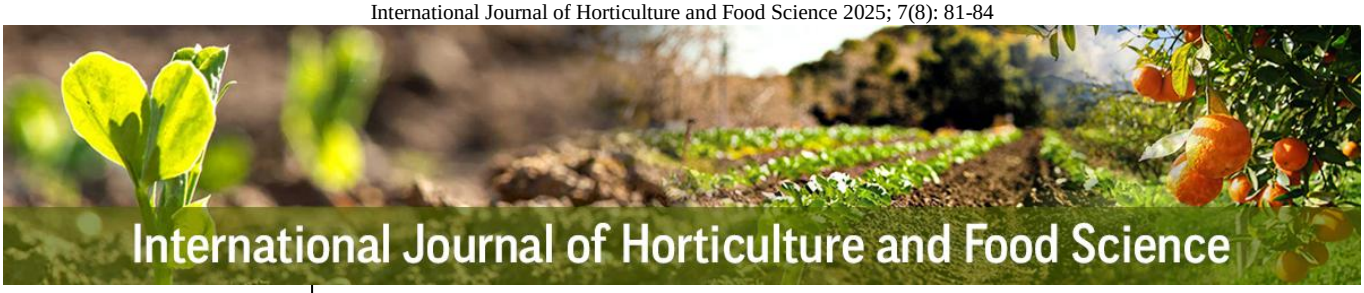

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Response of guava (*Psidium guajava* L.) cv. L-49 to thinning and bagging on yield attributing traits

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Abstract
The experiment entitled "Response of guava (*Psidium guajava* L.) cv. L-49 to thinning and bagging on yield attributing traits." was conducted at Fruit Research Station, Madhadibaug, College of Horticulture, JAU., Junagadh. During year 2024. Total twenty treatment combinations comprising four level of thinning *viz*., no thinning (T_1), 20% thinning (T_2), 40% thinning (T_3), 60% thinning (T_4) and five levels of bagging *viz*., no bagging (B_1), white paper bag (B_2), brown paper bag (B_3), nylon mesh net bag (B_4) and muslin bag (B_5) were allocated in randomized block design with factorial concept in two replications. The result of experiment revealed that among the thinning, no thinning (T_1) recorded more number of fruits per plant (329.90), 20% thinning (T_2) recorded maximum fruit yield per plant (44.44 kg) and maximum fruit yield per hectare (12.30 tonnes). Among the bagging treatments, brown paper bag (B_3) recorded maximum number of no of fruits per plant (230.00), maximum fruit yield per plant (42.39 kg) and maximum fruit yield per hectare (11.74 tonnes). Furthermore, the interaction effect between thinning and bagging found significant with parameters like; number of fruits per trees (337.50) in treatment combination no thinning + brown paper bag (T_1B_3). It was recorded maximum yield per plant (53.22 kg) and maximum fruit yield per hectare (14.74 tonnes) in treatment combination 20% thinning + brown paper bag (T_2B_3).

Keywords: Guava, yield, thinning, bagging

1. Introduction
Guava (*Psidium guajava* L.), often referred to as the "apple of the tropics," is a significant fruit crop cultivated worldwide. Commonly known as the "poor man's fruit," it belongs to the family *Myrtaceae*, which includes around 150 species of trees and shrubs, many bearing edible fruits. However, only a few of these species hold commercial value. Some notable wild relatives of guava include mountain guava (*Psidium montanum*), strawberry guava (*Psidium cattleianum*), Chinese guava (*Psidium friedrichsthalianum*), and Brazilian guava (*Psidium guineense*) (Pomer and Murkani, 2009). Most commercially grown guava cultivars are diploid (2n = 22), while seedless types are typically triploid (2n = 33) (Mitra and Sanyal, 2004) [5].

Guava fruit is a rich source of vitamin C (210-305 mg per 100 g of pulp) and pectin (0.5-1.8%), while being low in energy, providing only 66 calories per 100 g. Ripe guavas contain 12.3-26.3% dry matter and 77.9-86.9% moisture. They also include 0.51-1.02% ash, 0.10-0.70% crude fat, 0.82-1.45% crude protein, and 2.0-7.2% crude fiber. In addition to being nutrient-dense, guava is a good source of essential minerals such as phosphorus (22.5-40.0 mg/100 g), calcium (10.0-30.0 mg/100 g), and iron (0.60-1.39 mg/100 g). It also contains various vitamins including riboflavin (0.02-0.04 mg/100 g), niacin (0.20-2.32 mg/100 g), pantothenic acid, thiamine (0.03-0.07 mg/100 g), and vitamin A.The ascorbic acid content of fresh ripe fruit ranges from 75 to 299 mg/100 g of pulp which is 2 to 5 times more than oranges (Lal, 1983) [4] and 10 time more than tomatoes (Wilson, 1980) [14]. Guava can be eaten both in green and ripened stage (when it becomes fragrant). Moreover, guava fruits are processed commercially in to jellies jam, puree, cheese, juice, powder and nectar (Singh *et al*. 2003) [12].

Thinning improves the plant's physiological potential to initiate flower bud formation in the subsequent year. The fruits are close enough to encourage the spread of diseases due to high humidity. Therefore, thinning is profitable.

The proper spacing between individual fruits encourages attractive color, large sized and good flavored fruits. Fruit thinning minimizes the chance of branch breakage and increases uniformity in size and color of the remaining fruits.

Preharvest bagging influences several characteristics of the fruit, such as its size, ripening time, skin color, internal mineral composition, and overall quality. This technique helps to reduce or even eliminate the need for chemical pesticides and fungicides. By altering the immediate environment around the developing fruit, bagging also impacts its physical and chemical properties. This method has been widely applied in many fruit crops to enhance surface coloration and to minimize issues like cracking, physical damage, and sunscald.

Guava is commercially grown now in India, U.S.A., South America, Egypt, South Africa and Thailand. In India, guava is grown over an area of 2.05 lakh hectares, yielding an annual production of 24.62 lakh metric tonnes (Anon., 2024). Major guava-growing states include Uttar Pradesh, Bihar, Madhya Pradesh, Chhattisgarh, Odisha, West Bengal, Maharashtra, Andhra Pradesh, Haryana, Gujarat, and Punjab. In Gujarat, guava is cultivated extensively and ranks second only to citrus fruits. The crop covers around 14,278 hectares in the state, with an annual output of 1,73,544 metric tonnes (Anon., 2024).

2. Materials and Methods

The present investigation was conducted to know the effect of thinning and bagging on morphological traits of guava (*Psidium guajava* L.) cv L-49. The experiment was conducted at Fruit Research Station, Madhadibaug, College of Horticulture, JAU., Junagadh. During year 2024. Total twenty treatment combinations comprising four level of thinning *viz*., no thinning (T_1), 20% thinning (T_2), 40% thinning (T_3), 60% thinning (T_4) and five levels of bagging *viz*., no bagging (B_1), white paper bag (B_2), brown paper bag (B_3), nylon mesh net bag (B_4) and muslin bag (B_5) were allocated in randomized block design with factorial concept in two replications. Fruit thinning and bagging was done at marble stage of fruit.

3. Results and Discussion

The highest number of fruits/plant (329.90) was registered in no thinning (T_1). The minimum number of fruits (124.70) was found in 60% fruit thinning (T_4). The number of fruits per plant was negatively correlated with the percent of fruit thinning. As the intensity of fruit thinning was increased the number of fruits per plant was decreased. The above results are in close conformity with the result of Thakur and Chandel (2004) [13]. The effect of bagging on number of fruits was observed significant and maximum number of fruits (230.00) was noted in brown paper (B_3), which was at par with bagging with white paper (B2) and nylon mesh net bag (B_4). The minimum no of fruits (211.25) was found in no bagging (B1). This result is might be due to bagging act as a physical barrier protecting fruits from biotic and abiotic stress, which causes fruit drop or damage. The above results are close conformity with the result of Patel *et al*. (2023) [7]. In interaction highest no of fruits (337.50) was noted in treatment combination no thinning and bagging with brown paper bag (T1B3), which was at par with treatment combination of no thinning and bagging with white paper bag (T1B2), no thinning with nylon mesh net bag (T1B4), no thinning and bagging with muslin bag (T1B5) and no thinning and no bagging (T1B1). Whereas, the lowest number of fruits (120) was observed in treatment combination of 60% thinning and nylon mesh net bag (T4B4). This result is might be due to thinning improve quality and consistent fruit production though the immediate number of fruits per tree may decrease and bagging reduces losses from biotic and abiotic damage increasing the final number of good quality fruits at harvest. These results are similar with Rahman *et al.* (2017) [9] in guava.

The maximum yield (44.44 kg) was noted in 20% fruit thinning (T_2). The minimum yield (30.68 kg) was found in 60% thinning (T_4). Reduction in yield could be attributed to the decrease in no. of fruits per tree. However the number of fruits decreased, the fruit size was also increased which leads to increase fruit weight. These results are supported by the findings of Sharifuzzaman (1996) and Ilha *et al*. (1999). The effect of bagging on yield was observed significant and maximum yield (42.39 kg) was noted in brown paper (B_3), which was at par with bagging with white paper (B_2). The minimum yield (33.67 kg) was found in no bagging (B1). This might be due to the fact that, enhanced fruit yield in treated plants may be due to their continued metabolic activity, allowing them to store sufficient nutrients to support fruit development due to favourable microclimate fruits ultimately leading the higher yield. The results are in accordance with in Rahman *et al*. (2018) [10] in guava. The highest yield (53.22 kg) was noted 20% fruit thinning and bagging with brown paper bag (T_2B_3), which was at par with 20% fruit thinning and bagging with white paper bag (T_2B_2). Whereas, the lowest yield (28.36 kg) was observed in 60% thinning and no bagging (T_4B_1). The results might be due to direct association between fruit count and fruit weight microclimate created by bags had congenial effect that plant stays metabolically active to store enough food for growth due to favourable microclimate fruits ultimately leading the higher yield thereby increasing average fruit weight. These findings are similar with those of Rahman *et al.* (2017) [9] in guava.

The maximum yield (12.30 tonnes) was noted in 20% fruit thinning (T2). The minimum yield (8.49 tonnes) was found in 60% thinning (T4). The effect of bagging on yield was observed significant and maximum yield (11.74 tonnes) was noted in brown paper bag (B_3), which was at par with bagging with white paper (B_2). The minimum yield (9.32 tonnes) was found no bagging (B_1). Highest yield (14.74 tonnes) was noted in treatment combination of 20% fruit thinning and bagging with brown paper bag (T2B3), which was at par with treatment combination of 20% fruit thinning and bagging with white paper bag (T2B2). Whereas, the lowest yield (7.85 tonnes) was observed in treatment combination of 60% thinning and no bagging (T4B1). The per plant fruit yield was directly correlated with the per ha fruit yield as we convert per plant yield to per hectare yield by simply multiplying the number of trees on a (hectare) land.

Table 1: Effect of thinning and bagging on number of fruits/tree, yield/plant and yield/hectare

Treatment	No. of fruits/tree	Yield/plant (kg)	Yield/hectare (tonnes)
Levels of thinning			
T_1	329.90	41.27	11.43
T_2	252.20	44.44	12.30
T_3	177.10	35.93	9.95
T_4	124.70	30.68	8.49
S.Em.±	4.333	1.070	0.296
C.D. at 5%	12.33	3.05	0.84
Levels of bagging			
B_1	211.25	33.67	9.32
B_2	227.88	41.24	11.42
B_3	230.00	42.39	11.74
B_4	222.63	36.63	10.14
B_5	213.13	36.47	10.10
S.Em.±	4.845	1.196	0.331
C.D. at 5%	13.79	3.40	0.94
Interaction (T x B)			
S.Em.±	9.690	2.393	0.663
C.D. at 5%	27.58	6.81	1.89
C.V.%	6.20	8.89	8.89

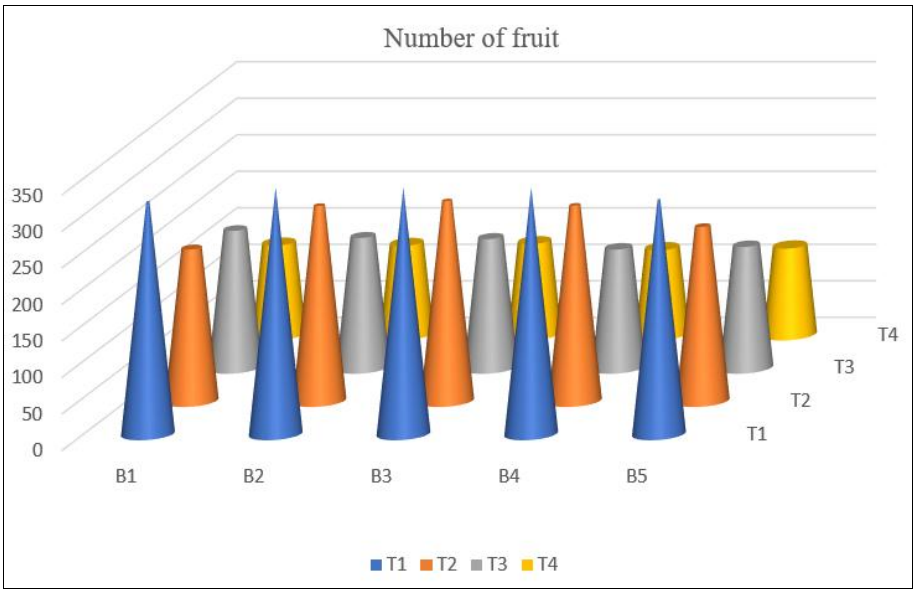

Fig 1: Impact of fruit thinning and bagging on fruit count per guava tree

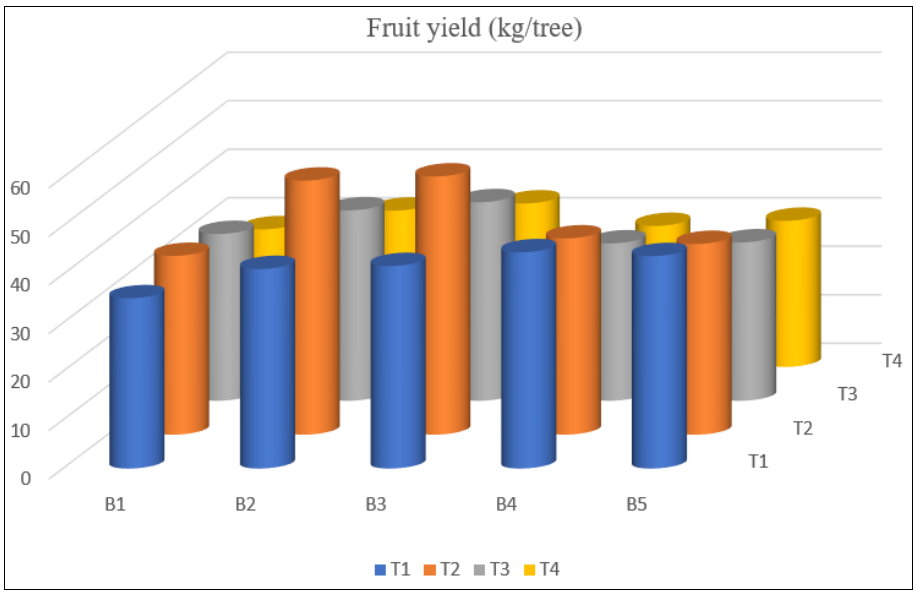

Fig 2: Influence of thinning and bagging practices on guava productivity per tree

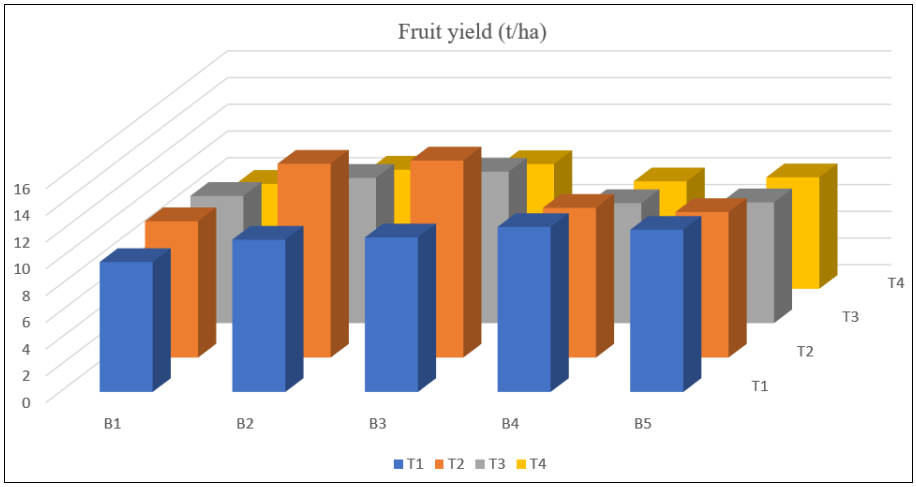

Fig 3: Influence of thinning and bagging practices on guava productivity per hectare

4. Conclusion

Experimental evidence suggests that among different levels of thinning and bagging, no thinning (T_1) was found the most effective for number of fruits per tree at final harvest, 20% thinning found most effective for yield per plant and yield per hectare of guava cultivar L-49. Bagging with brown paper bag (B_3) was found the most effective for number of fruits/tree, yield/plant and yield/hectare of guava cv L-49.

Hence, it is concluded that to adopt 20% thinning with brown paper bag (T_2B_3) getting higher yield and net realization in guava cultivar L-49 (*Psidium guajava* L.).

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