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Physical observation of *Aloe vera* (*Aloe Barbadensis* Miller) germplasm grown in Eastern UP

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Abstract

Aloe vera has a long history as a medicinal plant with diverse therapeutic applications. This study determined of physical parameter *Aloe vera* leaves. Ten genotypes of aloe vera leaves were analysed physical parameter exhibited prominent character in terms of leaf weight (475.87 g), leaf length (71.03 cm), leaf thickness (4.51cm), number of leaves/plant (15.33), leaf width (6.72 cm) and gel content (98.77%), IC-283610 germplasm was found best compare to other germplasm. Overall this investigation has provided a succinct resume of information regarding the physical parameter of *Aloe vera* leaves.

Keywords: *Aloe vera*, germplasm grown, *Aloe Barbadensis* Miller

Introduction

Aloe is derived from the Arabic word alloeh, which means "a bright bitter substance". It has been regarded as an all-purpose herbal plant with a high rating throughout recorded history. The thick, tapering, spiky leaves of aloe grow from a short stem near the ground. It's not a cactus, but rather a Liliaceae tree called *Aloe Barbadensis*. In India, it is found in Maharashtra, Andhra Pradesh, Gujarat, Rajasthan, Tamil Nadu and Uttar Pradesh (Farming India, 2019) [1]. Burn plant, also known as "Ghee kunwar" in Sanskrit, is a Lilly family member that is commonly utilised for therapeutic purposes. The leaves of the plant are lance-shaped, sharply pointed, and jagged and edged (Benefits of *Aloe vera* Plant., 2009) [2]. Aloes are perennial succulents or xerophytes; they're going to adapt to habitats with low or erratic water availability, are characterized by the capacity to store large volumes of water in their tissue, and are ready to use crassulacean acid metabolism is a photosynthetic pathway adaptation that involves the production of malic acid. Aloe plants, like burn plant, all have green fleshy leaves covered by a thick cuticle or rind, under which is a thin vascular layer covering an inner clear pulp. The leaves are 30–50 cm long and 10 cm in breadth at the bottom, pea-green in colour (when young spotted with white), and bright yellow tubular flowers are 25–35 cm long and placed in a slender loose spike (Boudreau *et al.*, 2013) [3]. This plant's flowers are yellow. The leaves are triangular and spear-like, with thorny ridges, and are grouped in a rosette arrangement.

Materials and Methods

Aloe Barbadensis plants were collected from the experimental farm medicinal and aromatic plants of ANDUAT, Kumarganj, Ayodhya.

Leaf weight: Three leaves of *Aloe vera* were harvested from the field. Each leaf was weighted on physical balance. The three measurements were averaged out and the leaf weight was recorded in gm.

Leaf length: Three leaves of *Aloe vera* were harvested and each leaf was measured with measuring tape from the basal point of midrib to its apex. The three measurements were averaged out and the leaf length was recorded in cm.

Leaf thickness: Three harvested leaves were measured for thickness with the help of vernier's caliper and their average thickness were taken to find out leaf thickness.

Number of leaves/plant: Four to five plants were randomly selected. The leaves in each plant were counted separately. The number of leaves counted for each plant were averaged out and recorded as number of leaves/plant.

Leaf width: Three leaves of *Aloe vera* were harvested and each leaf was measured with measuring tape one end to another center of the leaf. The three measurements were averaged out and the leaf width was recorded in cm.

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Gel content: The three leaves of *Aloe vera* plant were harvested and the peels from each leaf were removed and the total gel content was collected separately in each Petridis. The gel% was calculated on the basis of following.

$$\text{Gel content} = \frac{\text{Weight of gel}}{\text{Weight of leaf}} \times 100$$

Result and Discussion

Leaf weight (g)

Table 1.1 showed a wide variability in leaf weight. The leaf weight in *Aloe vera* germplasm ranged in grams from 470.33 to 475.87 g in year 2018-19 and 470.62 to 475.53 g in year 2019-20. Maximum leaf weight was found to be 475.87 g in IC- 283610 in year 2018-19 and in year 2019-20 the maximum leaf weight was also found to be 475.53 g in IC-283610. The variation among the germplasm was found statistically. Leaf weight is corresponded by its genetic potential. Hence, germplasm differed significantly with each other in respect of leaf weight. Variation in leaf weight is closely related with finding of Abhila *et al.*, (2010) [4], O'Brien *et al.*, (2011) [5].

Leaf length (cm)

Table 1.1 showed a wide variability in leaf length. The leaf length in *Aloe vera* germplasm ranged in grams from 65.11 to

70.69 cm in year 2018-19 and 65.33 to 71.03 cm in year 2019-20. Maximum leaf length was found to be 70.96 cm in IC- 283610 in year 2018-19 and in year 2019-20 the maximum leaf length was also found to be 71.03 cm in IC-283610. The variation among the germplasm was found statistically significant. Leaf length is corresponded by its genetic potential. Hence, germplasm differed significantly with each other in respect of leaf length. Variation in leaf length is closely related with finding of Abhila *et al.*, (2010) [4], O'Brien *et al.*, (2011) [5].

Leaf thickness (cm)

Table 1.1 showed a wide variability in leaf thickness. The leaf length in *Aloe vera* germplasm ranged in grams from 3.55 to 4.49 cm in year 2018-19 and 3.58 to 4.51 cm in year 2019-20. Maximum leaf thickness was found to be 4.49 cm in IC-283610 in year 2018-19 and in year 2019-20 the maximum leaf thickness was found to be 4.51 cm in IC- 283610. The variation among the germplasm was found statistically significant. Leaf thickness is corresponded by its genetic potential. Hence, germplasm differed significantly with each other in respect of leaf length. Variation in leaf thickness is closely related with finding of Abhila *et al.*, (2010) [4], O'Brien *et al.*, (2011) [5].

Table 1.1: Leaf weight (g), Leaf length (cm) and Leaf thickness (cm) of *Aloe vera* germplasm

Name of germplasms	Leaf weight (g)		Leaf length (cm)		Leaf thickness (cm)	
	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20
IC- 112512	470.23	470.62	65.11	65.33	3.55	3.58
IC- 112517	470.93	471.16	65.66	66.21	3.88	3.90
IC- 112518	471.40	471.84	66.11	66.51	4.07	4.17
IC- 112519	471.64	471.87	67.11	67.95	4.17	4.11
IC- 112521	472.48	472.85	67.67	67.93	4.20	4.19
IC- 112527	473.14	473.35	68.55	69.03	4.30	4.27
IC- 112531	472.33	472.33	69.03	69.03	4.39	4.41
IC- 112532	474.34	474.46	69.88	70.38	4.39	4.35
IC- 112569	474.88	474.99	70.52	70.76	4.43	4.43
IC-283610	475.87	475.53	70.96	71.03	4.49	4.51
CD at 5%	0.435	0.591	0.598	0.589	0.085	0.077
SE(m)	0.15052	0.2048	0.20722	0.20395	0.029	0.026

Number of leaf per plant

The number of leaf per plant in *Aloe vera* germplasm and varied from 12.66-14.66 in the year 2018-19 and in the year 2019-20 number of leaf per plant in *Aloe vera* germplasm was 13.33-15.33 presented in Table 1.2. Variation among the germplasm was found statistically significant. Leaf thickness is corresponded by its genetic potential. Hence, germplasm differed significantly with each other in respect of leaf length. Variation in leaf thickness is closely related with finding of Abhila *et al.*, (2010) [4], O'Brien *et al.*, (2011) [5]. In the year 2018-19 the maximum number of leaf per plant in *Aloe vera* germplasm was found 14.66 in IC- 283610 and minimum number of leaf per plant in *Aloe vera* germplasm was found 12.66 in IC- 112512. In year 2019-20 the maximum number of leaf per plant in *Aloe vera* germplasm was found 15.33 in IC- 283610 and minimum number of leaf per plant in *Aloe vera* germplasm was found 13.33 in IC- 112512.

Leaf width (cm)

The leaf width was recorded form 5.83-6.72 cm in year 2018-19 and 5.83-6.70 cm in year 2019-20 presented in Table 1.2. Difference in the leaf width in different *Aloe vera* germplasm

may be due to genetic character and other factors such as soil, climate and environment. Variation in leaf thickness is closely related with finding of Abhila *et al.*, (2010) [4], O'Brien *et al.*, (2011) [5], Hazrati *et al.*, (2012) [7]. Maximum leaf width was found in IC-283610 (6.72 cm) and minimum yield per plant was found in IC-112512 (5.83 cm) in year 2018-19. In year 2019-20 the maximum leaf width was found in IC-283610 (6.70 cm) and minimum yield per plant was found in IC-112512 (5.83 cm).

Gel content

The gel content of *Aloe vera* have been examined in Table 1.2 varied from 98.77- 96.98% in year 2018-19 and 98.76-97.13% in year 2019-20 in various *Aloe vera* germplasm. In the year 2018-19 of the germplasm was highest which was 98.77% in IC-283610 and statistically significant at 5% level of significant followed by 98.16% (IC-112569), 98.04% (IC-112532), 97.89% (IC-112527), 97.86% (IC-112531), 97.72% (IC-112521), 97.39% (IC-112519), 97.02% (IC-112518), 96.98% (IC-112512) and 96.86% (IC-112517). In the year 2019-20 of the germplasm was highest which was 98.76% in IC-283610 and statistically significant at 5% level of

significant followed by 98.56% (IC-112569), 98.54% (IC-112532), 98.03% (IC-112527), 97.96% (IC-112531), 97.88% (IC-112521), 97.72% (IC-112519), 97.54% (IC-112518), 97.32% (IC-112517) and 97.13% (IC-112512).

Table 1.2: Number of leaves/plant, Leaf width (cm) and Gel content (per cent) of *Aloe vera* germplasm

Name of germplasms	Number of leaves/plant		Leaf Width (cm)		Gel content (%)	
	2018-19	2018-19	2019-20	2018-19	2019-20	2019-20
IC- 112512	12.66	13.33	5.83	5.83	96.98	97.13
IC- 112517	11.66	12.00	6.00	6.03	96.86	97.32
IC- 112518	12.00	12.33	6.10	6.13	97.02	97.54
IC- 112519	12.33	12.66	6.26	6.28	97.39	97.72
IC- 112521	12.66	13.00	6.33	6.36	97.72	97.88
IC- 112527	14.00	13.33	6.40	6.40	97.89	98.03
IC- 112531	13.00	12.66	6.47	6.40	97.86	97.96
IC- 112532	12.66	13.33	6.53	6.50	98.04	98.54
IC- 112569	13.33	14.00	6.63	6.60	98.16	98.56
IC-283610	14.66	15.33	6.72	6.70	98.77	98.76
CD at 5%	0.990	1.469	0.10	0.094	0.369	0.256
SE(m)	0.333	0.494	0.037	0.032	0.127	0.088

Conclusion

By viewing the result, as explored physical parameter exhibited prominent character in terms of leaf weight, leaf length, leaf thickness, number of leaves/plant, leaf width and gel content, IC-283610 germplasm was found best compare to other germplasm.

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