

Short Communication

Eco friendly packages for freshness retention and shelf life extension of tuberose flower

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ABSTRACT

Tuberose is one among the important commercial flower crops popular for its pleasant fragrance in domestic as well as export market. Packaging material plays an important role in retention of freshness of tuberose flowers. At present, tuberose flowers are packaged in bulk in wet gunny bags and sold in whole sale market. For retail market, polyethylene covers are largely used for packaging of tuberose flowers which is not eco friendly. Hence, an attempt is made to standardise alternate eco friendly packages which will retain freshness and extend the shelf life of tuberose flowers. Experiments were conducted by packaging loose tuberose flowers (cv. Local Single) in areca nut sheath cup, banana leaf cup and peepal leaf cup. The samples were stored in both ambient (Temp 25-26°C, RH 52%) and low temperature (Temp 10p C, RH 86%). Periodical observations on colour index, freshness index and fragrance index were done using standard procedures. Studies revealed that arecanut sheath cup was found suitable for retail packaging of tuberose with higher freshness (82.26%), fragrance (71.21%), had shelf life upto 2 days in ambient storage condition when compared to flowers packaged in banana sheath cup and peepal cup which had less freshness and fragrance index in similar storage condition. In low temperature storage also tuberose flower packaged in areca nut sheath cup had higher freshness index (87.84), colour index (79.63) and fragrance index (71.21), as compared to flowers packaged in banana sheath cup and peepal leaf cup and shelf life of 7 days.

Key words: Tuberose, eco friendly package, shelf life extension, freshness retention

INTRODUCTION

Tuberose is one among the important commercial flower crops popular for its pleasant fragrance in domestic as well as export market. Packaging material plays an important role in retention of freshness of tuberose flowers. At present tuberose flowers are packaged in bulk in wet gunny bags and sold in whole sale market. Tuberose loose flowers are packaged in bamboo basket (around 10-15kg are packaged in each basket) and the baskets covered with wet gunny bags or muslin cloth (Safeena *et al.*, 2015). They are transported to the nearby wholesale market for selling. For retail market, polyethylene covers are largely used for packaging of tuberose flowers which is not eco friendly. Roy Chowdhury *et al.*(2011) reported the

beneficial effect of banana leaf over polyethylene and polypropylene in the packaging of tuberose flowers. An attempt is made to standardise eco friendly packages such as areca nut sheath cup, banana sheath cup and peepal leaf cup which will retain freshness and extend the shelf life of tuberose flowers.

Experiments were conducted by packaging loose tuberose flowers (cv. Local Single) in areca nut (*Areca catechu*) sheath cup, banana (*Musa acuminata*) sheath cup and peepal (*Ficus religiosa*) leaf cup. The samples were stored in both ambient (Temp 25-26°C, RH 52%) and low temperature (Temp 10pC, RH 86%). Periodical observations on PLW, colour index, freshness index and fragrance index were done. The PLW was

computed by subtracting fresh weight of flowers on any day from its weight on the previous day and expressed as percentage. Visual observations such as colour retention index, freshness index, fragrance index and shelf life (days) were recorded as sensory evaluation scoring (Thamaraiselvi *et al.*, 2010). All the experiments were conducted with four replications and statistically analyzed using Completely Randomised Design (CRD) with WASP 2.0 software (Bhuvaneswari *et al.*, 2016)

Among different packages, freshness index (%) of tuberose flower was higher in areca nut sheath cup (82.26), followed by banana sheath cup (78.38), peepal leaf cup (77.14) at ambient storage condition (**Table.1**). In low temperature storage, freshness index in the areca nut sheath cup and banana sheath cup were on par compared to peepal leaf cup (**Table 2**). Maintenance of maximum freshness in flowers might be due to higher levels of moisture content in the areca nut sheath cup. Packaging maintains higher humidity which slows down the process of moisture loss. Respiration loss also slows down due to proper balance of CO₂ and O₂ (Anzueto and Rizve, 1985). Similarly, fragrance index which is the important quality character was higher in tuberose packaged in areca nut sheath cup (71.21), followed by banana sheath cup (66.67) and peepal leaf cup (66.67) both in ambient and low temperature storage (**Table 1 and Table 2**). This may be due to biological nature of areca nut sheath

to retain the fragrance without any off flavour development. These results are in accordance with the findings of Karuppaiah *et al.* (2006). The fragrance retention of tuberose was higher in areca nut sheath cup kept in low temperature storage (73.33) even after seven days of storage than in ambient condition. Colour index which is used to determine the retention of whiteness of tuberose flower during storage was also higher in the flowers packaged in areca sheath cup both in ambient and low temperature storage when compared to other package. Low temperature storage of tuberose in areca sheath cup had good colour retention upto 7 days of storage as compared to those stored at ambient condition for 2 days (**Fig.1 and 2**). Higher



Fig. 1. Tuberose in different packages at ambient storage (Temp. 25-26°C, RH 52%)

Table 1. Tuberose retail package at ambient storage (Temp. 25-26°C, RH 52%) after 48h of storage

Treatments	Freshness Index	Colour retention Index	Fragrance Index	PLW(%)
Peepal Leaf cup	77.14	76.51	66.67	8.33
Arecanut sheath cup	82.26	78.15	71.21	10
Banana sheath cup	78.38	77.18	66.67	8.33
C.D. at1%	2.38	1.42	1.36	4.52

Table 2. Tuberose in eco friendly packages at low temperature storage (Temp. 10p C, RH 83%) after 7 days of storage

Treatments	Freshness Index	Colour retention Index	Fragrance Index	PLW(%)
Peepal Leaf cup	86.16	77.05	70.11	5.97
Arecanut sheath cup	87.84	79.64	70.33	7.60
Banana sheath cup	87.98	78.63	70.51	4.16
C.D. at1%	1.072	1.74	1.071	1.31



Fig. 2. Tuberose in different packages at low temperature storage (Temp.10pC, RH 83%)

relative humidity and lower temperature might have favoured the colour retention of tuberose flower.

It was found from the studies that areca nut sheath cup was found suitable eco friendly packaging of tuberose with higher freshness (82.26%), fragrance (71.21%), had shelf life upto 2 days in ambient storage condition when compared to those packaged in banana sheath cup and peepal leaf. In low temperature storage also tuberose flower packaged in areca nut sheath cup had higher freshness index (87.84), colour index (79.63) and fragrance index (71.21), as compared to those packaged in banana sheath cup and peepal leaf cup and shelf life of 7 days.

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