

**SYNERGISTIC EFFECT OF LASER LIGHT AND WASTE WATER ON SEED GERMINATION IN *TRIGONELLA FOENUM GRAECUM***

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**Abstract**

Rapid industrialization, intensive agriculture and other anthropogenic activities have led to land degradation, environmental pollution and decline in crop productivity and sustainability causing great concern to human and animal health. One of the prominent sources contributing to increased soil contamination is disposal of municipal waste. The city sewage water is being largely used for irrigation in the adjoining areas of the cities for growing vegetable crops. In order to maintain the soils in better fertility as well as productivity for supply of essential plant nutrients for crop production on sustainable basis without deteriorating the soil health. It becomes imperative to make thorough studies on the impact of sewage applied to agriculture lands.

In the present studies seeds germination was evaluated under sewage and LASER irradiation to know the effect of these components on seed germination capacity. LASER light enhances the seed germination percentage as compared to control.

**Introduction**

Irrigation through sewage is as old as agriculture itself (Singh, 1996). The earliest documented sewage farms being in Buzlan, Germany and Edinburgh, Scotland which were in operation from 1531 and 1650 respectively. In India, application of sewage farm coming up in the year 1885 at Ahmedabad. At present country have around 200 sewage farms where organic wastes are used in 50,000 hectares. Currently, 17.4 million cubic meter of raw sewage is generated in urban areas of country. The total waste water generated in In India from 23 class one cities is about 16662.5 mild. (Million liter daily). Maharashtra alone contributes about 23 per cent of total. In many developed and developing countries, the sewage and sludge are being effectively utilized for agricultural purposes due to unavailability of fresh water and their high nutritive values.

Sewage water varies widely in its composition. Sewage sludge must be considered as low analysis fertilizers a sewage irrigated lands are well supplied with organic matter and available nutrients too. It has been found that the use of municipal waste water for irrigation purpose leads to rise in pH and EC, organic carbon, total NPK content . Thus sewage effluent has agronomic value and potential to improve the soil fertility, if properly treated and applied for agriculture.

Rising cost of commercial fertilizers have stimulated interest in the use of sewage water for irrigating agricultural lands in the vicinity of big cities. It has been reported that the average N, P, K content of sewage effluents is much higher than the conventional irrigation water . Udgir is a Taluka place having a population over 1 lakh. The municipal water supply is through a lake but in order to meet the inadequate supply for the fast expanding population water is obtained through tube wells.

In the present study the seeds of Methi (*Trigonella foenum graecum*) vegetable crop plant is studied for their seed germination influenced by sewage and LASER light irradiation . Control study was carried out using well water and sunlight.

#### **Objectives of the study –**

1. To know the seed germination influenced by sewage and LASER light.

#### **Materials and Methods :**

The present study was undertaken to measure the agro-potentiality and pollution status of domestic sewage at Udgir. The sewage water from Udgir town is discharged along the hill slopes and various vegetables are cultivated using the sewage .

#### **Experimental details –**

The present investigation was carried out by collection of sewage water samples from two different sites (sample 1 and sample 2). The well water sample as control for the study.

#### **Collection of sewage samples –**

Sewage water samples were collected in polythene cans by employing the grab sampling method (APHA, 1985).

#### **Seed germination test:**

Methi seeds were obtained from local market. The red sandy soil used for pot culture experiments. The presoaked seeds in different percentage of sewage were stimulated with the LASER light and the exposer time was set to 10 min , LASER beam fallen from the top onto the seeds equally distributed underneath. The exposition time was measured with a timer.

Germination test was conducted in four replicates as per the method prescribed by ISTA (1996).

## Experimental Results and Discussion

**Table 1: Seed Germination influenced by Sewage and LASER light (sample I)**

Sr.No.	Sewage sample conc.	LASER light exposure time	Germination (%) After seven days
1	I ( 20 % Sewage water)	10 min	90
2	II ( 40 % Sewage water)	10 min	70
3	III( 60 % Sewage water)	10 min	60
4	Control	0 min	60

**Table 2 Seed Germination influenced by Sewage and LASER light (sample II)**

Sr.No.	Sewage sample conc.	LASER light exposure time	Germination (%) After seven days
1	I ( 20 % Sewage water)	10 min	80
2	II ( 40 % Sewage water)	10 min	70
3	III( 60 % Sewage water)	10 min	40
	Control	0 min	60

LASER light pre-sowing treatment of seeds resulted in the increase of the germination percentage although in some cases no statistically significant effect was observed. The maximal increase of the seed germination percentage was 90% as

compared to control in both sewage samples which justify usage of pre-sowing laser stimulation for improving the sowing quality in terms of germination quality of seeds (tab. 1).

The seed germination percentage, in the lab shows a progressive decrease with the increase in the concentration of sewage water directly from 20 % to 60 %.

Thus 20 % sewage water mixed with fresh water and LASER irradiation enhances seed germination , this is due to the synergistic effect of sewage and LASER irradiation.

### Summary and conclusion

- Presence of significant amount of essential nutrients, metals and organic matter provides better nutrition leading to higher percentage of seed germination .
- It was also observed that LASER light irradiation has a synergistic effect on seed germination along with sewage.
- It is recommended that, sewage will be used for irrigation purpose after a thorough analysis of sewage.

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