

IMPACT OF ANIMAL WASTE (GIR COW) ON FENUGREEK (TRIGONELLA FOENUM-GRAECUM L.) AND INVITRO SEED GERMINATION

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ABSTRACT

The laboratory experiment was carried out to investigate the effect of mixed formulation of gir cow waste product like dung, urine, on seed germination of fenugreek seeds. It was interesting to note that variation in seed germination percent in root length, shoot length, total length and dry weight as per the different concentration of waste product. The highest average root length 5.9 cm in 20% concentration of cow dung, highest average shoot length (7.01cm) in 20% concentration of cow urine, highest total height (11.57cm) in 20% concentration of cow dung as well as the average highest dry weight (0.094gm) noticed in 20% concentration of cow dung + cow urine in combination.

Key words: Fenugreek, cow dung, cow urine, seed germination.

INTRODUCTION

Most of the herbaceous plants are used medicinally in different countries by around 80 % of people around the world, mostly in developing countries. They are a source of many powerful medications, mainly because it is widely held that they are affordable, locally available, and have no negative effects. Fenugreek (*Trigonella foenum-graecum* L.) is an herb that grows anywhere around the world. (Basu S 2004) One of the earliest medicinal plants, fenugreek originated in Northern Africa and India. Its dried seeds have a wide application as a flavoring additive and are a good source of protein, crude fiber, fat, minerals, and vitamins. In addition, it

has a broad spectrum of therapeutic properties. (Jasim Naeem Al-Asadi,2014)(Yoshikawa M et.al., 1997)

Traditionally in our villages and rural areas organic manure is used such as dung of domestic animals. Cow manure has no significant negative impact on crops or human health. cow dung manure plays an important role in maintaining the nutrient status of the plant. (Dittrich et al., 2012).The main advantage of the cow dung is that it doesn't pollute the soil The use of inorganic pesticides and fertilisers also has a lasting impact on grain crops. Cow dung significantly increased the growth and yield of plants in addition to using cow dung, treating plants with urine either by itself or in conjunction with different plant extracts has also been used to control plant diseases. (Akhter et al., 2006;Gudugi, 2013; Mehedi et al., 2012; Akande et al., 2006;).

organic manures as a possible boost to seedling growth in nurseries to enhance decreased rotation period in plantations. (Agera Stephen et al., 2019)Cow urine contains about 1.0% nitrogen, traces of P₂O₅, and 1.0% of K₂O. Approximately 2400 to 2500 L of urine is produced per year per animal. If this urine were not conserved, nitrogen in the urine, which is mainly in the form of urea, would be quickly lost as ammonia. It is also considered a natural disinfectant and pest repellent (Tharmaraj et al., 2011;Jayanth et al., 2017)

Therefore, in the present investigation efforts were made to find out efficient animal waste combination to improve % seed germination and seedling growth of fenugreek.

MATERIALS AND METHOD

The waste material like domesticated animal (cow) waste i.e., cow dung, urine (Gircow) was collected from Pravaranagar area and the dried cow dung after burning the ash was collected and brought to the laboratory and prepared different concentrations like 10%, 20% and 30% was made along with only cow dung conc., cowurine, and combination of all these wastes along with control.fenugreek seeds were selected and soaked overnight in these prepared concentrations.The petri plates having diameter 9cm size thoroughly washed & sterilized in autoclave. Labelled each petri plates as per conc.and placed ten seeds on filter paper in each petri plate. After placing seed on petri plates 1st germination percentage count was recorded after 4thday andon 14th day second count was recorded. (R L Agrawal2012).

RESULT AND DISCUSSION:

Table no.1 Effect of waste product on fenugreek seed germination

Sr. No.	Material	Concentration %		
		10%	20%	30%
1	Control (DW)	100%	1	Control (DW)
2	Cow dung	100%	2	Cow dung
3	Cow urine	100%	3	Cow urine
5	Cow dung+Cow urine	60%	5	Cow dung+Cow urine

The result summarised in table no.1 revealed that 100% seed germination in cow dung, cow urine and control. However, 20% cow dung and cow urine in combination showed 100% seed germination and 60% seed germination in 10% and 30% concentration

Table no.2 Effect of different concentrations of cow dung on fenugreek seed germination

Number of Plants	Control			10%			20%			30%		
	Root length (cm)	Shoot length (cm)	Total length (cm)	Root length (cm)	Shoot length (cm)	Total length (cm)	Root length (cm)	Shoot length (cm)	Total length (cm)	Root length (cm)	Shoot length (cm)	Total length (cm)
1	3	6.5	9.5	2	4.3	6.3	3	5.3	8.3	3	5	8
2	2	5.5	7.5	2.9	4.5	7.4	6	7.2	13.2	5.5	6.9	12.4
3	1.5	5.3	6.8	2	5.5	7.5	7.5	7.6	15.1	3.5	3.5	7
4	4.3	6.3	10.6	2.7	5.4	8.1	7.5	6.5	14	2.9	4.5	7.4
5	3.1	6.8	9.9	3	4.9	7.9	6.6	5.0	11.6	3.4	7.5	10.9
6	3.5	5.5	9	1.9	5	6.9	7.8	5.4	13.2	2.2	5.5	7.7
7	2.8	5.6	8.4	3.2	5.5	8.7	5.7	5.5	11.2	2	6	8
8	2.5	6.8	9.3	2.5	4.3	6.8	4.8	3.5	8.3	4	7.1	11.1
9	3.6	7.5	11.1	2.2	4.3	6.5	4.7	4.2	8.9	2.8	5.5	8.3
10	3	5.5	8.5	2.3	5.2	7.5	5.4	6.5	11.9	3	4.5	7.5

Average mean	2.93	6.13	9.06	2.47	4.89	7.36	5.9	5.67	11.57	3.23	5.6	8.83
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The result summarised in table no.2 revealed that highest average root length (5.9) noticed in 20 %concentration followed by (3.23 cm) observed in 30% concentration as compared to control. The highest total average length (11.57cm) observed in 20% concentration.

Table no.3 Effect of different concentrations of cow urine on seed germination

Number of plants	Control			10%			20%			30%		
	Root length (cm)	Shoot length (cm)	Total length (cm)	Root length (cm)	Shoot length (cm)	Total length (cm)	Root length (cm)	Shoot length (cm)	Total length (cm)	Root length (cm)	Shoot length (cm)	Total length (cm)
1	3	6.5	9.5	3	6.1	9.1	4.5	5	9.5	4.2	4.9	9.1
2	2	5.5	7.5	4.2	6.5	10.7	2	7.5	9.5	1.7	4.5	6.2
3	1.5	5.3	6.8	7.5	6.2	13.7	4	5.4	9.4	5	1.5	6.5
4	4.3	6.3	10.6	6.5	6.5	13	3	4.5	7.5	2.3	4.9	7.2
5	3.1	6.8	9.9	5.3	6.2	11.5	3.6	5	8.6	3	4.3	7.3
6	3.5	5.5	9	4.9	5.7	10.6	3.2	5.1	8.3	2.5	5.7	8.2
7	2.8	5.6	8.4	2	4.5	6.5	5.5	6.5	12	5.9	3	8.9
8	2.5	6.8	9.3	4.5	5.7	10.2	3.2	5	8.2	4.9	2.9	7.8
9	3.6	7.5	11.1	3.7	5.9	9.6	3.8	8	11.8	0	0	0
10	3	5.5	8.5	0	0	0	4	8.5	12.5	0	0	0
Average mean	2.93	6.13	9.06	4.16	5.33	9.49	3.68	6.05	9.73	2.95	3.17	6.12

The result summarised in table no.3 revealed that highest average root length (4.16) noticed in 10 %concentration followed by (3.68 cm) observed in 20% concentration however highest average total length (9.73) noticed in 20 %concentration followed by (9.49 cm) observed in 10% concentration compared to control.

Table no.4 Effect of different concentrations of cow dung+ cow urine on seed germination

Number of Plants	Control			10%			20%			30%		
	Root length (cm)	Shoot length (cm)	Total length (cm)	Root length (cm)	Shoot length (cm)	Total length (cm)	Root length (cm)	Shoot length (cm)	Total length (cm)	Root length (cm)	Shoot length (cm)	Total length (cm)
1	3	6.5	9.5	2.5	3.5	6	3	6.2	9.2	4.5	2	6.5
2	2	5.5	7.5	4.3	4.5	8.8	4	7.4	11.4	1.2	3.3	4.5
3	1.5	5.3	6.8	3.2	4.2	7.4	8.3	7.5	15.8	0.8	4.3	5.1
4	4.3	6.3	10.6	5.6	2.3	7.9	5	7.5	12.5	0.5	3.7	4.2
5	3.1	6.8	9.9	5.2	2.7	7.9	5.5	7.3	12.8	2.3	3.5	5.8
6	3.5	5.5	9	4.3	2.4	6.7	5.5	7.5	13	2.7	3.8	6.5
7	2.8	5.6	8.4	0	0	0	4.3	5.5	9.8	0	0	0
8	2.5	6.8	9.3	0	0	0	2.3	7	9.3	0	0	0
9	3.6	7.5	11.1	0	0	0	3.2	6.9	10.1	0	0	0
10	3	5.5	8.5	0	0	0	4.3	7.3	11.6	0	0	0
Average mean	2.93	6.13	9.06	2.51	1.96	4.47	4.54	7.01	11.55	1.2	2.06	3.26

The result summarised in table no.5 revealed that highest average root length (4.54 cm) noticed in 20 % concentration however highest average shoot length (7.01cm) observed in 20 % conc. and highest total average length (11.55cm) observed in 20% concentration.

Table no. 5 Average Root, Shoot and Total Length

	Root length (cm)			Shoot length (cm)			Total length (cm)		
	10%	20%	30%	10%	20%	30%	10%	20%	30%
cow dung	2.47	5.9	3.23	4.89	5.67	5.6	7.36	11.57	8.83
cow urine	4.16	3.68	2.95	5.33	6.05	3.17	9.49	9.73	6.12
cow dung+ cow urine	2.51	4.54	1.2	1.96	7.01	2.06	4.47	11.55	3.26
Control	2.93	2.93	2.93	6.13	6.13	6.13	9.06	9.06	9.06

The result summarized in table no. 5 statistically provide that the average root length of the given data is significant at 1% & 5% L.O.S($F_{2,6}=1.7628$ & $P=0.2498$) however average shoot length is significant at 1% & 5% L.O.S($F_{2,9}=1.809063$ & $P=0.218582$) and average shoot length is significant at 1% & 5% L.O.S($F_{2,6}=3.135384$ & $P=0.092623$) as compare to control.

CONCLUSION: In the present investigation it was statistically proved that the combination effect of animal waste like cow dung + cow urine gives best result for enhancement of shoot, root, and total length of seedling growth when used in 20% concentration.

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