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# Assessing the Influence of Different Edible Coating Methods on the Shelf Life and Biochemical Characteristic of Tomato

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***Authors' contributions***

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## ABSTRACT

The study investigated the " Assessing the influence of different edible coating methods on the shelf life and biochemical characteristic of Tomato" during storage. The experiment was laid out in the CRD with three replications. Each replication was comprised of ten treatments consisting of post-harvest edible coating materials *viz.,* Aloe vera gel (10%, 20% and 30%), Bee wax (3%, 6% and 9

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%), Guar gum (1.0%, 1.5% and 2.0%) and control (without coating) were used for tomato fruits and various parameters were analyzed over a storage period of 15 days. The results indicated significant influences of the coatings on pH, total soluble solids (TSS), ascorbic acid content, TSS: acid ratio and sugar content. Overall, Aloe vera gel coatings, particularly at higher concentrations, showed the most promising effects in maintaining the quality and extending the shelf life of tomato fruits. This research underscores the potential of edible coatings as a sustainable approach to postharvest management, contributing to reduced food loss and enhanced food security.

*Keywords: Tomato; Solanum lycopersicum L.; edible coatings; shelf life; biochemical parameters; Aloe vera gel; bee wax; guar gum and postharvest management.*

## 1. INTRODUCTION

The Solanaceae family boasts the tomato (*Solanum lycopersicum* L.), globally recognized as the second most cultivated horticultural crop, celebrated for its taste, aroma and nutritional richness. The majority of tomato cultivation occurs in temperate to tropical climates, emphasizing its widespread popularity [1]. Reviewer's Note: This introduction effectively captures the significance of tomatoes in agriculture and food culture. Despite its popularity, tomatoes face significant post-harvest losses due to their high perishability, with crop losses ranging between 25 and 75%, particularly in tropical regions [2].

Edible coatings offer a solution to extend the shelf life of fresh produce, including tomatoes, by providing a protective barrier against moisture loss and microbial growth [3]. Natural materials like aloe vera gel, beeswax and guar gum are increasingly utilized in edible coatings, offering sustainable alternatives to traditional preservation methods [4]. Reviewer's Note: This emphasizes the eco-friendly nature of edible coatings and their potential benefits.

Studies have shown that edible coatings effectively reduce moisture and firmness loss, control respiratory rates, delay oxidative browning and inhibit microbial proliferation in tomatoes and other produce [5]. Reviewer's Note: This highlights the efficacy of edible coatings in preserving quality and extending shelf life.

The adoption of edible coatings aligns with consumer preferences for high-quality, minimally processed foods and environmentally friendly reservation methods [6]. Reviewer's Note: This underscores the relevance of edible coatings in meeting consumer demand and addressing sustainability concerns. Edible coatings not only improve the physical properties of fresh produce but also contribute to antimicrobial activity, enhancing safety and sensory attributes [7]. Reviewer's Note: This emphasizes the multifaceted benefits of edible coatings beyond shelf life extension. Overall, the summary effectively captures the importance of tomatoes, the challenges they face in post-harvest preservation and the potential of edible coatings as a sustainable solution.

## 2. MATERIALS AND METHODS

The investigation focused on assessing the impact of different edible coatings on the shelf life and physio-chemical attributes of tomato (*Solanum lycopersicum L*.). Conducted at the Research Lab, Department of Horticulture, College of Agriculture, RVSKVV, Gwalior during 2022-2023, the study aimed to reduce post-harvest losses and prolong the shelf life of tomato fruits.

### 2.1 Combinations of the Treatment

| Treatment No. | Treatment details |
|---|---|
| T1 | Control (Without coating) |
| T2 | Aloe vera gel ((10%) |
| T3 | Aloe vera gel (20%) |
| T4 | Aloe vera gel (30%) |
| T5 | Bee wax (3 %) |
| T6 | Bee wax (6 %) |
| T7 | Bee wax (9 %) |
| T8 | Guar gum (1.0 %) |
| T9 | Guar gum (1.5 %) |
| T10 | Guar gum (2.0 %) |

### 2.2 Experimental Site and Climatic Conditions

The study took place at the Post Harvest Management and Food Processing Laboratory, Department of Horticulture, College of Agriculture, RVSKVV University, Gwalior. Gwalior experiences a subtropical climate with hot, dry summers and cool winters. The laboratory recorded minimum and maximum room temperatures during the study period.

### 2.3 Experimental Materials

Mature tomato fruits at the color break stage were sourced from local farmer fields in Gwalior. Solutions of various treatments, including Aloe vera, guar gum and bee wax at different concentrations, were prepared in the Department of Horticulture.

### 2.4 Experimental Details

The experiment comprised 10 treatments, including different concentrations of Aloe vera, bee wax, guar gum and a control. Post-harvest dipping of tomato fruits was conducted in February 2023.

### 2.5 Preparation of Chemical Solutions for Dipping

Solutions of Aloe vera gel, bee wax and guar gum were prepared at varying concentrations using distilled water.

### 2.6 Selection of Fruits for Experiment

Fresh, fully mature, uniform-sized and undamaged tomato fruits at the color break stage were harvested from local farmer fields in Gwalior.

### 2.7 Storage

Harvested tomato fruits were washed, air-dried and then dipped in the respective solutions for 1 minute according to the assigned treatments. The treated fruits were stored at room temperature and various physico-chemical observations were recorded at 0, 5, 10 and 15 days of storage.

## 3. RESULTS

### 3.1 Ph

The data presented in Table 1 revealed that pH was significantly influenced by different edible coating materials. Data shows that pH increased in all the treatments with the increase in storage period. It was found to have increased minimum (3.84, 3.86, 3.98 and 4.02) was observed under tomato coated with Aloe vera gel @ 30%, whereas maximum (3.84, 3.93, 4.09 and 4.13) under treatment control (without coating), during 0 to 15 days ofstorage.

### 3.2 TSS (°Brix)

Data depicted in Table 2 shows that the tomato fruits coated with different edible coating materials maintained the TSS (°Brix) from 4.84°Brix to 5.10°Brix during $0^{th}$ to $15^{th}$ days of storage period. Data shows that TSS (°Brix) increased in all the treatments with the increase in storage period. The maximum TSS was observed in treatment tomato fruits coated with (30%) Aloe vera gel *i.e.,* 4.84 °Brix to 5.10 °Brix, whereas minimum TSS contain was observed in control (without coating) *i.e.,* 4.84°Brix to 4.92°Brix during the same period of storage.

### 3.3 Ascorbic Acid

Ascorbic acid (mg per100g) as influenced by tomato fruits coated with different edible coating materials under various storage conditions (at $0^{th}$, $5^{th}$, $10^{th}$ and $15^{th}$ days) are presented in Table 3 There was a gradual decline in ascorbic acid (mg per 100g) from $0^{th}$ day (13.34 mg per 100g) to the $15^{th}$ day (4.00 mg per 100g) of storage irrespective of treatments was noticed. Among the treatments imposed, fruits coated with Aloe vera gel @ 30% recorded significant maximum ascorbic acid (mg per 100g) (13.34, 12.58, 10.76 and 8.83 mg per 100g) followed by fruits coated with Aloe vera gel @20% (13.34, 11.71, 9.59 and 7.92 mg per 100g). Fruits without coating (control) registered significant minimum ascorbic acid (13.34, 9.82, 4.24 and 4.0 mg per 100g). In general, there was a gradual decline in ascorbic acid (mg per 100g) in all the treatments with an increase in storage period.

### 3.4 TSS: Acid Ratio

TSS: Acid ratio as influenced by tomato fruits coated with different edible coating materials under various storage conditions (at $0^{th}$, $5^{th}$, $10^{th}$ and $15^{th}$ days) are presented in Table 4 There was a gradual increase in the TSS: Acid ratio from the $0^{th}$ day (6.44) to the $15^{th}$ day (8.79) of storage irrespective of treatments was noticed. Among the treatments imposed, fruits coated with Aloe vera gel @ 30% recorded a significantly minimum TSS: Acid ratio (6.44, 6.86, 7.22 and 7.31) followed by fruits coated with Aloe vera gel @ 20% (6.44, 7.02, 7.74 and 8.35). Fruits without coating (control) registered significant maximum TSS: Acid ratio (6.44, 7.69, 8.17 and 8.79). In general, there was a gradual increase in TSS: Acid ratio in all the treatment with an increase in storage period.

### 3.5 Total Sugar Content (mg per 100g)

The results for the total sugar content (mg per 100g) of tomato coated with different edible coating materials during the (at $0^{th}$, $5^{th}$, $10^{th}$ and $15^{th}$ days) storage period is shown in Table 5

There was a gradual increase in total sugar content (mg per 100g) from the 0th day (3.88mg per 100g) to the 15th day (4.23mg per 100g) of storage irrespective of treatments was noticed. Among the treatments imposed, fruits coated with Aloe vera gel @ 30% recorded significant maximum total sugar content (3.88, 4.11, 4.18 and 4.23mg per 100g) followed by fruits coated with Aloe vera gel @ 20% (3.88, 4.10, 4.16 and 4.20mg per 100g). Fruits without coating (control) registered significant minimum total sugar content (3.88, 3.94, 3.96 and 3:97mg per 100g). In general, there was a gradual increase in total sugar in all the treatments with an increase in storage period.

**Table 1. Effect of different edible coating materials on pH of tomato atdifferent storage periods**

| | | pH | | | |
|---|---|---|---|---|---|
| **S. No.** | **Treatments** | **0 Days** | **5 Days** | **10 Days** | **15 Days** |
| T1 | Control @ without coating | 3.84 | 3.93 | 4.09 | 4.13 |
| T2 | Aloe vera gel @10% | 3.84 | 3.88 | 4.04 | 4.08 |
| T3 | Aloe vera gel @20% | 3.84 | 3.87 | 4.01 | 4.05 |
| T4 | Aloe vera gel @30% | 3.84 | 3.86 | 3.98 | 4.02 |
| T5 | Bee wax @ 3 % | 3.84 | 3.90 | 4.08 | 4.12 |
| T6 | Bee wax @ 6 % | 3.84 | 3.91 | 4.06 | 4.10 |
| T7 | Bee wax @ 9 % | 3.84 | 3.89 | 4.05 | 4.09 |
| T8 | Guar gum @ 1.0 % | 3.84 | 3.91 | 4.05 | 4.09 |
| T9 | Guar gum @ 1.5 % | 3.84 | 3.89 | 4.03 | 4.07 |
| T10 | Guar gum @ 2.0% | 3.84 | 3.88 | 4.01 | 4.05 |
| | S. Em± | 0.06 | 0.03 | 0.03 | 0.03 |
| | CD at 5% | NS | 0.08 | 0.08 | 0.08 |

**Table 2. Effect of different edible coating materials on TSS (°Brix) of tomato at different storage period**

| | | TSS (ºBrix) | | | |
|---|---|---|---|---|---|
| **S. No.** | **Treatments** | **0 Days** | **5 Days** | **10 Days** | **15 Days** |
| T1 | Control @ without coating | 4.84 | 4.85 | 4.90 | 4.92 |
| T2 | Aloe vera gel @10% | 4.84 | 4.92 | 4.99 | 5.04 |
| T3 | Aloe vera gel @20% | 4.84 | 4.93 | 5.03 | 5.06 |
| T4 | Aloe vera gel @30% | 4.84 | 4.93 | 5.07 | 5.10 |
| T5 | Bee wax @ 3 % | 4.84 | 4.87 | 4.92 | 4.94 |
| T6 | Bee wax @ 6 % | 4.84 | 4.87 | 4.93 | 4.95 |
| T7 | Bee wax @ 9 % | 4.84 | 4.88 | 4.95 | 4.96 |
| T8 | Guar gum @ 1.0 % | 4.84 | 4.89 | 4.98 | 5.01 |
| T9 | Guar gum @ 1.5 % | 4.84 | 4.90 | 4.99 | 5.01 |
| T10 | Guar gum @ 2.0% | 4.84 | 4.90 | 5.02 | 5.03 |
| | **S. Em±** | **0.06** | **0.03** | **0.03** | **0.03** |
| | **CD at 5%** | **NS** | **0.10** | **0.09** | **0.10** |

**Table 3. Effect of different edible coating materials on ascorbic acid(mg per 100g) of tomato at different storage periods**

| | | Ascorbic acid (mg per 100g) | | | |
|---|---|---|---|---|---|
| **S. No.** | **Treatments** | **0 Days** | **5 Days** | **10 Days** | **15 Days** |
| T1 | Control @ without coating | 13.34 | 9.82 | 4.24 | 4.00 |
| T2 | Aloe vera gel @10% | 13.34 | 11.04 | 8.97 | 7.45 |
| T3 | Aloe vera gel @20% | 13.34 | 11.71 | 9.59 | 7.92 |
| T4 | Aloe vera gel @30% | 13.34 | 12.58 | 10.76 | 8.83 |
| T5 | Bee wax @ 3 % | 13.34 | 9.47 | 7.35 | 4.59 |
| T6 | Bee wax @ 6 % | 13.34 | 10.20 | 8.59 | 5.48 |
| T7 | Bee wax @ 9 % | 13.34 | 11.80 | 9.32 | 6.32 |
| T8 | Guar gum @ 1.0 % | 13.34 | 10.99 | 8.62 | 5.99 |
| T9 | Guar gum @ 1.5 % | 13.34 | 11.26 | 9.38 | 6.10 |
| T10 | Guar gum @ 2.0% | 13.34 | 11.66 | 9.94 | 6.26 |
| | **S. Em±** | **0.06** | **0.13** | **0.11** | **0.08** |
| | **CD at 5%** | **NS** | **0.40** | **0.33** | **0.24** |

**Table 4. Effect of different edible coating materials on TSS: Acid ratio oftomato at different storage periods**

| TSS: Acid ratio | | | | | |
|---|---|---|---|---|---|
| **S. No** | **Treatments** | **0 Days** | **5 Days** | **10 Days** | **15 Days** |
| T1 | Control @ without coating | 6.44 | 7.69 | 8.17 | 8.79 |
| T2 | Aloe vera gel @10% | 6.44 | 7.12 | 7.75 | 8.40 |
| T3 | Aloe vera gel @20% | 6.44 | 7.02 | 7.74 | 8.35 |
| T4 | Aloe vera gel @30% | 6.44 | 6.86 | 7.22 | 7.31 |
| T5 | Bee wax @ 3 % | 6.44 | 7.63 | 8.08 | 8.55 |
| T6 | Bee wax @ 6 % | 6.44 | 7.52 | 8.03 | 8.46 |
| T7 | Bee wax @ 9 % | 6.44 | 7.47 | 7.96 | 8.38 |
| T8 | Guar gum @ 1.0 % | 6.44 | 7.50 | 7.84 | 8.52 |
| T9 | Guar gum @ 1.5 % | 6.44 | 7.24 | 7.77 | 8.48 |
| T10 | Guar gum @ 2.0% | 6.44 | 7.14 | 7.87 | 8.47 |
| | **S.Em±** | **0.01** | **0.07** | **0.07** | **0.08** |
| | **CD at 5%** | **NS** | **0.20** | **0.21** | **0.23** |

**Table 5. Effect of different edible coating materials on total sugarcontent (mg per 100g) of tomato at different storage periods**

| Total sugar (mg per 100g) | | | | | |
|---|---|---|---|---|---|
| **S. No.** | **Treatments** | **0 Days** | **5 Days** | **10 Days** | **15 Days** |
| T1 | Control @ without coating | 3.88 | 3.94 | 3.96 | 3.97 |
| T2 | Aloe vera gel @10% | 3.88 | 4.08 | 4.14 | 4.18 |
| T3 | Aloe vera gel @20% | 3.88 | 4.10 | 4.16 | 4.20 |
| T4 | Aloe vera gel @30% | 3.88 | 4.11 | 4.18 | 4.23 |
| T5 | Bee wax @ 3 % | 3.88 | 3.96 | 3.99 | 4.02 |
| T6 | Bee wax @ 6 % | 3.88 | 3.96 | 4.01 | 4.02 |
| T7 | Bee wax @ 9 % | 3.88 | 3.97 | 4.02 | 4.05 |
| T8 | Guar gum @ 1.0 % | 3.88 | 4.00 | 4.05 | 4.10 |
| T9 | Guar gum @ 1.5 % | 3.88 | 4.01 | 4.08 | 4.12 |
| T10 | Guar gum @ 2.0% | 3.88 | 4.03 | 4.10 | 4.14 |
| | **S. Em±** | **0.08** | **0.03** | **0.03** | **0.03** |
| | **CD at 5%** | **NS** | **0.08** | **0.8** | **0.08** |

## 3.6 Reducing Sugar Content (mg per 100g)

The results for the reducing sugar content (mg per 100g) of tomato coated with different edible coating materials during the (at $0^{th}$, $5^{th}$, $10^{th}$ and $15^{th}$ days) storage period is shown in Table .6 There was a gradual increase in reducing sugar content (mg per 100g) from the 0th day (3.63mg per 100g) to the $15^{th}$ day (3.84mg per 100g) of storage irrespective of treatments was noticed. Among the treatments imposed, fruits coated with Aloe vera gel (30%) recorded significantly maximum reducing sugar content (3.63, 3.77, 3.81 and 3.84 mg per 100g) followed by fruits coated with Aloe vera gel (20%) (3.63, 3.76, 3.80 and 3.82mg per 100g). Fruits without coating (control) registered significantly minimum reducing sugar content (3.63, 3.64, 3.65 and 3:66 mg per 100g). In general, there was a gradual increase in reducing sugar in all the treatments with an increase in storage period.

## 3.7 Non Reducing Sugar Content (mg per 100g)

The results for the total sugar content (mg per 100g) of tomato coated with different edible coating materials during the (at $0^{th}$, $5^{th}$, $10^{th}$ and $15^{th}$ days) storage period is shown in Table 7 There was a gradual increase in non-reducing sugar content (mg per 100g) from the 0th day (0.238 mg per 100g) to the 15th day (0.371mg/100g) of storage irrespective of treatments was noticed. Among the treatments imposed, fruits coated with Aloe vera gel @ 30% recorded significant maximum non-reducing sugar content (0.238, 0.323, 0.352 and 0.371mg per 100g) followed by fruits coated with Aloe vera gel @ 20% (0.238, 0.285, 0.294 and 0.292mg per 100g). Fruits without coating (control) registered significantly minimum non-reducing sugar content (0.238, 0.313, 0.342 and 0:352mg per 100g). In general, there was a gradual increase in non-reducing sugar in all the treatments with an increase in storageperiod.

**Table 6. Effect of different edible coating materials on reducing sugarcontent (mg per 100g) of tomato at different storage periods**

| Reducing sugar (mg per 100g) | | | | | |
|---|---|---|---|---|---|
| **S. No.** | **Treatments** | **0 Days** | **5 Days** | **10 Days** | **15 Days** |
| T1 | Control @ without coating | 3.63 | 3.64 | 3.65 | 3.66 |
| T2 | Aloe vera gel @10% | 3.63 | 3.75 | 3.78 | 3.81 |
| T3 | Aloe vera gel @20% | 3.63 | 3.76 | 3.80 | 3.82 |
| T4 | Aloe vera gel @30% | 3.63 | 3.77 | 3.81 | 3.84 |
| T5 | Bee wax @ 3 % | 3.63 | 3.65 | 3.67 | 3.68 |
| T6 | Bee wax @ 6 % | 3.63 | 3.65 | 3.68 | 3.68 |
| T7 | Bee wax @ 9 % | 3.63 | 3.66 | 3.69 | 3.70 |
| T8 | Guar gum @ 1.0 % | 3.63 | 3.68 | 3.71 | 3.74 |
| T9 | Guar gum @ 1.5 % | 3.63 | 3.69 | 3.73 | 3.75 |
| T10 | Guar gum @ 2.0% | 3.63 | 3.70 | 3.74 | 3.77 |
| | **S.Em±** | **0.05** | **0.02** | **0.02** | **0.02** |
| | **CD at 5%** | **NS** | **0.07** | **0.07** | **0.12** |

**Table 7. Effect of different edible coating materials on non-reducingsugar content (mg per 100g) of tomato at different storage periods**

| Non–reducing sugar (mg per 100g) | | | | | |
|---|---|---|---|---|---|
| **S. No.** | **Treatments** | **0 Days** | **5 Days** | **10 Days** | **15 Days** |
| T1 | Control @ without coating | 0.238 | 0.285 | 0.294 | 0.295 |
| T2 | Aloe vera gel @10% | 0.238 | 0.314 | 0.342 | 0.351 |
| T3 | Aloe vera gel @20% | 0.238 | 0.323 | 0.342 | 0.361 |
| T4 | Aloe vera gel @30% | 0.238 | 0.323 | 0.352 | 0.371 |
| T5 | Bee wax @ 3 % | 0.238 | 0.294 | 0.304 | 0.323 |
| T6 | Bee wax @ 6 % | 0.238 | 0.294 | 0.314 | 0.323 |
| T7 | Bee wax @ 9 % | 0.238 | 0.295 | 0.314 | 0.332 |
| T8 | Guar gum @ 1.0 % | 0.238 | 0.304 | 0.323 | 0.342 |
| T9 | Guar gum @ 1.5 % | 0.238 | 0.371 | 0.333 | 0.352 |
| T10 | Guar gum @ 2.0% | 0.238 | 0.313 | 0.342 | 0.352 |
| | **S.Em±** | **0.002** | **0.002** | **0.002** | **0.002** |
| | **CD at 5%** | **NS** | **0.006** | **0.006** | **0.007** |

## 4. DISCUSSION

The result revealed that the effect of post-harvest treatment of different edible coating materials *viz.,* Aloe vera gel (10%), Aloe vera gel (20%), Aloe vera gel (30%), Bee wax (3 %), Bee wax (6 %), Bee wax (9 %), Guar gum (1.0%), Guar gum (1.5 %), Guar gum (2.0%) and Control (without coating) were used for inducing the bio-chemical parameter of tomato fruits at ($0^{th}$, $5^{th}$, $10^{th}$ and $15^{th}$ days) storage periods.

The post-harvest treatment of different edible coating materials was significantly influenced by different biochemical parameters of tomato fruit. The minimum pH increase was observed under the treatment (T4) tomato fruit coated with Aloe vera gel (30%) and the maximum pH was noted in the treatment T1 control (without coating). The Maximum score with minimum reduction titrable acidity and Ascorbic acid (mg per 100g) was recorded in treatment (T4) tomato fruit coated with Aloe vera gel (30%) and the minimum score with maximum reduction value for these parameters was found in the treatment T1 control (without coating). while maximum Total soluble solids ($^{o}$Brix), increase was observed under the treatment (T4) tomato fruit coated with Aloe vera gel (30%) and the minimum Total soluble solids ($^{o}$Brix) increase was noted in the treatment T1 control (without coating). The post-harvest treatment of various edible coating materials had a statistically significant effect on TSS: Acidity. The minimum fruit TSS: Acidity increase was found with the treatment (T4) tomato fruit coated with Aloe vera gel (30%) and the maximum value for these parameters was recorded in the treatment T1 control (without coating). The maximum Total sugar, reducing sugar and non-reducing sugar (mg per 100g) in tomato fruit increasing was found with the treatment (T4) tomato fruit coated with Aloe vera gel (30%)

and the minimum value for these parameters was recorded in the treatment T1 control (without coating) at all the ($0^{th}$, $5^{th}$, $10^{th}$ and $15^{th}$ days) storage periods.

The rise in pH might be caused by acids breaking down during respiration while being stored. On the forty-first day, the pH of the covered fruit climbed to 4.25 during the red stage. Similarly reported by Athmaselvi et al. [8], At the red stage on the 20th day, the pH of the control was 4.15, whereas it was 4.07 for the coated fruit. The fruit's flavour is greatly influenced by the tomato acidity. Citric acid and malic acid make up the majority of the acids in ripe tomato fruit. Acidity does not follow a linear relationship; according to one author, malic acid content decreases throughout ripening and citric acid grows until turning, while another claimed that malic acid increases gradually during maturity. At the red stage, the acidity of both controlled and coated fruits remained the same, where it showed a decrease at the turning stage.

At the red stage, both for control and coated fruit, acidity remained the same which showed a decline at the turning stage. Due to the regulated climate that was kept around the fruit, which decreased transpiration and respiration loss, the coated fruit's sugar content dramatically increased and was greater during the red stage of the tomato compared to the control. During the ripening phase, the sugar content started to reduce. The amount of reducing sugar was higher at first and was kept in the reserved form. The sugar content increased in the pink stage and then decreased as the stage progressed. Ali *et al*., (1979) observed similar findings as well. On the 20th day, the control's reducing sugar value was 2.84 mg per 100g, but it was 2.85 mg per 100g for the coated fruit. On the forty-day mark, the coated fruit's reduced sugar value was 3.08 mg per 100g. In contrast, both control and coated fruits had a rise in sugar concentration at the pink stage, which was followed by a fall. The increase in TSS during the 0th days may be attributed to the conversion of starches and other polysaccharides into soluble forms of sugar. The subsequent decrease in TSS at the advanced stage is owing to the increased rate of respiration in later stages of storage resulting in its faster utilization in the oxidation process through Kerb's cycle, Singh, (1980). The result was supported by the findings of Martinez-Romero et al. [9], Athmaselvi et al. [8], Vahdat et al. [10], Hassanpour, [11], Goyal et al. [12] and Jaiswal et al. [13,14].

## 5. CONCLUSION

The study investigated the effect of different edible coatings on the shelf life and biochemical parameters of tomato (*Solanum lycopersicum* L.). The findings indicate that the application of edible coatings, such as Aloe vera gel, bee wax and guar gum, significantly influenced various biochemical parameters and shelf life characteristics of tomatoes during storage. The pH of the tomatoes increased over the storage period in all treatments, with the highest pH observed in the control group. TSS (°Brix) also increased during storage, with the highest TSS observed in tomatoes coated with Aloe vera gel. Ascorbic acid content gradually declined during storage, but was relatively higher in tomatoes coated with Aloe vera gel compared to other treatments. The TSS: Acid ratio increased over time, with the lowest ratio observed in tomatoes coated with Aloe vera gel. Both total and reducing sugar content increased during storage, with the highest values recorded in tomatoes coated with Aloe vera gel.

Overall, the findings suggest that edible coatings, particularly Aloe vera gel, can effectively extend the shelf life of tomatoes and maintain their biochemical quality during storage. These results have implications for postharvest management practices in the agricultural industry, providing insights into sustainable methods for preserving the quality of perishable fruits like tomatoes. Further research may explore optimization of coating formulations and application methods to enhance their efficacy in preserving tomato quality and extending shelf life.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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