



# Effect of Different Coloured Plastics and Liners on Shelf Life of Loose Marigold Flowers

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## ABSTRACT

A study was carried to evaluate the effect of different coloured plastics and liners on shelf-life of loose marigold flower under ambient condition was at the laboratory of the Department of Floriculture and Landscape Architecture, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, during the year 2021-2022. The experiment was laid out in Complete Randomized Design with 3 replication and 16 treatments. The treatment comprised of different coloured plastics (Red, Opaque, Transparent and Green) and liners (Paper cutting, Paper straw and Bubble film) in different combination including control. The results revealed that among all the combination of different coloured plastics and different liners used treatment T<sub>7</sub> (Transparent + Paddy straw) showed better quality in all parameters like physiological weight loss (2.26%, 34.20% and 47.10%), moisture content (82.33%, 71.72% and 55.01%), spoilage percentage (5.10%, 12.37% and 25.19%), diameter of flower (5.81cm, 5.09cm and 4.40 cm), freshness index (4.68, 3.98 and 3.11 out of 5 score card), relative water content (83.00%, 74.00% and 55.66%), shelf life (2.35 days) at 2<sup>nd</sup>, 4<sup>th</sup> and 6<sup>th</sup> days after storage respectively. When the spoilage of flower exceeded 50 percent, it was considered as the end of shelf life or storage life.

**Key Words:** Flower, Linen, Marigold, Plastic, Shelf life.

## INTRODUCTION

The African marigold (*Tagetes erecta* L.) is one of the significant loose flowers that are commercially grown in various regions of India. There are approximately 33 species of genus *Tagetes*, of which five species have been introduced into the India garden viz. *Tagetes erecta* L. (Aztec or African Marigold), *Tagetes minuta* L. (*Tagetes gladiifera* Schrank), *Tagetes patula* L. (French Marigold), *Tagetes lucida* (Sweet-scented Marigold), *Tagetes tenuifolia* (Striped Marigold). It is raised as an annual flower plant with a shorter flowering period and a higher growth habit. Its long flowering season and wide range of climate and soil tolerance have helped it gain popularity. The blossom might be lemon-colored, light yellow, orange, or much heavier. Marigold flowers are sold in market in the form of garlands as loose flowers.

Marigold has known for its multifarious or multiple uses. The diverse germplasm has been immensely used in festive occasions, social functions, marriages and religious ceremonies. Having broad range of attractive colours, sizes and shapes along with greater storage marigold is used for interior decoration as cut flowers and hanging occasion, decoration of cars in marriages, garlands making and offering God, honour Guests. High demand for marigold flowers during festivals such as Navratri, Dussehra, Diwali and New year, it has become a farmer-friendly crop.

Another reason may be that most of the flowers produced in India such as Marigold, tuberose, rose, etc., can withstand certain amount of rough handling in transport. The common method of packaging is to packed bamboo baskets lined with newspapers, paddy straw and bubble film to increase the shelf-

**Table.1. Effect of different coloured plastics and liners on physiological weight loss, spoilage flower percentage (%) and spoilage flower percentage.**

Notation	Treatment	Physiological weight loss (%)			Spoilage flower percentage (%)			Fresh flower percentage (%)		
		2 <sup>nd</sup> D	4 <sup>th</sup> D	6 <sup>th</sup> D	2 <sup>nd</sup> D	4 <sup>th</sup> D	6 <sup>th</sup> D	2 <sup>nd</sup> D	4 <sup>th</sup> D	6 <sup>th</sup> D
T <sub>1</sub>	Red + paper cutting	9.14	34.77	53.81	8.33	23.16	58.63	9.14	47.43	80.73
T <sub>2</sub>	Opaque+ paper cutting	9.25	55.58	67.33	12.11	28.01	66.73	9.25	57.80	80.00
T <sub>3</sub>	Transparent +paper cutting	12.90	57.24	70.36	10.21	26.47	62.09	12.90	55.66	81.80
T <sub>4</sub>	Green +paper cutting	10.14	54.17	65.18	12.04	30.18	71.85	10.14	47.33	78.00
T <sub>5</sub>	Red + paddy straw	8.30	52.69	59.54	8.66	21.37	58.18	8.30	50.26	82.20
T <sub>6</sub>	Opaque + paddy straw	7.13	47.88	62.49	12.35	26.38	73.99	7.13	58.53	77.33
T <sub>7</sub>	Transparent + paddy straw	2.26	30.58	47.10	5.10	22.37	36.19	2.26	34.20	71.73
T <sub>8</sub>	Green + paddy straw	7.74	48.80	61.90	10.03	28.24	72.83	7.74	51.80	78.01
T <sub>9</sub>	Red + Bubble film	13.48	58.10	73.21	17.03	34.78	83.10	13.48	68.60	84.00
T <sub>10</sub>	Opaque + Bubble film	6.07	57.50	69.18	9.20	22.53	74.17	6.07	39.33	75.20
T <sub>11</sub>	Transparent + Bubble film	6.48	60.65	71.51	10.87	28.12	73.19	6.48	59.40	78.68
T <sub>12</sub>	Green + Bubble film	13.09	55.84	73.22	16.21	31.72	77.98	13.09	59.40	85.67
T <sub>13</sub>	Paper cutting	10.45	56.36	69.21	8.18	24.65	68.24	10.45	60.86	78.93
T <sub>14</sub>	Paddy straw	3.65	45.24	50.42	7.33	16.72	57.51	3.65	38.43	78.30
T <sub>15</sub>	Bubble film	10.11	50.66	70.74	11.55	26.15	71.75	10.85	65.93	79.55
T <sub>16</sub>	<b>Control</b>	13.48	64.09	76.05	13.76	30.36	72.11	15.07	71.26	88.47
	Se(m)±	1.27	2.44	2.50	1.02	1.46	4.67	1.27	3.99	2.43
	C.D at 5%	3.69	7.06	7.24	2.97	4.24	13.51	3.69	11.57	7.03

life and better flower quality (Arundathi *et al*, 2019). Keeping the above facts in view, the present experiment has been planned to study the effect of different plastics and liners on shelf- life of loose marigold flower, under ambient condition.

### MATERIALS AND METHODS

The present investigation was conducted at the laboratory of the Department of Floriculture Architecture, College of Agriculture, Indira Gandhi

Krishi Vishwavidyalaya, Raipur, Chhattisgarh During the year 2021-2022. The experiment was done by Completely Randomized Design (CRD) with 16 treatments and 3 replications. The treatment used in the experiment are as follows: T<sub>1</sub> : Red+ Paper cutting, T<sub>2</sub>: Opaque + Paper cutting. T<sub>3</sub>: Transparent + Paper cutting, T<sub>4</sub>: Green + paper cutting, T<sub>5</sub>: Red + Paddy straw, T<sub>6</sub> : Opaque + Paddy straw, T<sub>7</sub>: Transparent + Paddy straw, T<sub>8</sub>: Green + Paddy straw, T<sub>9</sub> : Red + Bubble film, T<sub>10</sub>:

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**Table.2. Effect of different colored plastics and liners on diameter of flower(cm), diameter of receptacle(cm) and freshness index.**

Notation	Treatment	Diameter of flower (cm)			Diameter of receptacle (cm)			Freshness index (out of 5 Score card)		
		2 <sup>nd</sup> D	4 <sup>th</sup> D	6 <sup>th</sup> D	2 <sup>nd</sup> D	4 <sup>th</sup> D	6 <sup>th</sup> D	2 <sup>nd</sup> D	4 <sup>th</sup> D	6 <sup>th</sup> D
T <sub>1</sub>	Red + paper cutting	5.12	4.65	4.59	1.46	1.43	1.37	4.05	3.30	2.76
T <sub>2</sub>	Opaque+ paper cutting	4.94	4.82	4.78	1.46	1.42	1.36	4.63	2.99	2.77
T <sub>3</sub>	Transparent +paper cutting	5.29	5.24	5.20	1.43	1.40	1.33	4.20	3.45	2.04
T <sub>4</sub>	Green +paper cutting	5.00	4.67	4.65	1.40	1.35	1.29	4.13	3.46	2.32
T <sub>5</sub>	Red + paddy straw	5.21	4.89	4.83	1.41	1.35	1.30	4.45	2.96	1.94
T <sub>6</sub>	Opaque + paddy straw	5.47	5.08	5.03	1.40	1.33	1.27	4.63	3.61	1.94
T <sub>7</sub>	Transparent + paddy straw	5.81	5.76	5.71	1.39	1.33	1.27	4.68	3.98	3.11
T <sub>8</sub>	Green + paddy straw	4.76	5.06	4.98	1.42	1.35	1.35	3.90	3.40	2.76
T <sub>9</sub>	Red + bubble film	4.99	4.72	4.78	1.39	1.31	1.26	4.26	3.06	1.77
T <sub>10</sub>	Opaque + bubble film	5.03	5.04	4.99	1.44	1.38	1.30	4.01	3.28	2.2
T <sub>11</sub>	Transparent + bubble film	5.05	4.93	4.87	1.41	1.35	1.29	3.27	3.17	2.08
T <sub>12</sub>	Green + bubble film	5.19	5.01	4.96	1.34	1.28	1.20	4.01	2.83	2.19
T <sub>13</sub>	Paper cutting	4.67	4.43	4.37	1.37	1.31	1.25	4.35	3.22	2.06
T <sub>14</sub>	Paddy straw	5.59	5.71	5.66	1.40	1.36	1.31	4.40	3.55	2.80
T <sub>15</sub>	Bubble film	5.02	4.90	4.84	1.40	1.35	1.27	4.56	3.5	2.38
T <sub>16</sub>	Control	5.09	4.40	4.34	1.35	1.27	1.19	3.56	2.33	1.53
	Se(m)±	0.21	0.03	4.78	0.10	0.10	0.10	0.26	0.23	0.28
	C.D at 5%	NS	0.08	4.59	NS	NS	NS	0.81	0.67	0.83

Opaque + Bubble film, T<sub>11</sub>: Transparent + Bubble film, T<sub>12</sub>: Green + Bubble film, T<sub>13</sub>: Paper cutting, T<sub>14</sub>: Paddy straw, T<sub>15</sub>: Bubble film, T<sub>16</sub>: control. Observations were recorded following parameters like physiological weight loss (%), moisture content (%), spoilage flower percentage (%), fresh flower percentage (%), diameter of flower (cm), diameter of receptacles (cm), relative water content

(%) and shelf- life (days) were recorded at 2nd, 4th and 6th day after storage and analysed by analysis of variance techniques as suggested by Panse and Sukhatme(1967).

### RESULTS AND DISCUSSION

The result revealed that minimum physiological weight loss (2.26%, 34.20% and 47.10%),

**Table.3. Effect of different colored plastics and liners on relative water content (%), moisture content(%) and shelf-life( days).**

Notation	Treatment	Relative water content (%)			Moisture content (%)			Shelf life (days)
		2 <sup>nd</sup> D	4 <sup>th</sup> D	6 <sup>th</sup> D	2 <sup>nd</sup> D	4 <sup>th</sup> D	6 <sup>th</sup> D	
T1	Red + paper cutting	67.00	59.33	46.33	75.33	61.79	39.31	5.40
T2	Opaque+ paper cutting	68.00	61.66	49.00	78.72	63.73	45.00	5.83
T3	Transparent +paper cutting	75.66	66.66	53.33	78.33	53.72	46.31	5.70
T4	Green +paper cutting	70.00	61.00	43.00	73.97	59.96	39.66	4.60
T5	Red + paddy straw	71.00	64.66	46.66	75.02	62.37	43.27	5.76
T6	Opaque + paddy straw	72.66	65.33	45.00	77.51	59.95	45.56	4.40
T7	Transparent + paddy straw	83.00	74.00	55.66	82.33	71.72	55.01	7.40
T8	Green + paddy straw	70.33	64.33	49.66	72.02	59.46	43.14	5.30
T9	Red + Bubble film	70.00	57.66	42.33	71.63	59.89	39.48	4.80
T10	Opaque + Bubble film	76.00	64.00	38.33	76.28	60.05	42.79	5.30
T11	Transparent + Bubble film	71.33	64.33	39.66	75.14	59.65	41.85	5.50
T12	Green + Bubble film	71.33	60.33	45.00	73.66	59.85	39.49	4.90
T13	Paper cutting	72.00	64.33	46.33	79.2	59.19	40.49	5.17
T14	Paddy straw	75.33	67.67	54.66	78	62.33	42.98	6.10
T15	Bubble film	70.33	65.00	48.00	75.02	59.98	41.07	5.40
T16	Control	67.66	57.66	35.00	70.71	47.67	36.72	4.20
	Se(m)	1.19	1.69	2.83	1.97	1.14	2.29	0.017
	C.D at 5%	3.46	1.69	8.21	5.70	3.31	6.64	0.049

minimum spoilage percentage (5.10% ,12.37% and 25.19 %) was noted in treatment T<sub>7</sub> ( Transparent + paddy straw) at 2<sup>nd</sup>, 4<sup>th</sup> and 6<sup>th</sup> days after storage respectively. It might be due to better management of humidity under this particular treatment which helped in slow down process of respiration and balancing the proper CO<sub>2</sub> : O<sub>2</sub> management. The result was close enough with Madaiah and Reddy

(1994) who reported that packaging of tuberose florets in polyethylene result least physiological loss in weight. In Anab-e-Shahi grapes, Bhullar and Randhawa (1980) found that the PLW of grapes was maximum by polythene wrappers compared to paper wrappers.

The maximum moisture content (82.33%, 71.72% and 55.01%), maximum freshness index percentage

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(4.68, 3.98 and 3.11 out of 5 score card), diameter of flower (5.81cm, 5.09cm and 4.40 cm) and maximum relative water content (83.00% ,74.00% and 55.66 %) at 2<sup>nd</sup>, 4<sup>th</sup> and 6<sup>th</sup> day after storage respectively. It was mainly due to the preservation of relative humidity within the packages, which result in the least amount of moisture loss, spoilage of flower and higher moisture content lead to higher freshness index whereas paddy straw helped in maintaining moisture and temperature. When moisture content is high and weight loss is modest, the petals relative water content shows a higher water status. Similar results found in carnation by Nicholas (1996) and *Rosa damascena* by Sharma (1981).

Shelf-life of loose marigold flowers were packed in treatment T<sub>7</sub> (Transparent + paddy straw) resulted in increased shelf life (7.4d), which was 3.2 d more as compared to control (open condition). It might be due to combination of transparent plastics and paddy straw helped in better moisture content, loss spoilage flower and higher freshness index lead to less moisture loss and respiration. On the basis of present study after 4<sup>th</sup> day flowers were not acceptable because all flowers were damage more than economically threshold which are 50% and not economically accepted.

## CONCLUSION

It was observed from the result that treatment T<sub>7</sub> (Transparent + paddy straw) was found to be improved treatment in terms of shelf-life and better storage as compared with control and other treatment.

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- Received on 17/8/2022                      Accepted on 22/10/2022