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Impact of different types of pre-harvest bunch bagging on postharvest physiological quality of banana CV. Grand Naine

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Abstract
The present research was done to investigate the effect of different type of bunch protection material on postharvest quality of Banana and all related experiments were conducted at tissue culture banana farm and departmental laboratory in the year 2018-19. Five treatments were given in which fruit bunches were covered by Blue HDPE, Silver HDPE, White LDPE, Non-woven bag along with the Control (uncovered). Fruit bunches were covered at finger curling stage. Once fruits were matured they were harvested and kept at ambient temperature. Observations related to its physical parameters were recorded and the results indicated that pre harvest bunch covering affected the postharvest physical quality of Banana. Among bagging the best results were obtained in non woven bags followed by Blue HDPE bag. In non woven the maximum fruit weight 124.89 g, pulp to peel ratio 4.41 and moisture content 71.52% were recorded and same time minimum weight loss 1.76% was observed.

Keywords: Graind Naine, Banana Bagging, PLW, Firmness, Preharvest.

Introduction
Banana belongs to the genus Musa of the family Musaceae, originated from tropical region of South-East Asia. It is the second most important fruit crop of India. Botanically, banana fruit is a berry, rich in carbohydrates and fat. Banana is also a potent source of various vitamins and minerals. It makes healthy and salt free balanced diet than many other fruits, hence known as wholesome fruit. Not only nutritional quality it has also medicinal values for the treatment of many diseases such as ulcer, hypertension, diabetes etc and industrial value as well.

Among the various varieties of banana, Grand Naine is one of the most promising cultivar. It is a well-known fact that the fruit quality of banana deteriorates due to several biotic and a biotic factor, including production practices which is responsible for the deduction of the real value as buyers use visual quality of banana to purchase produce usually that is blemish-free. A number of Good agricultural practices (GAP) are becoming popular all over the World for the production of good quality fruit with less dependence on synthetic chemicals among such practices, pre-harvest bunch bagging has emerged as a fruitful method. It is an art of physical protection method which creates a physical barrier to the bunch and also improves the physical appearance of fruit by promoting skin colouration and reducing blemishes, but can also change the micro-environment for fruit development, which can have various beneficial effects on internal fruit quality due to its various useful effects. Researchers reported that appearance of fruit under bunch cover mostly improves which is one of the major factors of influencing a consumer for the fruit (Kutinyu, 2014) [3].

Materials and Methods

The present investigation was carried out at tissue culture banana farm and laboratory of Food Science and Postharvest Technology in BAU, Sabour Campus in the year 2018-19. Fruit variety selected for present study was tissue cultured banana cv. Grand Naine which is a promising cultivar of banana. Matured plants of banana cv. Grand naine trees were selected at tissue culture farm located in the BAU, Sabour campus for conducting the experiment. Banana bunch were bagged after the bracts covering the hands had fallen when the fingers curling upward and individual plants were marked and tagged. The individual bunch were covered with different bagging materials such as Blue high-density polyethylene (Blue HDPE), Silver High density polyethylene (Silver HDPE), White/transparent low-density polyethylene (White LDPE) and Non-Woven material. Bags were tied with rope at the end point separately. Control treatment was maintained by keeping the fruit bunch uncovered. Fruits were harvested in early morning at physiological maturity unripe stage and then taken carefully to the departmental laboratory. Experiment was conducted in RBD (Randomised block Design) with five treatments and each treatment replicated four times. The analysis of variance for different characters subjected to the method as given by (Cochran's and Cox, 1937) in the book of experimental design.

Results and Discussion

In the present investigation, effect of various bunch cover has been evaluated to see their impact on the physical quality of banana fruit. Weight of finger mainly contributes to yield attributes and this helps to get better price in local or export market. In the present study it was found that banana fruit weight was found to be increased in both treated and untreated fruits during the storage period. Among the treatments it has been observed that the fruit weight was influenced by the type of bunch sleeves used to cover the bunch and this increase was recorded highest in non-woven bag fruits as compared to control and rest of the treatment on harvest day as well as on other day of storage. Bunch covered with non-woven sleeve recorded the maximum finger weight (124.9g), while minimum finger weight (107g) was recorded in control on harvesting day (Table 1). The decline in fruit weight was at much faster rate in control fruits as compare to non-woven bags. These results are very close to the findings of Pathak *et al.* (2017) [6]. This decreased in fruit weight during the storage period could be due to physiological process such as respiratory degradation of reserve carbohydrate with release of water and transpiration through fruit skin. It could be also due to decrease in peel thickness with passage of ripening period which accelerates the weight loss of fruit (Patil and Shanmugasundaram, 2015) [7]. The fruit weight was significantly increased due to bagging of fruits as compare to control. This is probably due to under bunch cover better finger filling occur and the microclimate created by different bagging material might have congenial effect on fruit weight. These findings are accordance with some previous records that the effect of bagging on fruit weight in different fruit crops (Yang *et al.*, 2009; Chonhenchob *et al.*, 2010; Sharma *et al.*, 2014; Omar *et al.*, 2014; Rahman *et al.*, 2018) [11, 2, 9, 5, 8]. Similar, result was also reported by (Malshe and Parulekar,2017) [4].

Table 1: Effect of pre harvest bunch bagging on fruit weight and firmness on harvest day and during storage in banana cv.Grand Naine

Treatments	Fruit weight(gm)				Firmness(kg/cm^2)			
	Harvest Day	3rd Day	6th Day	9th Day	Harvest Day	3rd Day	6th Day	9th Day
Control	107.0	102.8	90.1	78.4	**7.0**	5.0	2.5	1.2
Blue HDPE	118.0	115.1	99.6	93.6	7.1	5.7	4.4	2.5
Silver HDPE	114.0	111.0	96.2	92.8	6.6	4.9	3.1	1.5
White HDPE	109.0	107.8	92.0	86.0	6.8	4.4	3.2	1.6
Non woven	124.9	122.7	119.6	104.0	6.9	5.9	4.9	3.9
C.D at 5%	6.16	5.82	4.90	4.49	0.52	0.30	0.15	0.04

In the same way, firmness of fruits was also found to be decreased during the storage irrespective of the treatments. The control fruits started losing firmness form 3rd day and recorded the lowest reading (1.2 kg/cm^2) on 9th day of storage. The highest firmness was observed in bunch covered with non woven bag followed by blue bag having 3.85 kg/cm^2 and 2.5 kg/cm^2, respectively (Table 1).This decreased in firmness of fruit during storage could be due to dissolution of cell wall. Fruit softening was accordance with change in constituents of cell wall, which promote several carbohydrate degrading enzymes Chonhenchob *et al.* (2010) [2]. The rapid loss in firmness might be due to rapid change in physiological process like ripening and respiration and also could be due to nutrient degradation that led to increase moisture content in pulp which causes reduction of fibres strength and therefore flushness of pulp, which reduced firmness of fruits during storage. These results are very close to the findings of Abbasi *et al.*, 2014 and Patil and Shanmugasundaram, (2015) [1, 7] in various fruit crops.

The physiological weight loss (PLW) are considered as main problem during postharvest storage of the fruit as water content of the fruits is an important consideration before consumption, because it is related to the freshness and solidity for the storage of the fruits for a longer time. The weight loss in banana fruits was tended to increase during the course of 9 day storage irrespective of the treatments. Results indicate the significant difference in weight loss among treated and control fruits. In general, the control fruits lost higher weight than the other treatments. The rate of weight loss in control fruits was recorded as 3.94 per cent that was quite higher than the other treatment and the lowest (1.76%) rate of weight loss was recorded in bunch covered with non woven sleeve that was followed by Blue HDPE (2.17%) on harvesting day and on 9th day (Table 2).These result are accordance with those of Carrilo *et al.* (2000) and Garwa, (2016) in mango fruits. Maximum weight loss was observed in control fruit might be due to high rate of respiration and transpiration from fruit surface, where as minimum weight loss was found to be very slow in fruit which were bagged with non woven bag, this could be due to its fabric structure and water retention capacity. Similar results were also reported by Abbasi *et al.* (2014) [1] in guava fruits when covered with news paper.

Unlike the other fruit crops the moisture content in banana fruits was tended to increase during the course of 9 days of storage irrespective of the treatments. On harvesting day itself maximum moisture content (71.52) was observed in bunch

covered with non woven sleeve which was statistically at par with rest of the treatments while minimum moisture content (64.96) was recorded in control (Table 2). The reason for this steady increase in moisture content during storage could be due to during storage there is increased in physiological process such as respiration and ripening, water is an end product of respiration hence moisture content increased during storage and also movement of water from pulp to peel has been observed in banana. Similar results were also reported by Wills, (1984) [10] in Cavendish banana. So, unlike other cases here moisture content is not the main cause for PLW.

Table 2: Effect of pre harvest bunch bagging on moisture content and PLW on harvest day and during storage in banana cv.Grand Naine

Treatments	Moisture content (%)				PLW (%)			
	Harvest Day	3rd Day	6th Day	9th Day	Harvest Day	3rd Day	6th Day	9th Day
Control	64.9	67.8	69.0	70.5	0	3.9	30.0	68.0
Blue HDPE	71.2	74.5	75.0	76.4	0	2.2	15.6	18.6
Silver HDPE	70.5	73.7	73.4	76.1	0	2.6	21.1	52.0
White HDPE	70.3	73.5	73.9	76.4	0	2.4	15.6	23.7
Non-woven	71.5	74.9	74.8	76.7	0	1.8	13.2	16.7
C.D at 5%	3.70	4.04	3.56	3.85	--	0.01	1.43	1.30

Fig: Picture showing on field bunch bagging of banana and their postharvest studies.

References

1. Abbasi NA, Amjad M, Chaudhary M, Ikram A, Hussain A, Ali I *et al.* On tree fruit bagging influences quality of guava harvested at different maturity stages during summer. International Journal of Agriculture and Biology. 2014; 16(3):543-549.
2. Chonhenchob V, Kamhangwong D, Kruenate J, Khongrat K, Tangchantra N, Wichai U, Singh SP *et al.* Preharvest bagging with wavelength- selective materials enhances development and quality of mango (*Mangiferaindica* L.) cv. Nam Dok. Journal of the Science of Food and Agriculture. 2011; 91(4):664-71.
3. Kutinyu R. The evaluation of different banana bunch protection materials on selected banana cultivars for optimum fruit production and quality in NampulaProvince, Mozambique (Doctoral dissertation), 2014.
4. Malshe KV, Parulekar YR. Effect of stage of preharvest bagging with skirting bags on fruit quality of Alphonso mango. International Journal of Processing and Post-Harvest Technology, 2017; 8(2):95-8.
5. Omar AE, Al-Saif AM, Ahmed MA. Bagging of bunches with different materials influences yield and quality of Rothana date palm fruit. Journal of Food, Agriculture & Environment, 2014; 12(2):520-522.
6. Pathak P, kumar R, Baishya B, Das U, Das J. work done regarding the impact of bunch cover application in banana. International journal of current microbiology and Applied Science. 2017; 6(7):2181-2194.
7. Patil SK, Shanmugasundarm S. Physicochemical changes during ripening of monthan banana. International journal of Technology Enhancements and Emerging Engineering research, 2015; 3(2):18-21.
8. Rahman MM, Hossain MM, Rahim MA, Rubel MH, Islam MZ. Effect of pre-harvest fruit bagging on post-harvest quality of guava cv. Swarupkathi. Fundamental and Applied Agriculture. 2018; 3(1):363-71
9. Sharma RR, Pal RK, Sagar VR, Parmanick KK, Paul V, Gupta VK *et al.*.. Impact of pre-harvest fruit-bagging with different coloured bags on peel colour and the incidence of insect pests, disease and storage disorders in 'Royal Delicious' apple. The Journal of Horticultural Science and Biotechnology. 2014; 89(6):613-618.
10. Wills RB, Lim JS, Greenfield H. Changes in chemical composition of 'Cavendish' banana (*Musa acuminata*) during ripening. Journal of Food Biochemistry. 1984; 8(2):69-77.
11. Yang WH, Zhu XC, Bu JH, Hu GB, Wang HC, Huang XM *et al.* Effects of bagging on fruit development and quality in cross-winter off-season longan. Scientia Horticulturae. 2009; 120(2):194-200.