Study on Seed Germination and Growth Behavior of Brinjal in Admiration to Effect of NPK and Organic Manure

Anoop Badoni* and J. S. Chauhan**
Seed Testing Laboratory
Department of Seed Science and Technology
H. N. B. Garhwal University, Srinagar Garhwal, 246 174, Uttarakhand
*Research Scholar, Young Scientist (UCOST)
**Assoc. Prof. and Head of Department
*For correspondence: annabadoni@yahoo.co.in

ABSTRACT
An experiment was conducted to study the seed germination and growth behavior of brinjal (*Solanum melongena* L.) with inorganic fertilizers (NPK) and organic manure (Cow dung) under environmental conditions. Seeds of *Solanum melongena* L. cv. BR 112, were sown in poly bags (1 seed/poly) at the depth of 2.5 cm. with different treatments i.e. S1 (Control- Only Soil), S2 (Soil + NPK), S3 (Soil + Cow dung). 50 replicates of each treatment were used for the study. Total numbers of germinated plants were counted from each poly bag of all treatments, at the interval period of 5 days after sowing, and reported as emergence count/poly bag. For growth study plant height, number of leaves, length and width of leaves and root length were measured from all the treatments. Result revealed that cow dung showed maximum germination% i.e. 49 plantlets from 50 seeds then control and NPK i.e. 29 plantlets and 35 plantlets respectively. Growth of plantlets also showed maximum plant height (59.2 cm.), number of leaves (5.8), length of leaves (7.82 cm.), width of leaves (5.73 cm.) and root length (19.63 cm.) in S3 treatment then control (34.6 cm. plant height, 3.7 number of leaves, 3.53 length of leaves, 2.72 width of leaves, 7.05 root length) and NPK (46.4 cm. plant height, 3.4 number of leaves, 4.15 length of leaves, 3.18 width of leaves, 17.76 root length). [Nature and Science. 2009;7(5):64-66]. (ISSN: 1545-0740).

Key words: *Solanum melongena* L., cow dung and NPK

INTRODUCTION:

Brinjal is used in all over the world as an edible vegetable crop. Brinjal or egg-plant (*Solanum melongena* L) is one of the most commonly grown vegetable crops of solanaceae family in India. India, China, Turkey, Japan, Philippines are the major brinjal production countries. India contributes 6,44,3062 MT to the global production of brinjal and ranks 2nd to China (Thamburaj and Singh, 2003). In Uttarakhand hilly regions it is grown only in summer. As we know the population of India increases day by day and by this region the scarcity of food also increases. To fulfill all human needs or to meet the demand of today's peoples, farmers generally used inorganic fertilizers to increases the quality and quantity of the crop. Although using these fertilizers farmers increases the yield of crops but this create an adverse effect on crops, consumer health and as well as on environment (Biswas and Mukharjee, 1994).

Traditionally in our villages and rural areas organic manure are used such as dung of domestic animals. Cow dung shows no or less adverse effect on crops and also on human health. The main scope of this investigation is that, the use of organic manure is better for quality and yield of the crops. As early as 5000 B.C. the *Vedas* and *Upanishads* as well as other Indian documents mention soil as synonymous with land-the mother- supporting and nourishing all life on the earth (Agarwal, 1967).

MATERIAL AND METHODS:

The preset study was carried out with the objective to evaluate the effect of inorganic fertilizers and organic manure on seed germination and growth behavior in Brinjal cultivar BR 112. Following treatments were used for the study:

Control (Only Soil)	:	S1
Soil + NPK	:	S2
Soil + Cow Dung	:	S3

50 replicates for each treatment were used for the study. Some important descriptions of the layout are given below:

Total number of poly bags used in the experiment	:	150
Number of poly bags used for each treatment	:	50
NPK used in 50 poly bags (grm.)	:	14.07
Cow dung (kg.) used 50 poly bags	:	25

The NPK complex fertilizer was used before sowing the seeds in S2 treatment. Cow dung meshed thoroughly for S3 treatment and mixed with soil before sowing the seeds. Total numbers of germinated plants were counted from each poly bag of all treatments at interval period of 5 days after sowing and reported as emergence count /poly bag. Plant growths were observed with different parameters i.e. plant height, number of leaves, length and width of leaves and root length. Ten normal seedlings were randomly taken at the end of the germination count for the study of plant height (shoot length), length and width of leaves were measured in cm. The no. of leaves was counted after 20 days of germination. Three plant of each treatment were randomly selected to measure the root length, which were already used to measure the other growth parameter, and the mean values were arrived at different growth stages.

RESULT:

Germination Study: The germination was influenced by different treatments. Result shows that the maximum number of seedling emergence was in S3 treatment, which contains Cow dung, in contrast to followed by S1 and S2 (Table-1).

Growth Study:

Plant height: Maximum plant height was recorded in S3 treatment, at 35 days after sowing which are higher then S1 and S2 treatment.

Number of leaves per plant: Number of leaves was recorded higher in S3 treatment in contras to S1, and S2 treatment (at 35 days after sowing).

Length & Width of leaves per plant: The leaf length and width were recorded up to 35 days after sowing of seeds in all the treatments. The length and width of green active leaves in S3 treatment is much higher then S1 and S2 treatment.

Root length: Three plants of each treatment were randomly selected to measure the root length, which were already used for other growth parameter. The root length in S3 treatment was recorded higher then all other treatments i.e. S1 and S2.

DISCUSSION:

The result of this investigation shows that the organic manure is better then the inorganic fertilizers i.e. Nitrogen, Phosphorus & Potassium, was started since "Green Revolution" to increase the yield of the crops. Day by day the use of these fertilizers was increased rapidly, in all agricultural sectors/ field of India. Farmers was used these inorganic fertilizers in more quantity to increase the yield and economy, now the use of these fertilizers is 6 to 8 times more then that time. The excess amount of the fertilizers, affect the soil as well as the crop characteristics and the product from the crop is also influenced. Fertilizers, pesticides, chemicals, etc. all contributes towards soil pollution.

The main advantages of organic manure are that it doesn't pollute the soil and not give any negative effect to environment. Because of the use of manures, the physical conditions such as aeration and water transmission properties of soil are improved. Because of the slow releases of ammoniac nitrogen and slow conversion to nitrates, the leaching loss of nitrogen is low in the presence of organic manures. The preparation of organic manure provides a hygienic and useful way of disposal and utilization of waste which wood otherwise have created and health hazards. A research was done by the agricultural chemistry's scientists of Chandrasekhar Ajad Agriculture and Technical University, Kanpur, in which it was described that the uses of inorganic fertilizers is increases day by day and by result of this the crops as well as its product, contain toxicity. According to scientists urea and other inorganic fertilizers are used in crops, because of this crop grains also contains these chemicals about 1 ppm. Dr. B. R. Gupta said that in year 1970, 18 kg/hac inorganic fertilizers were used but today it increases about 129 kg/hac. It is found that by consuming these products, which contain chemicals, are harmful for human heart, lever, stomach and kidney.

In this investigation on *Solanum melongena* L. under environmental conditions, growth and germination was evaluated, with the use of organic manure and inorganic fertilizers as a result it is found that organic manure gave better result then inorganic fertilizers.

Table: 1 Effect of different treatments on germination:

Treatments	Germination counts (%)			
	1-5 DAS	**5-10 DAS**	**10-15 DAS**	**Total**
S1	0	4	54	**58**
S2	0	18	52	**70**
S3	6	70	22	**98**

Table: 2 Effect of different treatment on Seedling growth:

S.N	Treatment	Plant height	No. of leaves	Length of leaves	Width of leaves	Root length
1.	S1	13.2 ±0.4	3.7 ±0.5	3.53 ±0.4	2.72 ±0.5	7.05 ±0.6
2.	S2	16.9 ±0.2	3.4 ±0.3	4.15 ±0.5	3.18 ±0.6	17.76 ±0.7
3.	S3	22.5 ±0.5	5.8 ±0.2	7.82 ±0.5	5.73 ±0.5	19.63 ±0.6

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