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The Effects of CaC_2 and Different Calcium Salt on Mango Fruits Ripening In Bangladesh

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Abstract
The effect of many calcium salts and CaC_2 is diverge on the ripening of the mango fruits in Bangladesh, which is frequently found. Green and mature fresh mango fruits (*mangefera indica,* four types of sub-group was taken, lokhna-*mangefera indica*, hemsagor-*mangefera indica*, gopalvogh – *mangefera indica*, and langra- *mangefera indica)* were harvested and immersed for l0 minutes in different calcium salt concentration. CaC_2 and three calcium salts were taken in four concentrations – 2.5, 5.0, 7.5 and 10 %. The salts were –calcium chloride ($CaCl_2$), calcium sulphate ($CaSO_4$) and calcium ammonium nitrate $Ca[NH_4NO_3]_2$. For the accuracy of the result, a control for every concentration was also included in which fruits were dipped in fresh water for 10 minutes. The mango fruits were ripened at ambient temperature (27°±4°c) in the paper carton–boxes lined and covered with newspapers. CaC_2 acts as a fast ripening agent. but Calcium salts delayed the fruits ripening about 3 days as compared to the control fruits, however, it induced skin shriveling. $CaSO_4$ also delayed fruits ripening but improved the pulp color. The gradual increase in concentration of calcium salts delayed the fruits ripening, but had negative effects on fruit quality by increasing skin shriveling and lowering flavor and taste of the mango fruits. On the other hand, the calcium ammonium nitrate had a poor influence in the mango fruits ripening. Although calcium salts delayed the ripening for some days, but it as well as decreased the fruits quality, thus, responsible for poor eating quality. CaC_2 is a fast ripening agent and it was seen that, after spraying the CaC_2 solution on the mango, they were ripped within 1/2days as compare to the controls were ripped within at least 5 days.

Keywords: Calcium Carbide, Calcium Chloride, Calcium Sulfate, Calcium Ammonium Nitrate, Organoleptic Evaluation, Ripening.

1. Introduction
Mango is a popular fruit. So, it is called the king of fruit. But Mango does not grow everywhere properly. Asia accounts for approximately 77% of global mango production and the America and Africa accounts for approximately 13% and 9% respectively. It grows in native to South-East Asia and consists of 62 species (Ekuguru Gorden Kwabena, November-2011).A plenty of Mangos grows in Bangladesh. The Mango of Rajshahi and Chapai Nawabgonj is popular in home and abroad. The Climate and soil of Rajshahi is appropriate to grow the mango. Mango grows in a slightly acidic (P^H: 5.5-7.5) and well-drained soil whether it is sandy, loam or clay. Mango is also drought tolerant and can withstand occasional flooding. Mango is an item of international trade. Because of its Super quality, various species and different tastes, Bangladeshi mangoes are sold at a good price in many developed countries. The mangoes of Rajshahi and Chapai Nawabgonj in Bangladesh are highly demandable and now a day the Bangladeshi mango export market is Lucrative. Because of some limitation, the export market is damaged. Domestic and International trade of fresh mango has been limited by the highly perishable nature and it's susceptibly do post-harvest diseases and physical injury. The fruits may require 3-10 days to ripe and this short period seriously limits commercialization in distance market. Mango fruits have low/poor storage qualities and technologies for long term storage such as controlled or modified atmosphere have not been applied successfully to this fruit. Fruits stored in modified atmosphere often show undesirable characteristics, i.e. poor colour, poor eating quality and presence of undesirable flavours. So, to solve the problem of short shelf-life of mango fruits, different chemicals are used to delay the ripening. Although calcium carbide has been frequently used since long times to enhance ripening process of mango fruits (Srivastava, 1967*;* Nagarag *et al*., 1984*;* Paj, 1998) [11, 5, 6].

To prevent from this problem some chemicals such as, calcium salts (calcium chloride, calcium sulfate and calcium ammonium nitrate) are used. These salts are delayed to ripen mangoes and develop its color, taste and flavor. The calcium salts in various/different concentrations have either been used as pre-harvest sprays, while some workers treated harvested fruit by immersing in calcium solution for varying times. Three fortnightly sprays of 1% calcium nitrate, commencing 6-8 weeks before harvesting, delayed color change and ripening in storage (Sive and Renizky, 1985) [9]. Application of calcium ammonium nitrate (0.6 or 1.2%) to Tommy Atkins mangoes before harvest did not resulted in increase Ca content of fruit pulp or fruit loss. However, total soluble solids, total titratable acidity and pulp firmness were affected by the treatments (Kluge *et al*., 1999 ; Will *et al*., 1988) [4, 14] dipped mature fruits of 3 mango cultivars in 4% (W/V) Ca solution under Sub-atmospheric pressure ranging from 20-80 kpa (Cv.Cengkir) or 20-100 Kpa (Cvs. Arumanis and Gedony) for 4.5 min. and stored 30^0C. Color changes were delayed by 1-2 days in fruits dipped in Ca at 20 kpa and 40 kpa. In another study, mature green mango fruits were infiltrated with 2, 4, 6 and 8% calcium chloride solution under a positive pressure of 115 kpa for 2 min. After treatment, fruits were stored at 28^0C in boxes lined and covered with polyethylene film. Pressure and vacuum infiltration with $cacl_2$ delayed fruit ripening by approximately 10 and 8 days respectively, Compared with fruits infiltrated with water. Few differences in the effects of different $cacl_2$ concentrations on ripening were also observed (Yuen *et al*., 1993) [15]. Mango (cvs. Manila and Tommy Atkins) fruits were stored at 4 or 8° C, 85% RH for 7 or 25 days. Half of the fruits were dipped in 5% $CaCl_2$ for 10 min prior to storage. The fruits were ripened at ambient temperature (20°c) after storage. Calcium treatment delayed softening in Tommy Atkins fruits but not in Manila fruits (Corrales-Garcia and Lakshminarayana, 1991) [1]. $CaCl_2$ at 2% in the fungicide dip raised the Ca level and delayed ripening (Sive and Resnizky, 1985) [9]. Hot water treatment containing 1% $CaCl_2$ has been found the most effective treatment to retard ripening and spoilage of mango fruits (cvs. Fazli and Ashwina). Ripening was delayed by 5 – 8 days (Gofure *et al*., 1997) [3]. Calcium ammonium nitrate application did not increase shelf-life of mango fruits when immersed for 90 min in 0.2 or 4% solution. However, the external appearance of the fruits was better at a concentration of 4% but this did not guarantee export quality. These results seem to be quite confusing. Therefore, in the present study different concentration of various calcium salts (i.e. Calcium chloride, calcium sulphate and calcium ammonium nitrate) were used to ascertain their effects on delaying the ripening, export quality and eating quality of mango fruits.

Materials and methods

This study was conducted to discern the many biological and morphological effects of the CaC_2 and calcium salts on ripening of mango fruits (*Mangefera indica* L.) at university of Mawlana Bhashanence and Technology, Tangail, Dhaka, during june – july, 2014. Four types of the mangoes (Lokhna, Himsagor, Gopalvogh And Langra), which were fresh and mature, were harvested in the evening from the largest mango garden situated in the natore, Rajshahi. In next morning, these fruits were cleaned with the cloth. Four types of mangoes were separately treated with the 2.5, 5.0 7.5 and 10% CaC_2, $CaCl_2$, $CaSO_4$ and $Ca[NH_4NO_3]_2$ solutions by dipping for 10 minutes. A control was also included in (every cases in every salts concentration) which fruits were immersed in fresh water for about 10 minutes as like as the samples.

There were 64 samples were used for CaC_2 and calcium salts in different concentration and 16 controls fruits were also used to judge accurate answer. Every sample was labeled properly with its group name, salts name, and salts concentration, date and time. The fruits were stored accurately for ripening at ambient temperature (27±4°c) in boxed lined and covered with newspaper. The experiment was laid out as factorial with completely randomized design, having two factors, (salts and concentration) and four replications. The data were recorded on color of the fruits at ripening; skin shriveling of the fruits at ripening, aroma of the fruits at ripening, pulp color of the fruits at ripening, flavor and taste of the fruits at ripening and many other morphological and physiological properties and changes. (Anjum *et al*., 2004) [10].

Sensory evaluation

The physiological and morphological change of the fruits before and after ripening, with or without any chemicals, was observed very carefully and regularly. The organoleptic evaluation of fruits for skin color shriveling, aroma, pulp color, flavor and taste was done using the hedonic scale method of (Peryam and pilgrim, 1957) [7]. Ten qualified judges were employed in the panel who were asked to score the above mentioned parameters using the 10 points hedonic scale,10 being the highest score indicating most acceptable and zero the least. For proper evaluation and better accuracy, the SD (standard deviation) for each parameter was computed by the method of steel and torrie, (1980) [12]. All parameters were checked daily and in every case, the fraction of the day was also calculated and their changes were also well established by proper judgment.

Result and discussion

Effects of CaC_2 in the fruits ripening

CaC_2 is a fast ripening agents. But its effects on the fruits ripening are very bad and highly hazardous. CaC_2 is a highly carcinogenic chemical. It causes cancer and many other complexities of heart, lungs and kidney. But many surveys indicated that, about 70-80% of Bangladeshi local sellers used CaC_2 as a early ripening agent. But it was clear in our study that, although cac_2 is a early ripening agent but this chemical directly affects fruits quality and reduced all the considered parameters in a worst level.

Table 1: Effects of CaC_2 in the mango fruits ripening

parameter	Control	2.5%	5%	7.5%	10%
Time required for ripening	5 days ±…….	20 hours ±….	16 hours ±….	15 hours ±….	12 hours ±….
Color of the skin	Greenish and yellowish, uniform	Yellowish but not uniform color	Yellowish but not uniform color	Yellowish but not uniform color	Yellowish but not uniform color
Flavor, pulp color, aroma	Natural and attractive	Same as control but less attractive	Same as control but less attractive	Deep yellow but less attractive	Deep yellow but less attractive

Skin shriveling	None	Frequent and widespread	Frequent and widespread	Very high and widespread	Very high and widespread
Taste	Sweet but not sour	Some portion sweet, some sour	Some portion sweet, some sour	Some portion sweet, some sour	Some portion sweet, some sour
Smoothness and softness	Naturally smooth and soft	Naturally smooth and soft	Rough	Rough	Highly Rough
Uniformity	All parameters are uniform in all parts of mango	All parameters are not uniform in all parts of mango	All parameters are not uniform in all parts of mango	Nothing is uniform through the whole mango.	Nothing is uniform through the whole mango.

Time required for ripening

The calcium salts used differed for the time required for ripening of the fruits. Calcium chloride was more effective in delaying the ripening as compared to other salts and fruits treated with this salt ripened about 3.5 days later than the untreated (control) fruits. The ripening in the fruits treated with calcium sulphate was delayed only for 3.00 days. Calcium ammonium nitrate was not so effective but it was almost at par with control (Table 3). The delay in ripening by calcium chloride treatments has already been reported by several workers (Sive and Resnizky, 1985*;* Corrales-Garcia and Lakshminarayana, 1991*;* Yuen *et al*., 1993*;* Gofure *et al*., 1997) [9, 1, 15, 3]. Although the concentrations of the calcium salts used resulted in about 2 - 3.5 days in delaying the ripening than control, however, the concentrations did not differ with each other significantly (Table 4). Calcium chloride at the concentrations of 2.5%, calcium sulphate at 2.5% and 5.00% and Calcium ammonium nitrate at 2.5% and 5.00% behaved alike and delayed ripening for about 2 days. However, calcium chloride at the concentrations of 7.5% and 10%, and calcium sulphate at 7.5% and 10% were the most effective and fruits in these treatments ripened 4 days or 5 days later than those kept as control. Calcium ammonium nitrate was only effective at lower concentration of 2.5% and delayed ripening for only 2 days. However, at higher concentrations it stood at par with untreated (control) fruits (Table 5). (Sive and Resnizky, 1985) [9] have already reported that calcium chloride at 2% in fungicide dip delayed the ripening of fruits. The differences in the effects of different $CaCl_2$ concentrations have also been observed by (Yuen *et al.*, 1993) [15].

Skin color of the fruits at ripening:

Among the physiological properties, the skin color of the mango fruits is a vital characteristic for marketing as it makes the commodity more attractive. Color of the fruits at ripening, was significantly different from the control Fruits and the fruits treated with CaC_2 and calcium salts. The fruits treated with CaC_2 were not gained the accurate or exact color, although it was ripened. The skin of the fruits remained greenish in color, major portion was slightly yellowish and the color was not uniform. The fruits treated with $[Ca[NH_4NO_3]_2$ were slightly inferior in color than the untreated fruits and fruits treated with other two salts. The fruits treated with $CaCl_2$ and $CaSO_4$ were not also in accurate desired color. In the both cases, at least 25% parts of the mango fruits was greenish, except the Hemsagor (*Mangefera indica*). All the Hemsagor mangoes were yellowish in color in the both case of $CaCl_2$ and $CaSO_4$ treatment. The concentration of these salts used to treat the fruits also behaved alike and stood at par with control except the concentration of 5% and 10%, in which color development was less as compared to the other. Regarding the combined effect of calcium salts and concentrations, maximum color development was noted in the fruits treated with calcium chloride at a concentration of 7.5% and 10% while the minimum was in these treated with $Ca[NH_4NO_3]_2$ at a concentration of 5% (Table 5). In all the treatment, color development was at least slight different than those kept as control (untreated). There was/may also a possible reason for poor color development could be reduced rate of the respiration of the treated fruits. It was also mention that all the controls fruits were also not in its exact ripened color and the color was not also uniform in all cases.

Table 2: Effects of various calcium salts and CaC_2 on ripening and fruit quality

No.	Name of the parameters	Name of the salts			
		CaC_2	$CaCl_2$	$CaSO_4$	$Ca[NH_4NO_3]_2$
1.	Days tale to ripe	8-12 hours	8 days	7 days	6 days
2	Color of the fruits	Yellowish and Greenish	90% yellowish +10%greens	90% yellowish +10%greens	25%yellowish +75%greens
3	Taste	Partially sour + lower sweeten compare to the other	Satisfactory	Satisfactory	Satisfactory
4	Spoilage of mango fruits	75% of fruits were spoiled after 1 day.	25% of fruits were spoiled after 10 days.	25% of fruits were spoiled after 9/10 days.	25%of fruits were spoiled after 7 days.
5	Black spots on the skin	Yes	No	Low quantity/number	Very Low quantity/number
6	Color of the nipple	Black	Light black	Greenish + yellowish	Light black
7	Aroma, flavor, texture (control is considered best)	Not so good	Good but not better	Better	Good but not better
8	Overall appearance	Not Satisfactory	Normal but so attractive as control	Normal but so attractive as control	Normal and attractive
9	Hardness and softness	Very very soft	Like as control	Like as control	Like as control

Table 3: Effects of different concentrations of various calcium salts on ripening and fruit quality

No.	Name of the parameters	Name of the salts			
		Control	$CaCl_2.2H_2O$	$CaSO_4.2H_2O$	$Ca[NH_4NO_3]_2$
1.	Time required for ripening (days)	5 ± 0.00	8.5 ± 1.29	8 ± 1.15	6 ± 1.15
2	Skin Color of the fruits at ripening	5.42 ± 0.29	5.56 ± 0.52	5.38 ± 1.44	5.44 ± 0.52
3	Skin shriveling of the fruits at ripening	0.00±0.00	3.25 ± 1.72	3.06 ± 1.52	0.63 ± 0.102
4	Aroma of the fruits at ripening	3 ± 0.00	3 ± 0.84	1.63 ± 1.20	2.31 ± 0.67
5	Pulp color of the fruits at ripening	4.5 ± 0.00	4.75 ± 0.35	5.096 ± 0.41	3.47 ± 0.48
6	Flavor and taste of the fruits at ripening	3.50 ± 0.00	2.94 ± 0.78	3.03 ± 0.68	3.38 ± 0.37

* Data represent means ±SD of 4 replicates.

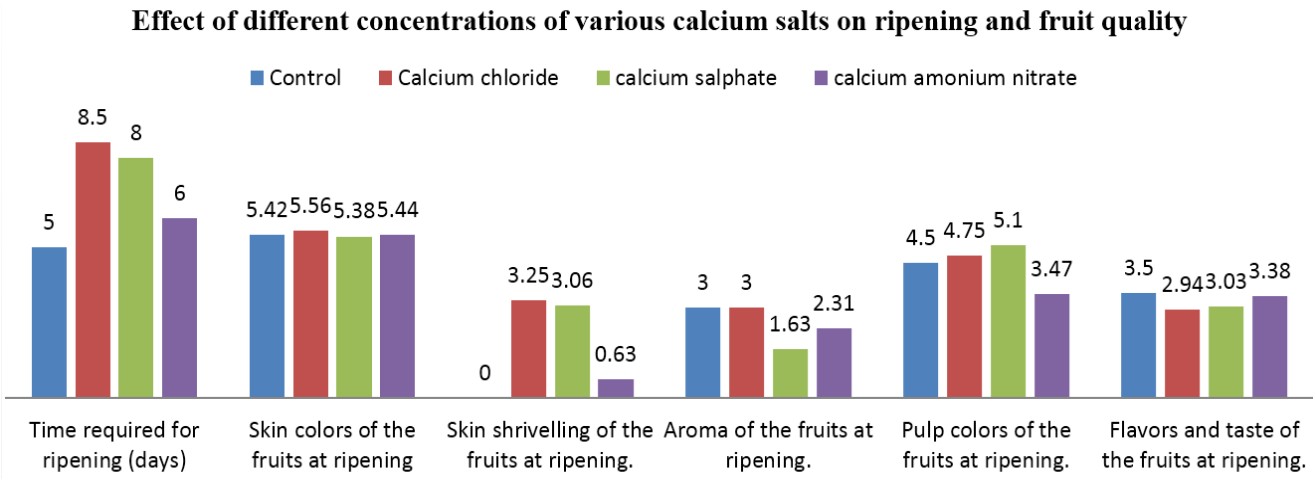
$$SD = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$

Table 4: Effects of different concentrations of various calcium salts on ripening and fruit quality

	Name of the parameter	Concentration				
		0%	2.5%	5%	7.5%	10%
1.	Time required for ripening (days)	5 ± 0.00	7 ± 0.00	7 ± 0.56	7.67 ± 2.11	8 ± 2.65
2	Skin Color of the fruits at ripening	5.42±0.29	5.42 ± 0.14	5 ± 0.25	5.58 ± 0.38	5.83 ± 0.29
3	Skin shriveling of the fruits at ripening	0.00±0.00	0.92 ± 0.88	1.92 ± 2.00	3.00 ± 2.17	3.00 ±1.98
4	Aroma of the fruits at ripening	3 ± 0.00	1.42 ± 0.52	1.83 ± 1.98	3.08 ± 0.80	2.92 ± 0.29
5	Pulp color of the fruits at ripening	4.5 ± 0.00	4.33 ± 1.18	4.04 ± 0.83	4.62 ± 0.76	4.75±0.66
6	Flavor and taste of the fruits at ripening	3.50 ± 0.00	3.21 ± 0.97	3.17 ± 0.52	3 ± 0.5	2.42±1.12

* Data represent means ±SD of 4 replicates.

$$SD = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$



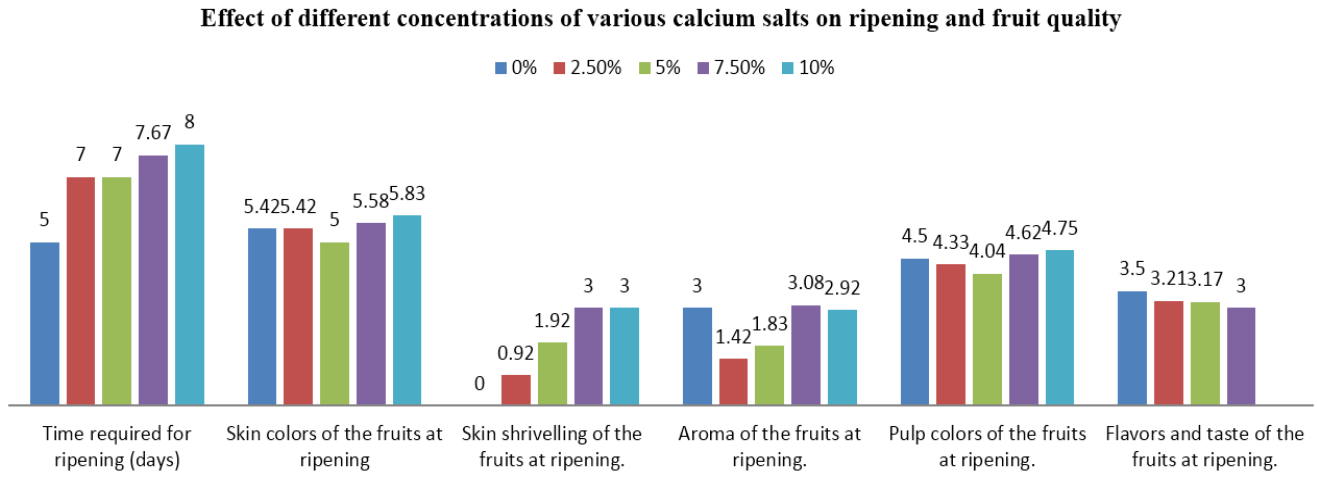


Table 5: Effects of different concentrations of various salts on ripening and fruits quality Data represent means +SD of 4 replicates.

	$CaCl_2.2H2O$					$CaSO_4.2H_2O$					$Ca[NH_4NO_3]_2$				
Parameters	**0%**	**2.5%**	**5.0%**	**7.5%**	**10%**	**0%**	**2.5%**	**5.0%**	**7.5%**	**10%**	**0%**	**2.5%**	**5.0%**	**7.5%**	**10%**
Time required for ripening (days)	5.00 ± 0.61	7.00 ± 0.77	8.00 ± 0.82	9.00 ± 0.64	10.00 ± 0.84	5.00 ± 0.61	7.00 ± 0.76	7.00 ± 0.62	9.00 ± 1.02	9.00 ± 1.17	5.00 ± 0.61	7.00 ± 0.67	7.00 ± 0.63	5.00 ± 0.46	5.00 ± 0.63
Skin colors of the fruits at ripening.	5.75 ± 0.89	5.25 ± 0.20	5.00 ± 0.61	6.00 ± 0.74	6.00 ± 0.46	5.25 ± 0.61	5.50 ± 0.16	5.25 ± 0.50	5.25 ± 0.75	5.50 ± 0.16	5.25 ± 0.61	5.50 ± 0.58	4.75 ± 0.31	5.50 ± 0.16	6.00 ± 0.22
Skin shriveling of the fruits at ripening.	0.00 ± 0.00	1.00 ± 0.35	4.00 ± 0.79	4.25 ± 0.46	3.75 ± 0.56	0.00 ± 0.00	1.75 ± 0.46	1.75 ± 0.54	4.25 ± 0.21	4.50 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00	0.50 ± 0.00	0.75 ± 0.73
Aroma of the fruits at ripening.	3.00 ± 1.53	2.00 ± 1.37	2.75 ± 0.00	4.00 ± 0.09	3.25 ± 0.00	3.00 ± 1.53	1.00 ± 0.35	0.25 ± 0.00	2.50 ± 0.36	2.75 ± 0.00	3.00 ± 0.65	1.25 ± 0.85	2.50 ± 0.36	2.75 ± 0.00	2.75 ± 0.00
Pulp colors of the fruits at ripening.	4.50 ± 0.63	4.75 ± 0.31	4.25 ± 0.46	5.00 ± 0.61	5.00 ± 0.00	4.50 ± 0.63	5.25 ± 0.61	4.75 ± 0.31	5.13 ± 0.00	5.25 ± 0.00	4.50 ± 0.63	3.00 ± 0.32	3.13 ± 1.30	3.75 ± 0.00	4.00 ± 0.79
Flavors and taste of the fruits at ripening.	3.50 ± 1.07	4.00 ± 0.09	3.00 ± 0.32	2.50 ± 0.36	2.25 ± 0.00	3.50 ± 1.07	2.13 ± 0.51	3.75 ± 0.13	3.00 ± 0.00	3.25 ± 0.00	3.50 ± 1.07	3.50 ± 0.29	2.75 ± 0.94	3.50 ± 0.31	3.75 ± 0.00

Skin shriveling of the fruits at ripening

The first and most attractive feature of the ripped mango is the appearance and smoothness of the skin of the fruits. The mangoes that contain smooth skin and no shriveling fetch better price. In our study, it was seen that, there were no shriveling was noted in the controls fruits and those treated with $[Ca(NH_4NO_3)]_2$ salts. With some presence of the shriveling were found in the fruits those were treated either by $CaCl_2$ or by $Ca[NH_4NO_3]_2$ (Table 3). The shriveling was depends on the concentration of the salts and which was directly proportional to the salts concentration. As the concentration of the $CaCl_2$ and $CaSO_4$ salts were increased, the shriveling of the skin was also increased (Table 4). Minimum skin shriveling was noticed when the fruits were treated with the 10% $caso_4$ followed by those treated with both $CaCl_2$ and $CaSO_4$ at the concentration of the 7.5 % (Table 5). The calcium salts delay ripening and senescence in fruits by lowering the rate of respiration (Sings *et al*., 1993). But the causes of the skin shriveling are still now unknown.

Aroma of the fruits at ripening:

The aroma of the mango fruits is varied within the subspecies of the mango and it is a characteristic of the cultivars. In another study, it was proven that the ripening condition, ripening state and environmental stress also affects the aroma of the fruits. Calcium chloride slightly increased the aroma of the fruits then the controls ones, but fewer aroma was observed in these fruits treated with $CaSO_4$ and $Ca[NH_4NO_3]_2$ (Table 3). In the case of the $CaSO_4$ and $Ca[NH_4NO_3]_2$ at the 10% concentration, the aroma is very mild but nearest as the control fruits. As concentration of calcium salts was concerned, lower concentration of 2.5% and 5.0% reduced the aroma of treated fruits; however it improved when fruits were treated at the

higher concentration of 7.5% and 10% (Table 4). Regarding the combined effects of salts and their concentration, fruits treated with $CaCl_2$ at concentration of 7.5% had the maximum aroma, followed by those treated at 10%. All other treatments resulted in aroma either lower or similar to the untreated fruits (Table 5). Those results indicate that fruits treatment with calcium salts not only affects the ripening process but also influences the aroma of the fruits.

Pulp color of the fruits at ripening:

The edible portion of the mango fruits is the pulp; therefore pulp color is also important as it related to the fruit quality. Pulp color was significantly improved with the calcium sulphate treatment and deteriorated with calcium ammonium nitrate treatment. However, the fruits treated with calcium chloride had almost same color as untreated fruits (Table 3). Pulp color was also affected by the concentrations of the salts used and decreased randomly and then recovered (Table 4). As the combined effect of calcium salts and concentrations is concerned, calcium sulphate treatment at 2.5 and 10 % and than 7.5%, calcium chloride treatment at 7.5% and 10% resulted in better pulp color as compared to the untreated fruits. The pulp color was deteriorated when fruits were treated with calcium ammonium nitrate at all the concentrations (Table 5) indicating that the calcium ammonium nitrate treatment had negative effect on pulp color.

Flavor and taste of the fruits at ripening

Flavor and taste are the important quality parameter to measure the mango quality for the Bangladeshi population. CaC_2 and the all three calcium salts treated fruits resulted in reduced flavor and taste (Table 3). As all the fruits were treated in different concentration of the CaC_2 and all calcium salts, but was clear that in all the concentration, the flavor and taste of the fruits were also reduced similarly. As the combined effect of the calcium salts and concentrations was a major concern in our study, it was seen that only $CaCl_2$ at 2.5% resulted in better flavor and taste of the fruits than the untreated control. On the other hand, $Ca[NH_4NO_3]_2$ treated fruit's flavor and taste were same as like as the control one, as in the concentration of the 2.5% and 7.5%. It is a matter of the great concern that, all others treatment of the fruits combindly had a negative effects on the flavor and taste of the fruits. The overall condition of the fruits flavor and taste were the worst in the 2.5% of $CaSO_4$ (Table 5). So it is clear that, delay ripening of the fruits with calcium salts also have some negative effects on the fruits quality.

Conclusion

In Bangladesh, the use of different harmful carcinogenic chemical like the calcium carbide is most commonly used as ripening agent for fruits, while other calcium salts are used to delay fruit ripening agents for local fruit industries but the eating quality of these fruits were poor. The use of calcium carbide is being discouraged worldwide, due to associated health hazards. Calcium carbide treatment of food is extremely hazardous because it contains traces of arsenic and phosphorous, and once dissolved in water, it produces acetylene gas that can affect the different body organs. CaC_2 treated fruits are strongly prohibited, although it is not maintained. So it is the high time to be concerned about use of chemical in different fruits. It should always remind that, "All natural things are real beauty containing real taste and contain wonderful our flavor, aroma and texture as like as the nature wonder."

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