Original Research Article

Effect of Edible Coatings on Morphological Characters of Strawberry Fruits

ABSTRACT

Strawberry (*Fragaria* × *ananassa* Duch.) a member of rosaceae family, is a monoecious, short day, succulent thalamus, perennial herb and quick growing fruit plant.Strawberries are processed into various value-added products such as canned strawberry, jam, jelly, ice cream, wine and other soft drinks. Strawberry is a delicious but delicate fruit with 2-4 days shelf life on ambient condition. Fruit of strawberry are very delicate and highly perishable in nature which resulted very short life span and considerable postharvest loss.The use of edible coating improved the strawberry shelf life in general compared to untreated control. Significant difference was observed for effect of edible coating on strawberry for all the quality parameter during storage.The fruit weight, width and length decreased in all edible coating treatment. The minimum decrease in fruit weight, Width and length was recorded in treatment T_7 (EC + *Aloe vera* gel 20%) while, the minimum decreasement volume and specific gravity of fruit in the same edible coating.

Keywords:Strawberry, succulent, shelf life, edible coating, specific gravity.

INTRODUCTION

Strawberry (*Fragaria* × *ananassa* Duch.) a member of rosaceae family, is a monoecious, short day, succulent thalamus, perennial herb and quick growing fruit plant. It is native to France. Flower is born in small cluster with white colour. Strawberry fruit is complete fruit having 98% edible portion, botanically is etaerio of achens. Strawberry fruit is good source of natural antioxidant, carotenoids, vitamins, phenols flavonoids, dietary glutathione and other metabolites (Larson, 1988). The fruit also contains vit.A (60 IU/100g), vitamin C (30-120mg/100g) and also has high pectin content (calcium pectate) which severs as an excellent ingredient for jelly making (Mitra, 1991). Strawberries are processed into various value-added products such as canned

strawberry, jam, jelly, ice cream, wine and other soft drinks (Joshi *et al*., 2005). Strawberry are known for their characteristic aroma, and major compounds are ethyl hexanoate and ethyl heptanoate. The ripe strawberry attain attractive red colour on maturity with a soft, melting pulp with a characteristics flavour. The red colour of the fruit is due to presence of anthocyanin, pelargonidin 3-monoglucosides, and traces of cyanidin. Citric acid, followed by malic, and oxalic are the major organic acids and ellagic acid present in fruits prevent cancer and occurrence of heart diseases. However, Strawberry is a delicious but delicate fruit with 2-4 days shelf life on ambient condition. Fruit of strawberry are very delicate and highly perishable in nature which resulted very short life span and considerable postharvest loss. It easily undergoes fungal spoilage after harvesting due to attack of *Botrytis cinerea*, (Snowdown, 1990). Among the various post-harvest management practices, recently, edible coatings have been developed to extend the self-life of fruits and vegetables (Maji *et al,* 2018). The antifungal activity of aloe-vera gel has observed against several pathogenic fungi including *Botrytis cinerea* (Jasso de rodriguiez*et al*., 2005,). Aloe vera has shown antibacterial property against gram positive and gram negative pathogens (Dahiya *et al,* 2012). Edible coating have been used to protect perishable food stuffs from deterioration by retarding dehydration, suppressing respiration, improving textural quality to retain volatile flavor compounds, and reducing microbial growth (Ozdemir *et al*., 2010).Edible coating based on chitosan, Aloe vera, $CaCl_2$ because these prevent loss of moisture, firmness, control respiration rate and maturation development, delay oxidative browning, and reduce microorganism proliferation(Ahmed *et al.*, 2009).

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MATERIAL AND METHODS

The experiment was conducted during the year 2018-19 on the Horticulture laboratory of the Department of Horticulture, Babasaheb Bhimrao Ambedkar University, (A Central University), Vidya- Vihar, Raebareli Road, Lucknow - 226025 (U.P.).

Procurement of samples: Almost uniform size and matured fruits of strawberry were collected from collage of Horticulture and forestry Jhalawar, Rajasthan. The fruit were sorted out to see

any injury or damage, and then fruits were cleaned with moist cloth gently to remove any dust and other unwanted materials.

Chart 1-Treatment details:

Sr.No.	**Treatment**	**Edible coating material**
1	T_0	Control
2	T_1	Distilled water
3	T_2	Edible coating (EC)
4	T_3	EC + $CaCl_2$ (1 %)
5	T_4	EC+ *Aloe vera* gel (5%)
6	T_5	EC+ *Aloe vera* gel (10%)
7	T_6	EC + *Aloe vera* gel (15%)
8	T_7	EC + *Aloe vera* gel (20%)
9	T_8	EC + *Aloe vera* gel (25%)

Chart 2-**Details of experiment:**

Numberoftreatment	**:**	9	Crop	**:**	Strawberry
Numberofreplication	**:**	3	Variety	**:**	winter dawn
Total number of treatment	**:**	27	Sample size	**:**	30 fruits
Design of experiment	**:**	Completely Randomized Design (CRD)	Total fruits studied	**:**	810

Chart 3-Preparationofediblecoating: Edible coating solution (2 *L*) –Basic solution of edible coating was prepared as per the following composition

Sr. No.	**Chemical Name**	**Concentration (%)**	**Concentration (g/2L)**
1.	CMC (Carboxy Methyle Cellulose)	2.0	20
2.	Ascorbic acid	1.0	10

3.	Calcium chloride	0.4	4.0
5.	Chitosan	4.0	40
6.	Glycerin	0.4	4.0

To prepare chitosan coating, chitosan was first purified by the method given by El Ghaouth*et al.* (1992).

Purified chitosan was prepared by dissolving chitosan in 0.25 N HCL and the un dissolved particles were removed by centrifugation. The viscouse solution was then neutralized with 2.5 N NaOH (pH 9.8). Are precipited chitosan was collected, washed extensively with Deionized water to remove the salts and sub sequently dried. Purified chitosan was redissolved in 0.25 N HCL and the pH were adjusted to 5.6. Carboxy Methyl Cellulose(CMC) coatings (2%) was prepared by dissolving 4.0 g of Methyl cellulose powder in 20 ml of water & ethyl alcohol mixture (3:1L) at 80 C and stirred for 10 min by using magnetic stirrer. Ethyl alcohol was used to reduce drying time and obtain a transparent and shinyCoating. 4% $Cacl_2$dissolve in water and add all chemical solution like 1% ascorbic acid, 0.4% glycerin in 2 litter measuring cylinder and volume made up 2 liter solution with distilled water.

Collection of Aloe vera extract: Leaves of *Aloe vera* were harvested and washed with fresh water followed by a mild chlorine solution (25%). *Aloe vera* gel matrix was then separated from the outer cortex of the leaves with help of a sharp knife and tea spoon and this colorless hydro parenchyma was ground in the blender and fresh *Aloe vera* extract was obtained by removing the fibers.

Approximately, 526 g gel was extracted from 1.230 kg leaves (42.76% recovery). The gel matrix was pasteurized at 70 °C for 45 minutes and was cooled immediately and ascorbic acid (2.0 g/ L),citric acid (4.6 g/ L) was added to maintain the pH at 4.0. The gel prepared was stored in brown amber bottle to prevent oxidation (Adetunji *et al.*, 2012).The final *Aloe vera* based edible coating was prepared by mixing and boiled with continuous stirring for uniform dispersion and filtered for purification (Chauhan *et al.*, 2014). Strawberry fruits were coated by dipping the fruits in prepared *Aloe vera* extract supplemented with edible coating as per the treatment combination.

Application of edible coating solutions: Before coating, strawberry fruits were washed thoroughly and dried. The coating solution used for strawberry fruits. Take eight 500ml beakers

for different treatment and 300 ml EC solution, add different chemical and *Aloevera* gel were taken in separate beaker as per treatment. The fresh fruits were dipped completely into the coating solution at room temperature for 15 minutes they were allowed to drain and then dried at room temperature with forced air drying to allow a thin layer to be formed on the fruits.

Storage of fruits: Fruits were dip individually in different edible coating solution as described above and stored under low temperature (0-4□) conditions. Observations for different parameters recorded until the fruits loss their marketable quality.

Observations recorded:

i. Length of fruits (mm):

Length of five fruit in each replication was recorded with the help of Vernier Calipers and average value was calculated.

ii. **Width of fruits (mm):**

Width of selected fruits in each replication was recorded with the help of vernier Calipers and average value was calculated.

iii. Weight of fruits (g):

Weight of fruits in each replication of each treatment was recorded with help of Electrical Balance and value was calculated.

iv. Volume of fruit (ml):

Water displaced method-

Volume of fruit was measured with the help of volumetric flask and expressed in ml.

v. Cumulative physiological loss in weight (CPLW %):

CPLW was calculated by subtracting the final weight from initial weight and dividing by initial weight and multiply by 100. It was expressed as percent CPLW as per the formula given below:

$$\text{CPLW (\%)} = \frac{\text{Initial weight} - \text{Final weight}}{\text{Initial weight}} \times 100$$

vi. **Specific gravity:**

Specific gravity was calculated by dividing the fruit weight with the volume as per method given by Ranganna (1986) according to the following formula:

$$\text{Specific gravity} = \frac{\text{Weight of fruit (gm)}}{\text{Volume of fruit (ml)}}$$

The percent change in each parameter was estimated to see the treatment effect clearly.

RESULTS AND DISCUSSION

i. Fruit weight (gram)

The decrease in average weight of fruit was found minimum (15.49%) under treatment T7 (EC+ aloe vera gel 20%) followed by treatment T5 (Table 1 and Fig 1). The maximum decrease (33.27%) in fruit weight was recorded under treatment T0 (control) followed by treatment T1 at 5 DAS (Day after storage).The fruit weight decrease recorded at 10 DAS, was the lowest (11.76%) in treatment T5 (EC + aloe vera gel 10%) followed by treatment T4. The maximum fruit weight (16.32%) decrease was recorded under treatment T1 (distilled water) followed by control. After 15 DAS, the fruit weight decrease was minimum (0.61%) in treatment T7 treated with EC + aloe vera gel 20% followed by treatment T5 and maximum (27.3 %) fruit weight decrease was under the T3 (EC + cacl2) followed by treatment T2.Fruit weight was observed at 20 DAS, and found minimum decrease (9.92%) under treatment T5 (EC + aloe vera gel 10%) followed by treatment T3.The maximum weight decrease (33.33%) in treatment T1 (Distilled water) followed by control.

However, overall decrease in fruit weight from 0 to 20 DAS (day after storage) was estimated lowest (26.70 %, 2.55 g) under treatment T7 (EC + Aloe vera gel 20%) followed by minimum at T1, T0 (control).

There was a significant variation inphysiological loss in fruit weight which was maximum at 20 days after storage (DAS) when the fruits were kept as untreated control. At 20 DAS, it was minimum under EC + *Aloe vera 20%* gel where losses is about 26.70% followed by application EC + *Aloe vera* extract 10%. The weight loss percentage increased significantly with the ripening and control fruits displayed rapid increase in weight loss as compared to all other treatments due to uncontrolled ripening in untreated strawberry fruits which might be due to a

sudden increase in ethylene production and respiration rate (Haile, 2018, Ayranci and Tunc, 2003).

ii. Fruit length (mm)

Minimum (3.07%) fruit length decrease was recorded under treatment T7 (EC + Aloe vera gel 20%) followed by T5 and maximum decrease (9.76%) seen in treatment control at 5 DAS.At 10 DAS, it was found that lowest (1.33%) decrease with treatment EC under the treatment T2 followed by treatment T3 and the maximum length decrease (5.05%) was in treatment T7 followed by treatment T4.It was observed that treatment T7 (EC + aloe vera gel 20%) showed lowest fruit length decrease (2.79%) followed by treatment T4 (EC + aloe vera gel 5%). Whereas, the highest fruit length decrease (4.48%) was recorded under treatment T2 followed by T1, T0 at 15 DAS.Decrease of fruit length minimum was (1.96%) under treatment T5 (EC + aloe Vera gel %) followed by treatment T7 and maximum fruit length decrease (7.5%) was observed under the treatment T0 (control) at 20 DAS.

The recorded on length of fruit were analyzed statistically. It is evident from the data portrayed in Table 2 and Fig 2 that overall decrease from 0 to 20 DAS (day after storage), minimum fruit length (8.60%) was obtained with the coating of EC + Cacl2 1.0 % (T3) followed by (9.09%) was noted in EC + Aloe vera gel 10% (T5).The maximum fruit length decrease (14.88%) was recorded under distilled water (T1) treatment followed by (T0) control.

iii. Fruit diameter (mm)

The data recorded on width of fruits were analyzed statistically and presented in Table 3 and Fig 3.The results revealed that the lowest decrease in fruit width (9.02%) was measured in treatment T7 (EC+ Aloe vera gel 20%) which was followed by treatment T6. The maximum decrease in fruit width (25.11%) was recorded under T1 (distill water treatment) followed by treatment T0 (control) at 5 DAS (days after storage). It was also seen that at 10 DAS, minimum decreases in fruit width (0.64%) was measured in treatment T1 (distilled water) which was followed by control while, the maximum width decrease was recorded in T8 (Aloe vera gel 25% +EC). At 15 DAS, minimum decrease in fruit width (3.23%) was recorded in treatment T1 followed by treatment T0 (control) and the maximum decrease of width was in T2 (Edible coating).Similarly, at 20 DAS width of fruit was analyzedand the result recorded lowest fruit width decrease in T5

(7.65%) followed by T7 (EC + Aloe vera gel 20 %) and maximum width decrease was noticed in T1 (distilled water).

Table 3 also indicated that the decrease in width of fruits varied under different treatments during various stages of storage. However, the calculation of overall decrease from 0 days of storage to 20 days after storage clearly showed that the minimum decrease (4.28 mm, 19.21 %) was noticed when the fruits where treated with EC +Aloe vera gel 20% (T7) followed by T5 and T6.

Marpuri*et al.* (2011) also reported that the fruit size reduced at higher rate when fruits are uncoated and coated fruits with *A. vera*, chitosan showed a reduction in fruit size.

iv. Fruit volume (ml)

The change in fruit volume is presented in Table4 and Fig 4 and it showed that lowest fruit volume decrease measured (18.18%) in treatment T7 (EC + Aloe vera gel 20%) followed by treatment T5 and maximum was recorded under treatment control at 5 DAS.At 10 DAS, it was found that minimum decrease (8.33%) in fruit volume under treatment control followed by treatment T2 and maximum was recorded under T1.Maximum (30.51%) decrease was recorded for fruit volume under treatment T2 followed by T3 and the increase fruit volume (3.95%) in T7 at 15 DAS and lowest fruit volume decrease (11.27%) was calculated in treatment T5 (EC+ Aloe vera gel 10%).At 20 DAS it was seen that treatment T5 (EC + Aloe vera gel 10%) caused lowest fruit volume decrease (6.35%) followed by treatment T3 and highest fruit volume decrease was seen under the treatment T1 (34.69%) followed by control.

However, data observed in total overall decrease in fruit volume (Table 4) at 0 to 20 DAS, and found that maximum decrease overall volume (3.9 mm, 54.93%) in treatment T1 and lowest volume overall decrease (2.2 mm, 27.16%) was found in T5 treated with EC+ Aloe vera gel 10 %) followed by treatment T7.

v. Specific gravity (g/ml)

Table 5 showed that change in specific gravity of fruit decreased highest (3.7%) under treatment T3 (EC+CaCl2 1 %) followed by treatment T4 while maximum specific gravity increase (8%) under the treatment T2 (EC) followed by treatment T8 at 5 DAS (day after storage).It was found that maximum decrease (7.34%) of fruit specific gravity under the treatment T0 (control)

followed by treatment T2 but maximum increase (2%) fruit specific gravity under treatment T4 (EC + Aloe vera gel 5%) followed by T7 at 10 DAS.Data represented that fruit specific gravity decrease was maximum (4.63%) under treatment T7 (EC + Aloe vera gel 20%) followed by the treatment T1 but maximum fruit specific gravity increase (4.9%) under treatment T2 followed by treatment T3 at 15 DAS (day after storage).The maximum (3.85%) fruit specific gravity decrease under the treatment T5 (EC + Aloe vera gel 10 %) followed by treatment T2 while maximum specific gravity increase (6.06%) in treatment T4 (EC + Aloe vera gel 5%) followed by T7 at 20 DAS.

Overall change in fruit specific gravity from 0 to 20 DAS was found maximum decrease (9.17%) under the treatment T0 (control) followed by T5. However, fruit specific gravity increase (5%) in treatment T4 (EC + Aloe vera gel 5%) followed by treatment T7.

CONCLUSION

The use of edible coating improved the strawberry shelf life in general compared to untreated control. Significant difference was observed for effect of edible coating on strawberry for all the quality parameter during storage.The fruit weight, width and length decreased in all edible coating treatment. The minimum decrease in fruit weight, Width and length was recorded in treatment T_7 (EC + *Aloe vera* gel 20%) while, the minimum decreasement volume and specific gravity of fruit in the same edible coating.

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Table 1: Effect of edible coatings on change of fruitSingle fruit weight loss (%) of strawberry cv. winter dawn

Treatments	Single fruit weight (gram)										
	0 DAS	**5 DAS**	**Decrease (%)**	**10 DAS**	**Decrease (%)**	**15 DAS**	**Decrease (%)**	**20 DAS**	**Decrease (%)**	**Overall decrease**	**Overall decrease (%)**
T_0 - Control	10.05	6.52	35.12	5.57	14.57	4.37	21.54	2.98	31.81	3.54	54.29
T_1- Distilled water	11.39	7.6	33.27	6.36	16.32	5.1	19.81	3.4	33.33	4.2	55.26
T_2 – Edible coating (EC)	9.19	7.0	23.83	6.0	14.29	4.4	26.67	3.5	20.45	3.5	50.00
T_3 - EC + $CaCl_2$ (1%)	10.12	7.8	22.92	6.85	12.18	4.98	27.3	4.3	13.65	3.5	44.87
T_4 -EC + *Aloe vera* gel (5%)	8.68	6.8	21.66	6.0	11.76	4.83	19.5	4.0	17.18	2.8	41.18
T_5 -EC + *Aloe vera* gel (10%)	10.56	8.5	19.51	7.5	11.76	6.55	12.67	5.9	9.92	2.6	30.59
T_6 -EC + *Aloe vera* gel (15%)	10.55	8.45	19.91	7.4	12.43	5.95	19.59	5.1	14.29	3.35	39.64
T_7 -EC+ *Aloe vera* gel (20%)	11.3	9.55	15.49	8.2	14.14	8.15	0.61	7.0	14.11	2.55	26.70
T_8 - EC+ *Aloe vera* gel (25%)	9.19	7.32	20.35	6.43	12.16	5.18	19.44	4.4	15.06	2.92	39.89
SEm (±)	0.407	0.477		0.394		0.288		0.288			
CD (p=0.05)	1.217	1.429		1.181		0.861		0.862			

Table 2: Effect of edible coatings on change of fruit length (mm) of strawberry cv. Winter dawn.

Treatments	Fruit length (mm)										
	0 DAS	**5 DAS**	**Decrease (%)**	**10 DAS**	**Decrease (%)**	**15 DAS**	**Decrease (%)**	**20 DAS**	**Decrease (%)**	**Overall decrease**	**Overall decrease (%)**
T_0 - Control	32.69	29.5	9.76	28.4	3.73	27.2	4.23	25.16	7.5	4.34	14.71
T_1- Distilled water	33.18	30.1	9.28	28.9	3.99	27.65	4.33	25.62	7.34	4.48	14.88
T_2 – Edible coating (EC)	30.2	27.8	7.95	27.43	1.33	26.2	4.48	25.2	3.82	2.6	9.35
T_3 - EC + $CaCl_2$ (1%)	33.9	31.4	7.37	30.8	1.91	29.5	4.22	28.7	2.71	2.7	8.60
T_4 -EC + *Aloe vera* gel (5%)	30.63	29.1	5.0	27.7	4.81	26.8	3.25	26.0	2.99	3.1	10.65
T_5 -EC + *Aloe vera* gel (10%)	34.6	33	4.62	31.8	3.64	30.6	3.77	30.0	1.96	3.0	9.09
T_6 -EC + *Aloe vera* gel (15%)	31.94	30.39	4.85	29.34	3.46	28.17	3.99	27.5	2.38	2.89	9.51
T_7 -EC+ *Aloe vera* gel (20%)	33.53	32.5	3.07	30.86	5.05	30	2.79	29.4	2.0	3.1	9.54
T_8 - EC+ *Aloe vera* gel (25%)	31.28	29.73	4.96	28.7	3.46	27.5	4.18	26.83	2.44	2.9	9.75
SEm (±)	4.143	1.011		1.422		1.422		0.471			
CD (p=0.05)	N/A	3.026		N/A		N/A		1.411			

Table 3: Effect of edible coatings on change of fruit width of strawberry cv. winter dawn.

Treatments	Width of fruits (mm)										
	0 DAS	**5 DAS**	**Decrease (%)**	**10 DAS**	**Decrease (%)**	**15 DAS**	**Decrease (%)**	**20 DAS**	**Decrease (%)**	**Overall decrease**	**Overall decrease (%)**
T_0 - Control	24.18	18.2	24.73	18.0	1.1	17.36	3.56	12.3	29.15	5.9	32.42
T_1- Distilled water	20.83	15.6	25.11	15.5	0.64	15.0	3.23	10.61	29.27	4.99	31.99
T_2 – Edible coating (EC)	21.24	18.49	12.95	17.56	5.03	15.9	9.45	13.1	17.61	5.39	29.15
T_3 - EC + $CaCl_2$ (1%)	21.68	19.3	10.98	18.08	6.32	16.5	8.74	13.7	16.97	5.6	29.02
T_4 -EC + *Aloe vera* gel (5%)	21.68	19.3	10.98	18.0	6.74	16.54	8.11	14.2	14.15	5.1	26.42
T_5 -EC + *Aloe vera* gel (10%)	25.0	22.7	9.2	21.6	4.85	19.6	9.26	18.1	7.65	4.6	20.26
T_6 -EC + *Aloe vera* gel (15%)	25.16	22.5	10.57	21.5	4.44	19.5	9.3	17.4	10.77	5.1	22.67
T_7 -EC+ *Aloe vera* gel (20%)	24.49	22.28	9.02	21.35	4.17	19.6	8.2	18	8.16	4.28	19.21
T_8 - EC+ *Aloe vera* gel (25%)	22.14	19.8	10.57	18.5	6.57	17.1	7.57	15.2	11.11	4.6	23.23
SEm (±)	2.273	0.327		0.292		0.654		0.534			
CD (p=0.05)	N/A	0.979		0.874		1.959		1.597			

Table 4: Effect of edible coatings on change ofSingle fruit volumeof strawberry cv. winter dawn

Treatments	Fruit volume (ml)										
	0 DAS	**5 DAS**	**Decrease (%)**	**10 DAS**	**Decrease (%)**	**15 DAS**	**Decrease (%)**	**20 DAS**	**Decrease (%)**	**Overall decrease**	**Overall decrease (%)**
T_0 - Control	9.3	6	35.48	5.5	8.33	4.3	21.82	3	30.23	3	50.00
T_1- Distilled water	10.6	7.1	33.02	5.9	16.9	4.9	16.95	3.2	34.69	3.9	54.93
T_2 – Edible coating (EC)	9.2	6.5	29.35	5.9	9.23	4.1	30.51	3.4	17.07	3.1	47.69
T_3 - EC + $CaCl_2$ (1%)	9.4	7.5	20.21	6.8	9.33	4.8	29.41	4.2	12.5	3.3	44.00
T_4 -EC + *Aloe vera* gel (5%)	8.5	6.8	20	5.9	13.24	4.9	16.95	3.8	22.45	3	44.12
T_5 -EC + *Aloe vera* gel (10%)	10	8.1	19	7.1	12.35	6.3	11.27	5.9	6.35	2.2	27.16
T_6 -EC + *Aloe vera* gel (15%)	10.2	7.9	22.55	7.1	10.13	5.9	16.9	5	15.25	2.9	36.71
T_7 -EC+ *Aloe vera* gel (20%)	11	9	18.18	7.6	15.56	7.9	-3.95	6.4	18.99	2.6	28.89
T_8 - EC+ *Aloe vera* gel (25%)	9.1	6.9	24.18	6.2	10.14	5.1	17.74	4.3	15.69	2.6	37.68
SEm (±)	0.525	0.527		0.285		0.283		0.310			
CD (p=0.05)	N/A	1.577		0.855		0.849		0.929			

Table 5:Effect of edible coatings on change of fruitSpecific gravity of strawberry cv. winter down

Treatments	Specific gravity										
	0 DAS	**5 DAS**	**Decrease (%)**	**10 DAS**	**Decrease (%)**	**15 DAS**	**Decrease (%)**	**20 DAS**	**Decrease (%)**	**Overall decrease**	**Overall decrease (%)**
T_0 - Control	1.08	1.09	-0.93	1.01	7.34	1.02	-0.99	0.99	2.94	0.10	9.17
T_1- Distilled water	1.07	1.07	0	1.08	-0.93	1.04	3.7	1.06	-1.92	0.01	0.93
T_2 – Edible coating (EC)	1.0	1.08	-8.0	1.02	5.56	1.07	-4.9	1.03	3.74	0.05	4.63
T_3 - EC + $CaCl_2$ (1%)	1.08	1.04	3.7	1.01	2.88	1.04	-2.97	1.02	1.92	0.02	1.92
T_4 -EC + *Aloe vera* gel (5%)	1.02	1	1.96	1.02	-2	0.99	2.94	1.05	-6.06	-0.05	-5.00
T_5 -EC + *Aloe vera* gel (10%)	1.06	1.05	0.94	1.06	-0.95	1.04	1.89	1	3.85	0.05	4.76
T_6 -EC + *Aloe vera* gel (15%)	1.03	1.07	-3.88	1.04	2.8	1.01	2.88	1.02	-0.99	0.05	4.67
T_7 -EC+ *Aloe vera* gel (20%)	1.03	1.06	-2.91	1.08	-1.89	1.03	4.63	1.09	-5.83	-0.03	-2.83
T_8 - EC+ *Aloe vera* gel (25%)	1.01	1.06	-4.95	1.04	1.89	1.02	1.92	1.02	0	0.04	3.77
SEm (±)	0.029	0.034		0.033		0.018		0.025			
CD (p=0.05)	N/A	N/A		N/A		N/A		N/A			

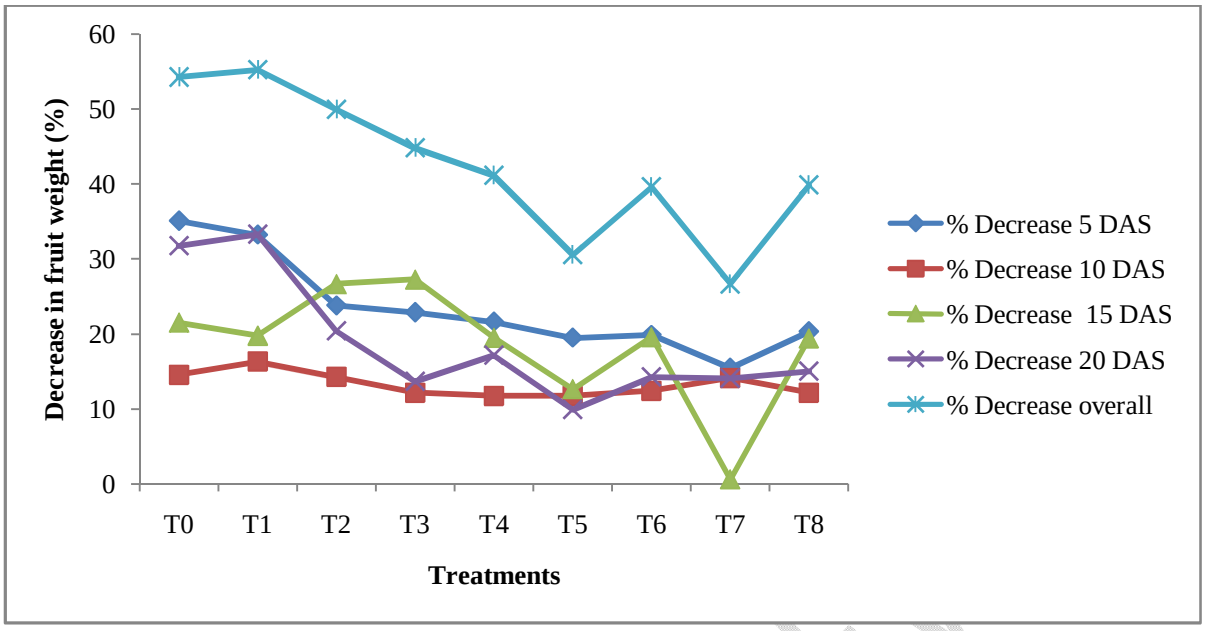

Figure 1: Effect of edible coating treatments on change of fruit weight during storage

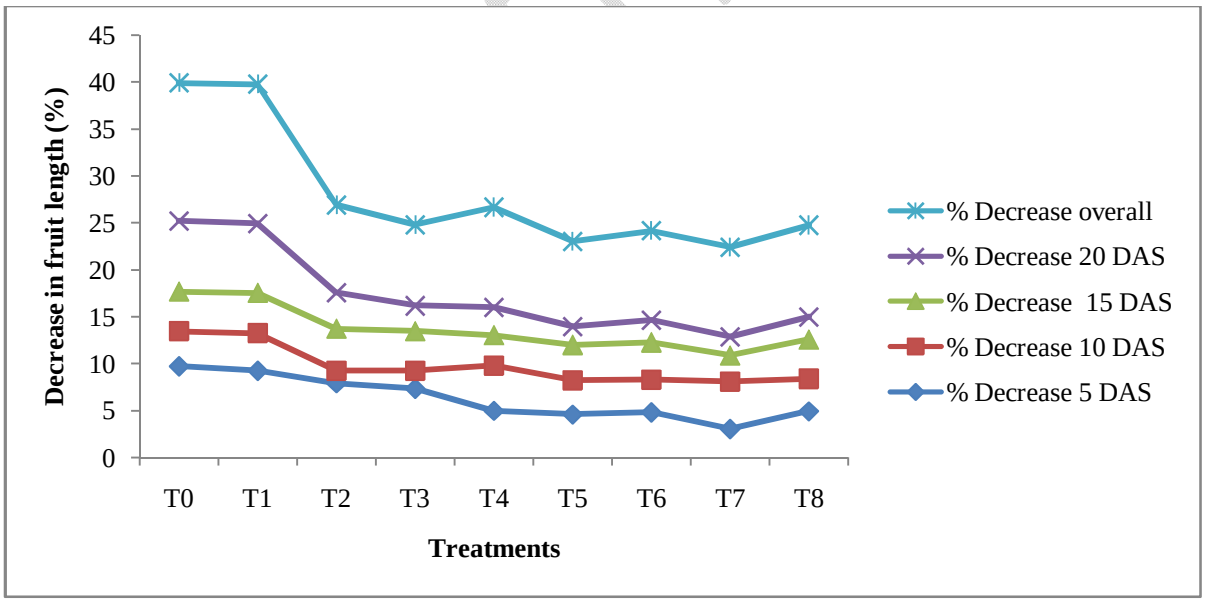

Figure 2: Decrease in length of fruits of strawberry with various edible coating treatments

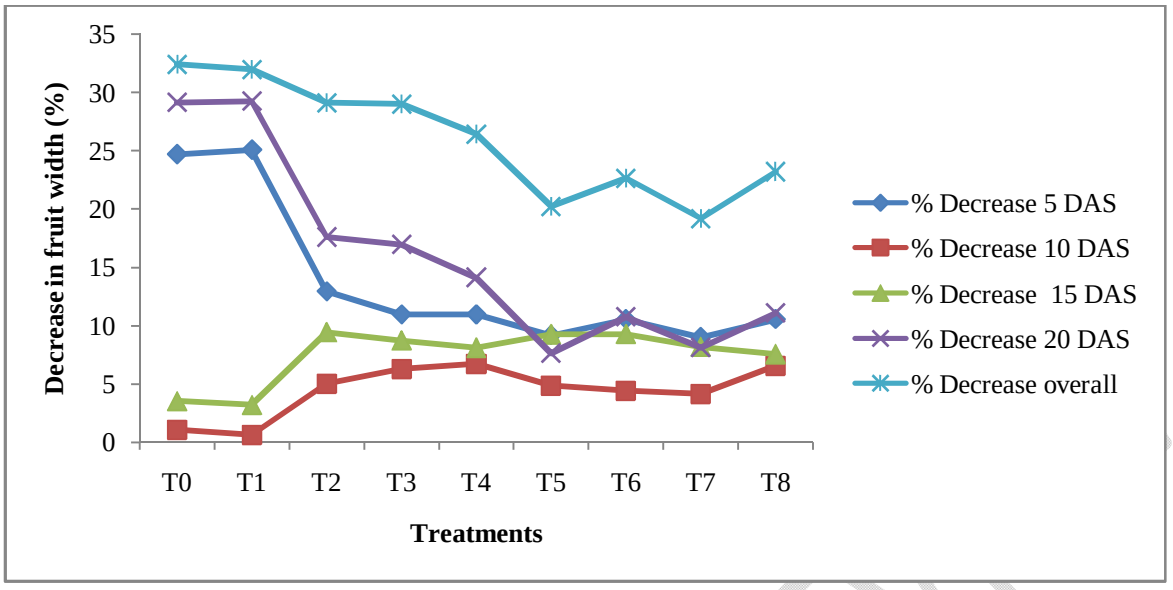

Figure 3: Decrease in fruit width of strawberry at various stages of storage

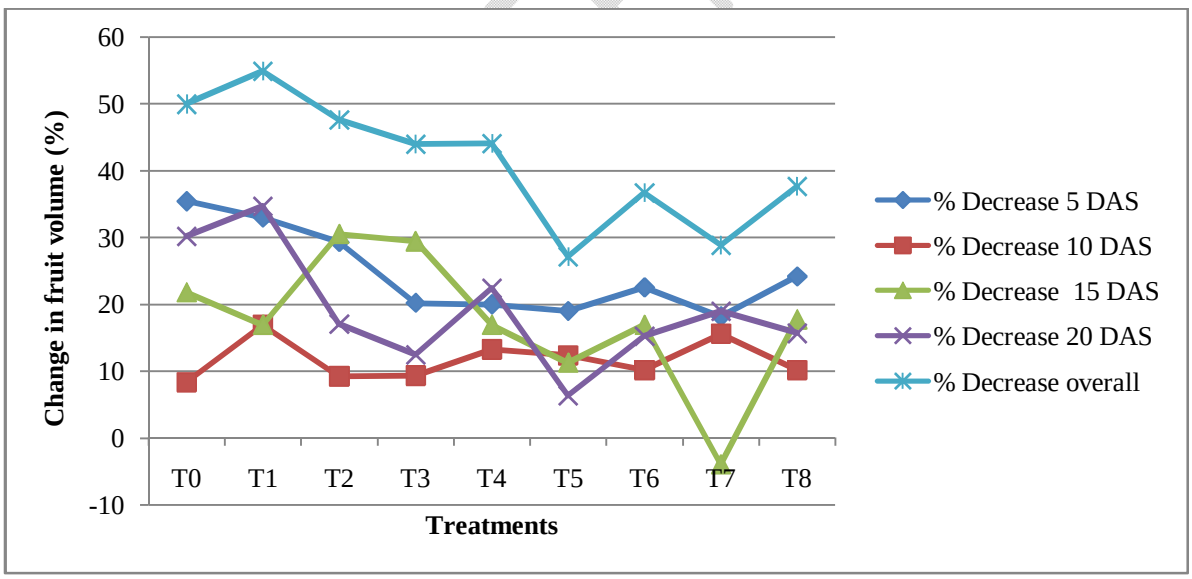

Figure 4: Change in fruit volume due to edible coating treatments on strawberry