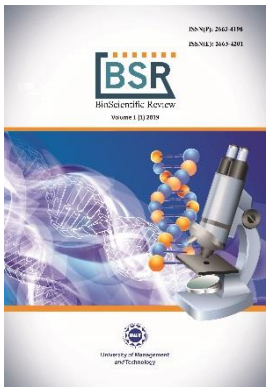

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Evaluation of Tinda Gourd (*Praecitrullus fistulosus*) Germplams's Yield

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Abstract

Tinda Gourd is the most important summer vegetable widely grown in Pakistan. It contains a high amount of iron and other vitamins and minerals. Hence, its medicinal value is also high due to its ingredient profile. This field experiment was conducted in the vegetable area, Institute of Horticultural Sciences in the University of Agriculture, Faisalabad in order to recognize the morphological characteristics of Tinda gourd, fruit growth pattern, and the yield of Tinda (*Praecitrullus fistulosus)* gourd germplasm lines. Sixteen germplasm lines, in which one line was used as control, were sown and grown on flat beds in the field. The field experiment was arranged as Randomized Complete Block Design (RCBD) with three replications. Data related to the maturity time of fruit, fruit per vine, fruit weight in grams, fruit diameter and total yield obtained were recorded. The fruit texture was marked as phenotypic parameter. All parameters were collected and then analyzed statistically. All lines and replications showed different results from each other according to the chosen parameter. The variety L_1 took 56 days to mature, closely followed by line L_4 (56.66 days) and line L_8 (56.33 days). There was not much difference in fruit per plant among Tinda gourd lines. Among them, 198 g fruits were found in line L_0, followed by line L_1 (224 g) and line L_{15} (225.00 g). Line L_9 showed fruit diameter of 7 cm closely followed by line L_1 (7.23 cm) and line L_2 (7.23 cm). The maximum yield was observed in line L_0 (599.33 grams) as compared to other lines. There was a significant difference in the yield of lines. Among them, line L_4 showed 421 grams of yield closely

followed by line L_1 (440.67 g). At the harvesting stage, all the lines in this study had smooth hairless texture fruits.

1. Introduction

Tinda gourd (*Praecitrullus fistulosus*) is a member of the well-known family *Cucurbitaceae* and it is the most important and major annual summer vegetable grown widely across the neighboring country India and in Pakistan. It is good in taste and palatable. When cooked with other food products, it is known as *Dilpasand.* It contains a high amount of iron and other vitamins and minerals. Hence, it has considerable medicinal value due to its ingredient profile. It grows in almost all types of soil. It has medicinal properties that are beneficial for human beings' normal growth and health [1].

The *Cucurbitaceae* family has a wide distribution worldwide but is grown mostly in subtropical to tropical areas with the requirement of sandy soil for better root penetration. The *Cucurbitaceae* family contains important fruit bearing products that are *Cucumis melo L.* (melons), *Citrullus lanatus* (thunb.), *Cucurbita pepo* L., Nakai (watermelon), *Cucumis sativus* L. (cucumber) and other known species such as squashes and pumpkins etc. Other species of gourds like Luffa L. are used as dried fruits and medicines [2].

Tinda gourd is used as vegetable in India and Pakistan. The pulp of Tinda is creamy whitish or green yellowish when it is in the stage of immaturity. The fruit has abundant quantity of proteins and carbohydrates. The leaves are used for a medicinal purpose in some parts of India [3]. The fruit is ovoid and elliptical with white strips when they are at an immature stage and acquire a smooth surface and yellowish strips on the surface when ripened. The shape and size of Tinda fruit vary according to their growth pattern and location of a fruit, that is, where it lies on vines. The seeds of Tinda are opaque and edible when cooked with meat. Fruits can be stored for more than one or two weeks. The seeds of Tinda (*Praecitrullus fistulosus*) are used as fodder and also as medicine for the ailment of many other diseases [4]. When leaves are cooked with other vegetables, they are able to maintain high blood pressure. Only the mature fruit is cooked as vegetable and also to make pickles in India and in Pakistan [5].

Morphologically, fruits and vegetables differ in class and quality which is explained by their four attributes. The first is the appearance and color tone. The second is the flavor which includes taste and aroma. The third attribute is the texture and skin surface and the fourth and final attribute is nutritional value and ingredients. These above mentioned characteristics are highly effective on human beings. The glossy effect, size and shape of fruit becomes the cause of its selection by our hands. There are some associations between text ural attributes, especially juiciness and flavor and betwee n the color and nutritional composition of fruits and vegetables [6]. Gerald Carr. termed fruit as a type of berry called apepo. The fruits which are spherical in

shape are roughly 5 to 8 cm in diameter. The size of fruit is small and elliptical on both upper and lower sides of the end, while hispid is globule afterwards [7]. In the light of studies discussed above, the current study will benefit the farmers and will address the issues of vegetable growers.

2. Material and Methods

The field experiment was conducted at Olericulture field of Institute of Horticultural Sciences, University of Agriculture, Faisalabad during 2017. The field is situated at 186 meters above the sea level. The seeds of Tinda lines were sown in early April at raised flat beds. Ten seeds per bed were sown. Seeds were not treated with any fungicide before sowing. Before sowing the seeds, the layout was designed according to Randomized Complete Block Design (RCBD) method. The plot was prepared by planking and ploughing and a recommended amount of FYM (Farm Yard Manure) and NPK (Nitrogen, Phosphorus, Potash) were added in the soil. Sixteen different varietal lines, in which one variety was used as control, were used as experimental design with three replications. The seed material was obtained from National Agricultural Research Center (NARC), Islamabad. The bed size in which seeds were sown was 15 × 5 ft. The bed to bed distance was maintained at 2 ft while plant to plant was maintained at 1.5 ft, respectively. Right after sowing the seeds, first irrigation was applied by canal water two times a week. Intercultural practices were done in an interval of fourteen days. Weedicides were applied before seed sowing and after land preparation. Three plants in each line were selected for data recording. The data were compiled after taking their means and averages. Data were collected on days taken by plant to mature, fruit per vine, fruit weight in grams, fruit diameter, total yield in grams and fruit texture. Data were subjected to statistical analysis using the STATISTIX statistical software **(**Version 8.1**)** and the mean values were compared using the Least Significant Difference **(**LSD**)** multiple range test P: 0.5% [8].

3. Results and Discussion

Many factors directly involved in Tinda lines include the date of seed sowing either early or late, cultural practices during the time period of research, and the effect of environment throughout the period. We observed diversity and modification in Tinda fruits that was associated with plant habitat and nutrient amount. According to Bhunia (2006), 40 kg P_2O_5/ha resulted in significant increase of yield attributes and application of P also increased the uptake of P, N, and K [9]. Kumar (2010) also confirmed that the use of bio-fertilizers increased the productivity of fenugreek [10]. The recommended dose of 75 percent NPK resulted in enhancing fruit growth parameters. A similar substantial improvement in development characters due to the immunization of bio-fertilizers has been reported by [11] in Cucurbits and also [12] in Tinda gourds and [13] in Cucurbits vines (Table 1).

Least Significant Differencethe findings of [14], who reported a similar number of days taken by first fruit of Tinda to reach the stage of maturity. The maximum fruit per vine acquired by Tinda line were observed in line L_3 (1.66), line L_8 (1.66) and line L_{12} (1.66) as compared to other lines. There was not much difference in fruit per plant.

Table 1. Yield and Other Parameters of Tinda Gourd (*Praecitrullus Fistulosus*) Germplasms

Lines	DTM	F/P	FW (g)	FD (cm)	Yield (g)
L_o	68.66 a	0.33 a	198.00 f	7.89 bcde	599.33 a
L_1	56.00 e	1.00 a	224.00 e	7.23 fg	440.67 h
L_2	59.66 cde	1.33 a	232.33 bcde	7.23 fg	495.67 g
L_3	57.00 de	1.66 a	228.33 de	7.99 abcde	531.00 f
L_4	56.66 de	1.33 a	239.67 abcd	7.51 defg	421.00 h
L_5	60.00 cde	1.33 a	240..00 abcd	7.84 bcde	550.67 def
L_6	64.66 ab	0.66 a	244.00 ab	7.70 cdef	481.67 g
L_7	59.00 cde	1.00 a	231.67 cde	8.06 abcde	592.33 abc
L_8	56.33 de	1.66 a	235.67 bcde	8.20 abc	595.67 ab
L_9	61.33 bc	0.66 a	239.00 abcd	7.03 g	588.00 abc
L_{10}	61.33 bc	1.00 a	248.33 a	7.50 efg	561.33 cdef
L_{11}	60.33 cd	0.33 a	242.33 abc	7.73 cdef	540.33 ef
L_{12}	57.66 cde	1.66 a	243.67 abc	8.28 abc	563.67 bcde
L_{13}	57.33 cde	1.00 a	238.00 abcd	8.50 a	562.00 cdef
L_{14}	65.66 a	1.00 a	236.00 bcde	8.36 ab	561.33 cdef
L_{15}	64.66 ab	1.00 a	225.00 e	8.09 abcd	577.67 abcd
LSD	**4.27**	**2.27**	**12.09**	**0.59**	**32.14**

*Means with different letters are significantly comparable at 5%; DTM= days to maturity, F/P= fruit per plant, FW= fruit weight, FD= fruit diameter; Y= yield, LSD=

Among them, the line L_{11} showed 0.33 fruit per plant, closely followed by line L_0 (0.33) and line L_6 (0.66). The soil decrease in carbohydrate content expands the C: N ratio and lowers the metabolic activity which leads to switching from reproductive buds to vegetative buds [15] in cucumber.

The maximum weight gained by fruit was observed in line L_{10} (248.33 g) as compared to other lines. Among them, the line L_0 showed 198 g fruit closely followed by line L_1 (224.00 g) and line L_{15} (225.00

g). The significant mean values for average fruit weight of Tinda gourd was affected by late sowing [16].

The maximum fruit diameter was obtained in line L_{13} (8.50 cm) as compared with other lines. Among them, the line L_9 showed fruit diameter of 7 cm, closely followed by line L_1 (7.23 cm) and line L_2 (7.23 cm). Edible fruits are characterized by thin rind and mature fruits for more developed rind, increasing fruit protection. Fruit size is another important characteristic and the most desired size might change depending on use or the harvest system [17].

The maximum yield was observed in line L_0 (599.33 g) as compared to other lines. There was a significant difference in the yield of lines. Among them, the line L_4 showed 421g of yield, closely followed by line L_1 (440.67 g). The maximum net return was also recorded with NPK application, FYM and mulching, respectively. Similarly, Choudhary *et. al* (2012) also reported favorable effect on yield in *Cucurbitaceae* species [18].

Texture characteristics include firmness or hardiness, softness or smoothness, crispiness or juiciness, succulence or fibrousness [19]. According to the collected data, the Tinda gourd texture is harvested at horticultural maturity; therefore, all Tinda gourd fruits are hairless and smooth skinned when touched.

4. Conclusion

The line L_1 showed the highest fruit yield 440.67 g among all the Tinda lines. However, all the lines in this study had smooth hairless texture fruits at the harvesting stage.

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