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GENERATION AND MOBILIZATION OF NUTRITION
EVIDENCE TO TACKLE MALNUTRITION: FROM DATA TO ACTION

Extending Avocado (*Persea americana*) shelf life using a blend of Aloe Vera Gel and Corn Starch as Surface Coating

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Introduction

- Avocado fruit is a tropical ever green climacteric fruit scientifically known as *Persea americana*.
- It has a high fat content: 71 to 88%
- It is the most perishable commodities, has a very high rate of postharvest respiration, limited shelf life.
- Quality factors of any fresh produce contributing to the marketability are texture, colour, appearance, flavour, nutritional value and microbial safety.

Introduction...

- 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.
- Corn Starch as an edible coating exhibits several advantages, such as low cost, good filmogenic capacity, forming colourless and tasteless films with high oxygen barrier properties and mechanical resistance.
- Aloe Vera gel has been also proven as one of the best edible coatings because of its film-forming properties, antimicrobial actions, and biodegradability and biochemical properties.

Materials and Methodology

Materials

- Fresh and well matured avocado fruit variety of Hass were collected.
- Sample was collected based on its shape, size, maturity stage in which the uniformity is useful in random selection of the sample
- Other raw materials used for coating were corn starch and Aloe Vera which were collected simultaneously.

Materials and Methodology...

Preparation of coating film

- Aloe Vera gel was separated from the outer cortex, the colourless gel like substance which is hydro parenchyma was blended with juice maker. This mixture was filtered to remove unwanted fibers. Then pasteurized at a temperature of 70⁰C for 45 minutes and cooled to ambient temperature and was ready for coating.
- Corn seed was milled and coating solution was prepared by dissolving starch in distilled water with agitation for 10 min at 90⁰C and it was ready for coating.

Materials and Methodology...

Table-1: Combination ratio of coating

Corn starch	Aloe vera		
	0%	1%	2.5%
0%	T ₀	T ₁	T ₂
1%	T ₃	T ₄	T ₅
2.5%	T ₆	T ₇	T ₈

- **Method of avocado coating process:** After finding well dispersed solutions of coating, avocado was dipped into each combination ratio for 5 minutes then put it into a tray at ambient temperature to dry before storage. Then coated avocado was stored in cartoon bag at temperature of 25°C.

Materials and Methodology...

Method of analysis

- ✓ Physiological weight loss (%)
- ✓ Fruit firmness
- ✓ Fruit colour
- ✓ Total soluble solid
- ✓ pH

Results and Discussion

Result

- **Colour:** retention of coated avocados was due to delay in ripening of coated avocado.
- Aloe Vera gel coating material retarded the ethylene production rate, therefore, delaying
 - ✓ ripening,
 - ✓ chlorophyll degradation,
 - ✓ anthocyanin accumulation and
 - ✓ carotenoid synthesis
- corn starch has also possessed active compounds such as antimicrobials; on the other hand it also modify the internal gas composition by creating a modified atmosphere through the regulation of the gas exchange.

Results and Discussion...

➤ Weight loss:

Coating Material	% weight loss
Aloe Vera	9.56
corn starch	16.89
aloe Vera and corn starch	9.48
Control	22.45

- This positive effect in terms of reduction of moisture loss may be due to the hygroscopic properties of Aloe vera gel and that allows the formation of water barrier between the fruit and the surrounding environment.

Results and Discussion...

- Additionally, Aloe Vera gel mostly composed of polysaccharide which is highly effective as a barrier against moisture loss.
- In the case of corn starch the reduction in weight loss was probably due to the effects of semi permeability property of coating material.
- Consequently the best result was obtained at the composite coating material. This may be due to the optimization of internal modified atmosphere of the avocado fruit with the activity of both aloe Vera gel and corn starch.

Results and Discussion...

- **Determination of PH:** value of control at the time of storage on the 25th day was 7.23, whereas aloe Vera was 7.03. while pH value of corn starch coated fruit was 7.15 and the composite aloe Vera and corn starch coated fruit was increased to 7.03. The increase in pH value may be due to break-up of acids with respiration during storage.
- **Firmness:** Surface coatings were found to cause higher retention of tissue firmness and the positive effect was attributed to the restriction in metabolic activities associated with cell wall degrading enzymes. The aloe Vera coating with or without corn starch showed significant retention in firmness of avocado fruits as compared to the uncoated ones.

Results and Discussion...

- **Total soluble solid:** Significant ($p < 0.05$) decrease in TSS content was observed in uncoated avocado than coated avocado during storage. Loss of TSS could be due to utilization of sugar in respiration and other metabolic activities

Conclusion

- From the result Avocado applied edible coating and stored at room temperatures had lower weight loss than avocado without edible coating;
- Aloe Vera gel delayed softening, total soluble solid, and maintained the quality of avocado fruit.
- The composite of the two coating materials has also retard ripening of the fruit which keeps the fruit longer storage time than the control.

Conclusion...

- However, significant ($p < 0.05$) differences were observed among these coatings: composite of aloe Vera gel and corn starch was superior during storage maintaining avocado fruit in higher quality levels relative to other coatings.
- The quality maintenance and the storage life extension of avocado reveal that composite of aloe Vera gel and corn starch coating can be considered for commercial application during storage of the fruit

Recommendation

- It is recommended that further study need to be conducted on the application of edible film coating used in food stuffs.
- In this study avocado was the ultimate fruit, however other fruit and vegetables can be coated within the coating materials.
- It is recommended that further studies would be interesting to carry out further experiment on the study of Postharvest quality management of horticultural produce through eco-friendly treatments is an emerging field.