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Economics Analysis of *Aloe Vera (Aloe barbadensis Miller)* production in Prayagraj (U.P.)

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Abstract
An Investigation on economics analysis of *Aloe ve*ra (*Aloe barbadensis* Miller) production was carried out successfully at Forest Nursery, College of Forestry, SHUATS, Prayagraj during 2020-2021. The total cost of cultivation of treatment T-12+ 45 DAT was found maximum (Rs. 228,663.20). The highest gross return was (Rs. 531250.00) per hectare as depicted in T-12+ 45 DAT. The maximum cost benefit ratio was found in T-12 (1: 2.32). Therefore, treatment T-12(FYM 12.5 t) + 45 DAT was recommended for best yield and economic feasibility of *Aloe vera* plant recorded in Prayagraj condition for farmers doubling income.

Keywords: Cost-effective, Cost benefit ratio, Cost of Cultivation and *Aloe ve*ra

Introduction
*Aloe vera*is an evergreen perennial plant it is thought to have come from the Arabian Peninsula about 6000 years ago. The majority of the time, this plant flourishes in the wild in tropical climates. This stem less plant grows to a height of between 60 and 100 cm. Hossain *et al.* (2012) [14]. The leaves of this plant are either green with dense meat inside or grayish-green in colour. The leaves have tiny white teeth that are serrated Abrieand Staden (2015) [2]. The mushy material inside the leaves tastes harsh and has a foul odour. The plant has yellow blossoms that aren't used for therapeutic purposes Aggarwal (2013) [5]. This plant is a succulent, which means that it can close its stomata to prevent water loss through evaporation and hence survive drought conditions. Although it was once cultivated as an aesthetic plant, its cultivation is currently in high demand because of its countless medical benefits. (Abdi G *et al.* 2013) [1]. Despite having its origins in the Arabian Peninsula, this plant initially became well-known in the United States. The gel has polysaccharides, vitamins (A, C, E), amino acids, plant sterols, salicylic acid, magnesium, zinc, calcium, glucose, and cholesterol. Various uses of *Aloe Vera* include gel, juice, creams, raw material, etc.

Materials and Methods
The experiment consists of different treatment combinations of both Control and FYMwas taken from the different treatments for the study of cost benefit analysis. A total of 12 treatmentscombinations were used forcalculations of the benefit cost ratio for feasibility of the study on farmers field Aggarwal and Barna (2014) [4].
Two main economic indicators used to assess the economic viability of tissue culture plants *Aloe Vera* cultivation were net profit, as well as the family farm's income O'Donogh *et al.* (2012) [15]. Despite the fact that the first is the most widely used indicator for evaluating a variety of economic activities, cultivation holds particular significance in agriculture and is intimately connected to the idea of economic sustainability Van Calker*et al.* (2004) [16]. The treatment combination *viz.,* T_1 Control+15 DAT, T_2 (FYM 7.5 t) +15 DAT, T_3 (FYM 10 t) +15 DAT, T4 (FYM 12.5 t) +15 DAT, T_5 Control +30 DAT, T_6 (FYM 7.5 t) +30 DAT, T_7 (FYM 10 t) +30 DAT, T_8 (FYM 12.5 t) +30 DAT, T_9 Control+45 DAT, T_{10} (FYM 7.5 t) +45 DAT, T_{11} (FYM 10 t) +45 DAT and T_{12}(FYM 12.5 t) +45 DAT.

Benefit-Cost Ratio: The benefit cost ratio (BCR) was worked out by using following formula:

$$\text{Benefit cost ratio} = \frac{\text{Gross returns}}{\text{Cost of cultivation}}$$

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Results and Discussion

The experimental results showed that the costs associated with growing *Aloe vera* on 2 to 5 acres of land, in leased during the farming field. The lease fees may also change from one location to another these are similar finding reported by Afzal *et al.* (2016) [3]. Common Cost of cultivation of *Aloe vera* Crop per Ha was 142,220.00 these are similar finding reported by Van Calker *et al.* (2005) [12]. The Important results on Economic parameters ware shown in the following table 1 to 3 Haque and Ghosh (2013) [8].

Table 1 shows that maximum total cost of cultivation was observed in T-12 (FYM 12.5 t/ha) + 45 DAT (228,663.20) and the minimum cost was observed in T-1 Control (227,426.82) these are similar finding reported by Islam (2012) [9].

Table 2 shows that maximum yield Q/ha was in T-12 (FYM 12.5 t/ha) + 45 DAT (1062.50) and the minimum yield Q/ha observed in T-1 Control (725.00) and maximum Gross return (Rs. Ha^{-1}) was in T-12 (FYM 12.5) + 45 DAT (531250.00) and minimum Gross return (Rs. Ha^{-1}) was in T-1 Control (362500.00) these are similar finding reported by Weligamage *et al.* (2014) [13].

Fig 1: *Aloe vera* on 2 to 5 acres of land in leased during the farming field

Table 3 shows that maximum net profit (Rs /ha)observed in T-12 (FYM 12.5 t/ha) + 45 DAT (302586.80) and the minimum net profit (Rs /ha)was observed in T-1 Control (135073.18) and the maximum benefit Cost ratio was observed in T-12 (FYM 12.5 t/ha) + 45 DAT (1: 2.32) and the minimum benefit Cost ratio observed in T-12 (FYM 12.5 t/ha), (1: 1.59) these are similar finding reported by Hosseini and Parsa (2007) [6].

Table 1: Cost of Cultivation for different treatment sunder farmers field for *Aloe vera*

Treatment	Cost /Unit	Cost of Cultivation	Interest 7.5% for Six month	Total Cost of Cultivation
T$_1$Control+15 DAT	72333.60	142,220.00	12873.22	227,426.82
T$_2$(FYM 7.5 t) +15 DAT	72693.24	142,220.00	12894.79	227,808.03
T$_3$(FYM 10 t) +15 DAT	72870.36	142,220.00	12905.42	227,995.78
T$_4$(FYM 12.5 t) +15 DAT	73290.48	142,220.00	12930.63	228,441.11
T$_5$Control +30DAT	72353.04	142,220.00	12874.38	227,447.42
T$_6$(FYM 7.5 t) +30DAT	72547.00	142,220.00	12886.02	227,653.02
T$_7$(FYM 10 t) +30DAT	72967.56	142,220.00	12911.25	228,098.81
T$_8$(FYM 12.5 t) +30DAT	73480.00	142,220.00	12942.00	228,642.00
T$_9$Control+45 DAT	72625.20	142,220.00	12890.71	227,735.91
T$_{10}$(FYM 7.5 t) +45 DAT	72987.00	142,220.00	12912.42	228,119.42
T$_{11}$(FYM 10 t) +45 DAT	73212.72	142,220.00	12925.96	228,358.68
T$_{12}$(FYM 12.5 t) +45 DAT	73500.00	142,220.00	12943.20	228,663.20

DAT: days after transplanting

Table 2: Economics in different treatment under farmers field for *Aloe vera*

Treatments	Yield (Q ha^{-1})	Selling price (Rs. Q-1)	Total cost of cultivation	Gross return (Rs. Ha^{-1})	Net profit (Rs /ha)	Cost benefit ratio
T$_1$Control+15 DAT	725.00	500.00	227426.81	362500.00	135073.18	1: 1.59
T$_2$(FYM 7.5 t) +15 DAT	812.50	500.00	227808.03	406250.00	178441.96	1: 1.78
T$_3$(FYM 10 t) +15 DAT	875.00	500.00	227995.78	437500.00	209504.21	1: 1.92
T$_4$(FYM 12.5 t) +15 DAT	987.50	500.00	228441.10	493750.00	265308.89	1: 2.16
T$_5$Control +30DAT	735.50	500.00	227447.42	367750.00	140302.57	1: 1.62
T$_6$(FYM 7.5 t) +30DAT	750.00	500.00	227653.02	375000.00	147346.98	1: 1.65
T$_7$(FYM 10 t) +30DAT	937.50	500.00	228098.81	468750.00	240651.18	1: 2.06
T$_8$(FYM 12.5 t) +30DAT	1000.00	500.00	228642.00	500000.00	271358.00	1: 2.19
T$_9$Control+45 DAT	775.00	500.00	227735.91	387500.00	159764.08	1: 1.70
T$_{10}$(FYM 7.5 t) +45 DAT	962.50	500.00	228119.42	481250.00	253130.58	1: 2.11
T$_{11}$(FYM 10 t) +45 DAT	975.00	500.00	228358.68	487500.00	259141.31	1: 2.13
T$_{12}$(FYM 12.5 t) +45 DAT	1062.50	500.00	228663.20	531250.00	302586.80	1: 2.32

Conclusion
Hence the experimental results shows that the cost benefit ratio of (1: 2.32) was recorded in T-12 (FYM 12.5 t) + 45 DAT followed by T-11 (FYM 10 t) (1: 2.13) + 30 DAT. Therefore, treatment T-12 (FYM 12.5 t) + 45 DAT was recommended for best yield and economic feasibility of *Aloe vera* plant recorded under Prayagraj environmental condition.

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