with food packaging can be diminished. Coatings play an essential role, from farm produce and retail store, in these stages of supply chain, coating acts as barriers to prevent the ingress of contaminants and the deterioration of the underlying surface due to oxidation, corrosion, and mechanical stress. Nonetheless, finding coatings with good surface adhesion is essential to guarantee long-term performance.

## Aloe vera Edible Coating fresh produce : Green focus and sustainable

The most significant component of A. vera gel is water (99.20%). The remaining solids consist of carbohydrates, monosaccharides comprising mainly glucomannan and small amounts of arabinan and galactan, and polysaccharides such as D-glucose, D-mannose, arabinose, galactose, and xylose. the active chemical components contained in A. vera are vitamins, minerals, lignin, saponins, salicylic acid, and amino acids, which could act as antimicrobials and antioxidants. The presence of polysaccharide components in A. vera gel can be used as an ingredient for edible films or coatings. Polysaccharide components can provide hardness, density, quality, viscosity, adhesiveness, and gelling ability. The use of plant extracts as antioxidants and polyphenols derived from aloe may exhibit several properties in various modelling systems. Enrichment fruits and vegetables, at the first stage, post harvested, with aloe edible coating can beneficially influence their oxidative stability and thanks to additional aloe coating, contribute to a decline in the incidence of degenerative diseases. An edible film or coating is a thin layer made of hydrocolloids (proteins, polysaccharides, and alginates), lipids (fatty acids, glycerol, and wax), and emulsifiers that function as coatings of or packaging for food Effective, safe and sustainable post-harvest treatment to enhance shelf-life of vegetables, One of the economical techniques used for the preservation of food is the application of edible coating onto the surface of fresh or minimally processed fruits and vegetables. To keep vegetables fresh and appealing, aloe vera juice mixed with other biopolymers as chitosan, alginate, tamarind kernel, and others, is sprayed on them. It is theoretically possible that the misting system would be used with chemicals, but the vast majority of grocery stores rely solely on water Fresh fruits and vegetables and increase food loss waste, water is not enough effort , water make more perishable products with high post-harvest food loss. There is a growing market demand for organic solutions to increase the shelf life of fresh products and reduce food waste.

Edible coatings are the most promising solutions to prevent vegetable food loss and extend vegetable shelf life. However, synthetic additives are present in most of them. Aloe vera edible coating, sustainability, circular economy actions, imply new approaches to reduce loss in supply chain farm to consumer, to be effective, safe, and sustainable use Aloe vera-based post-harvest

edible coating. Aloe vera gel also decrease the disease incidence within the horticultural commodities, combination of chitosan on the cucumber to improve its quality and extend it postharvest life. Effective in retarding fruit ripening, retaining fruit firmness, and improving fruit quality attributes including levels of fatty acids and aroma volatiles, Reduced weight loss, and shrivel; increase shelf life; increase ground skin coloration. Retaining texture (especially for brittleness); Vegetables and fruits are highly perishable as they contain80–90% water by weight. When the fruit is harvested, there is a change of the gaseous balance between the consumption of oxygen and the production of car-bon dioxide. In this new condition, the cells are not renewed, and the gas transfer rates increase, causing a metabolic loss and taking the fruit to a gradual maturation and eventual senescence, decreasing the fruit quality and the risk to consumer due to pathogenic micro-organisms presence. The optimum extension of the postharvest life of food products is critically dependent upon three factors:(1) reduction in desiccation, (2) reduction in the physiological process of maturation and senescence, and (3) reduction in the onset and rate of microbial growth.


Aloe vera edible coatings have a high potential to carry active ingredients such as ant browning agents, colorants, flavors, nutrients, spices, and antimicrobial compounds that can extend product shelf life and reduce the risk of pathogen growth on food surface, Moreover, another important advantage of aloe edible coating is the reduction of synthetic packaging waste because these coatings are composed of biodegradable raw material. Edible coatings are thin layers of edible material applied to the product surface in addition to or as a replacement for natural protective waxy coatings and to provide a barrier to moisture, oxygen, and solute movement for the food, re applied directly on the food surface by dipping, spraying, or brushing to create a modified atmosphere. Edible and biodegradable coatings must meet several special functional requirements, for example, moisture barrier, solute or gas barrier, water/lipid solubility, color and appearance, mechanical characteristics, nontoxicity, etc.

The effect of aloe vera coatings on fruits and vegetables depends greatly on temperature, alkalinity, thickness and type of coating, and the variety and condition of fruit and vegetable. The functional characteristics required for the coating depend on the product matrix (low to high moisture content) and deterioration process to which the product is subjected. Fruits and vegetables continue to respire even after harvest and use up all the oxygen within the produce, which is not replaced as quickly as by edible coating and produces carbon dioxide, which

accumulates within the produce because it can-not escapes as easily through coating. Eventually the fruit and vegetable will shift to partial anaerobic respiration that requires less oxygen (1–3%). With less oxygen, the production of ethylene (which accelerates ripening process) is disrupted, and physiological loss of water is minimized. Thus, the fruits and vegetables remain firm, fresh, and nutritious for longer period and their shelf life almost doubles. The natural barrier on fruit and vegetable, and the type and amount of coating will influence the extent to which the internal atmosphere (oxygen and carbon dioxide) are modified and the level of reduction in weight loss. The properties of edible coating depend primarily on molecular structure rather than molecular size and chemical constitution. Specific requirements for edible films and coatings are: The coating should be water-resistant so that it remains intact and covers a product adequately, when applied, it should not deplete oxygen or build up excessive carbon dioxide. A minimum of 1–3% oxygen is required around a commodity to avoid a shift from aerobic to anaerobic respiration. It should reduce water vapor permeability. It should improve appearance, maintain structural integrity, improve mechanical handling properties, carry active agents (antioxidants, vitamins, etc.) and retain volatile flavor compounds. the application of Aloe vera gel as coating, extend the postharvest life of fruits and vegetables without decomposition. Aloe vera coating is easily emulsifiable, non-sticky or not tacky, and have efficient drying performance, never interfere with the quality of fresh fruit or vegetable and not impart undesirable order. It has low viscosity and  translucent to opaque but not like glass and capable to tolerate slight pressure. Fruits and vegetables that are coated with aloe vera juice as coating as whole include: Fruits: Apple, banana, Kinnow, kiwi, grapefruit, passion fruit, avocado, orange, lime, peach, lemon. Vegetables: Cucumber, bell pepper, melons, tomato. Fresh-cut products are highly perishable, the main reason being removal of skin (the natural protective layer) from their surface area and the physical stress they undergo while peeling, cutting, slicing, shredding, trimming, coring, etc. Fresh-cut fruits and vegetables on which coating is used commercially include Fruits: Fresh-cut apple, fresh-cut pear, fresh-cut peach. Vegetables: Minimally processed carrot, fresh-cut lettuce, fresh-cut cabbage, minimally processed onion, fresh-cut potato, fresh-cut tomato slices, fresh-cut muskmelon, and cantaloupe.

Edible coatings to act as carriers of antimicrobial compounds, help to extend the shelf-life of the fruits and reduce the risk of pathogen's establishment on their surfaces, aloe vera is a biopolymer  has the capacity of acting as elicitor activating enzymes production related to mechanism of fruit's defense reducing fruit spoilage, edible coatings can be applied with different methods that range from immersion and aspersion to more sophisticated methods such as spreading/brushing, additives are incorporated as active agents, Impact of postharvest losses of fruits, production and processing of plant-based foods, of great importance is the postharvest, where it is estimated that the losses of fruit and vegetable products exceed 20% worldwide, mainly caused by microbiological and physiological agents, protective barrier during processing, handling, and storage of food products, delaying the deterioration of food, improving its quality and extending its shelf-life, edible coatings on fruits for shelf-life extension and management of the quality, most of the fruits we consume are treated with coatings to extend their shelf-life, Fruit continues to lose water and solutes after harvest due to biological activities.

Moisture loss during postharvest.

Aloe Vera mucilage influence film-forming properties, preserves produce's qualities in storage, preservative mechanisms and performance predictors, aloe vera edible coating/film improves fresh produce's quality and shelf life, preservation. Choose aloe vera coating, is plant-derived mucilages, structure–function relations and corresponding influence on film-forming properties, prepare edible packages. On the other hand, the strawberry fruits treated with Aloe vera gel (1:3) reduced the weight loss, firmness and TSS. Sensory evaluations such as aroma, color, taste and flavor are also maintained by Aloe vera gel during storage.

We will be glad, if you contact us, please visit our web page www.amb-wellness.com or by email with our global sales manager, Mr Oscar Lozano, oscar@amb-wellness.com or by whatsapp mobile +52 871 315 4092

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Edible Film and Coating Applications in Fruits and Vegetables

Edible Coating

Recently advances in edible coatings for fresh and minimally processed fruits,

Application of Edible Coatings on Fruits and Vegetables

Edible Films and Coatings as Food-Quality Preservers: An Overview

Edible Coating- To enhance shelf life and safety of fruits and vegetables

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