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Impact of Marble Slurry Effluent on Germination of Seed Growth of Crops (Gram-RSG 888, Barley-RD 2035)

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ABSTRACT
The paper describes the effect of marble dust on seed germination in Jaipur, Dist Rajasthan. The study focus on impact of different concentrations of marble slurry effluent on seed germination (%), germination plumule and radicle length, fresh and dry weight of plumule and radical of crops cercium-79, Gram-RSG888 and Barley-RD 2035 was investigated. The germination percentage of seed and seedling growth showed a gradual decline with increase in effluent concentration. The marble slurry effluent did not show any inhibitory effect on seed germination at low concentration. Seeds germinated in higher concentration effluent but survive for longer period.
KEY WORD: Germination, Slurry Effluent, Marble Dust, Plumule and Radical

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INTRODUCTION

Rajasthan being a rocky state, is rich in diverse minerals, particularly dolomite CaMg (CO3)2), marble ($CaCO_3$), and granite (a mixture of micronutrient minerals) [2]. As in common practice, manufacturers dump this waste material over the nearby wasteland areas. The heaps of this waste material acquire large land areas and remain scattered all around, spoiling the aesthetics of the entire region and have affected tourism and industrial potential of the state [1]. Although minerals and heavy metals are naturally present in the soil, geologic and anthropogenic activities increase the concentration of these elements to amounts that are harmful to plants.

Some of these activities include mining smelting of metals, processing of minerals also. Since different crop species may have different tolerance to various pollutants. Seed germination and plant growth bioassays are the most common techniques used to evaluate phytotoxicity [3].

The physical and chemical characteristics of a range of mining dust types are explained and its effects on photosynthesis, respiration and transpiration. Plants growing on this atmosphere show a reduction in growth performance and yield. Visible injury symptoms and decreased in productivity on vegetation is well noticed. Most of the plant community structure is altered [4]. A large number of mines and mining industrial process can produce particulate emission [5]. This paper briefly explains the effects of marble slurry pollution on seed germination.

MATERIALS AND METHOD

A study was conducted to evaluate the effect of marble industry effluent on seed germination: root length, shoot length and total dry weight of crops Gram-RSG888, Barley-RD 2035 and pulse from Durgapura, Jaipur. The experiment was conducted in triplicate form for each treatment and tape water was used as control (T0). Effluents were diluted with tap water at concentration of 20% (T1), 40% (T2), 60% (T3), 80% (T4) and also used 100% (T5) were grown for 7 days. Experimental setup was the same as described by respective effluent concentration were provided and incubated for three days at 26±2^{0}Cfor germination. Daily observations were made for seed germinated seeds. After seven days, seedling was harvested: root length, shoot length and total dry weight were recorded. For dry weights seeds were incubated at 60^{0}C for 24hrs. Experimental setup was the same as described by Nawaz *et. al.,* [6]. Data was subjected to statistical analysis.

RESULTS

Table1: Effects of marble industry effluent on seed germination (Barley-RD 2035)

S.no	Parameters	0%	20%	40%	60%	80%	100%
1.	Final Weight(gm)	1.15	1.07	1.14	1.01	1. 00	1.15
2.	Roots	9.6±1.07	9.7±1.05	10.06±1.12	10.14±1.02	9.26±0.74	9.68±1.22
3.	Shoots	8.38±0.93	9.34±0.81	8.7±0.33	7.4±0.64	7.64±2.11	9.44±0.74

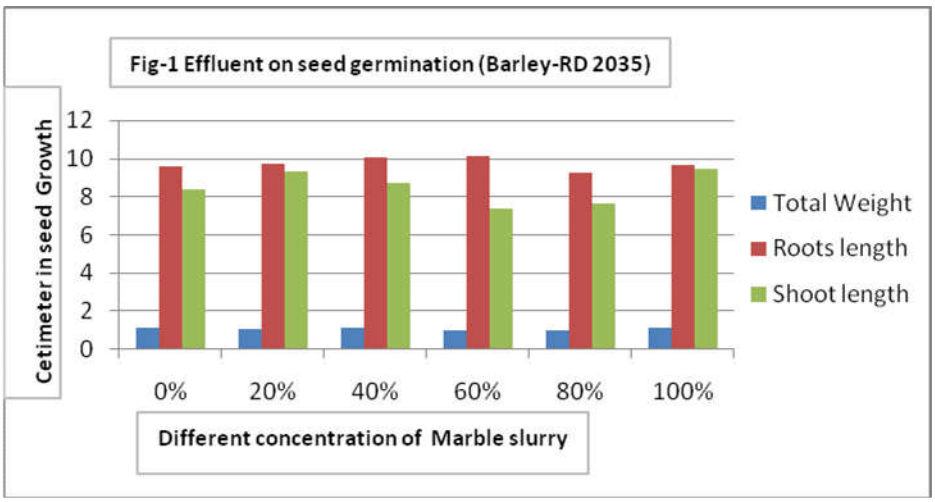


Table2: Effects of Marble industry effluent on seed germination (Gram-RSG888)

S.no	Parameters	0%	20%	40%	60%	80%	100%
1.	Weight(gm) Final (Dry)	1.64	1.62	1.57	1.50	1.30	1.52
2.	Roots	6.62±1.21	6.76±0.74	5.52±1.68	5.62±0.37	7.22±1.10	6.36±0.41
3.	Shoots	3.92 ±0.71	2.54±0.47	1.73±0.90	0.62±0.27	3.26±0.48	3.65±0.64

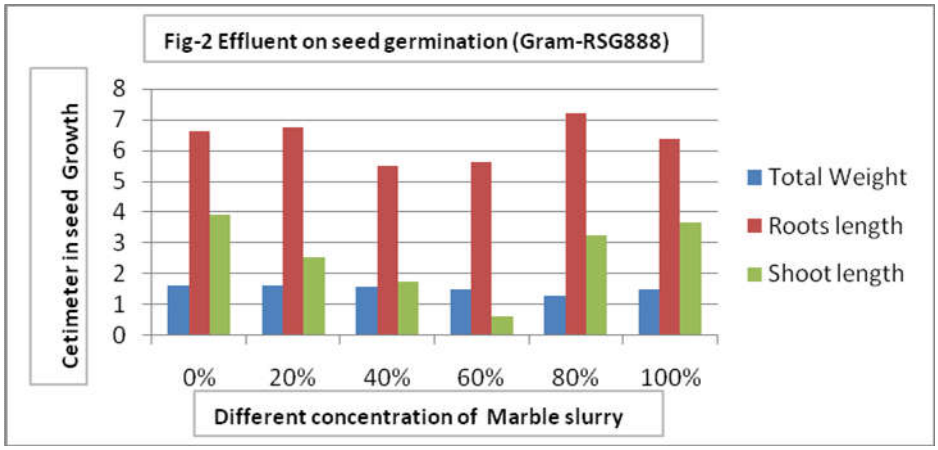
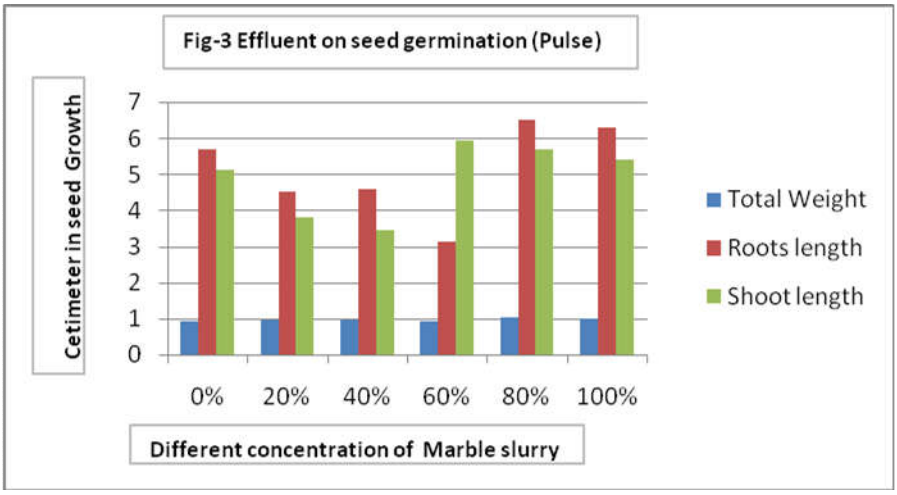


Table 5: Effects of Marble industry effluent on seed germination (Pulse)

S.no	Parameters	0%	20%	40%	60%	80%	100%
1.	Weight (gm) Final (Dry)	0.94	0.96	0.95	0.91	1.02	1.01
2.	Roots	5.7±1.60	4.5±0.84	4.6±1.18	3.12±1.51	6.52±0.94	6.28±0.75
3.	Shoots	5.10±0.85	3.8±0.38	3.43±0.48	5.93±1.44	5.7±0.98	5.41±1.02



DISCUSSION

This paper was shows a comprehensive studies on Seed germination in the Marble slurry effluents to monitor the seed germination growth. Environmental pollution caused by the release of a wide range of compounds as a consequence of industrialization has assumed serious proportions. Industrial effluents are responsible for serious water [7] and soil pollution [8]. Which is considered as one of the major factors responsible for low productivity of crops. A considerable number of reports are available on the effect of different industrial effluent on different crops [9].

Marble industry effluent affected the seedlings of three varieties and resulted in negative and positive ways. Similar finding in seedling growth was observed in variety Gram-RSG888 and pulse. Results showed table no.1 and fig-1that there was an increase in effluent concentration while germination, root length and shoot length was enhanced and found maximum respectively at 60% and 100% concentration of effluent applied in Barley-RD 2035. The shoot length and root dry biomass was depressed as compared to control. Controversy Study of Augusthy and Sherin [10] indicated that length of root system and number of lateral roots of *Vigna radiata* increased by low concentrations of effluent. Similar results had been reported by Sundaramoorthy and Lakshami [11].

The Root, Shoot Length and Total Dry Weight of Gram-RSG888 at different stages of growth under marble slurry effluents are represented in table no.2. Root length of Gram RSG888 was higher in 80% concentration with compare to control. Where under slurry treated in different concentration Gram RSG888 seed germination growth decreased with compare to control. And as well as total dry weight were higher in control.

In present study in table no.3 pulse seed germination was germination equally well from 0%, 80% and 100% effluent. Whereas a little decreases growth was observed in 20%, 40% and 60% of all three concentrations. Where under slurry treated in different concentration pulse seed germination growth higher with compare to control. Controversy study decrease in root and shoot length due to effluent were noticed by [12,13].

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