A REVIEW ON THE EFFECT OF CEMENT DUST SITE SOIL ON *LUFFA CYLINDERICA* AND *AMARANTHUS VIRIDIS*

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ABSTRACT

The purpose of this research was to detect the distribution of HMs on the cement dumpsite and to establish whether or not the morphological variations between *Luffa Cyclindrica and Amaranthus viridis* growing on the dumpsite are indicative of the HMs. Three sites at the dumpsite had HM levels substantially greater than the control (p=0.5), according to the data. Pb > Zn > Cr > Fe > Cu > Ni was the order of HM concentrations in soil type A. B: Fe > Cr > Pb > Zn > Cu > Ni; C: Fe > Pb > Cr > Zn > Cu > Ni; Pb > Fe > Zn > Cu > Ni; Control: Pb > Fe > Zn > Cu > Ni. Except for Zn, which was exactly within the limit (50.000Mg/kg), all HMs found at the three sites and control were well below the World Health Organisation (WHO). No apparent morphological alterations occurred in the plants collected from either the dumpsite or the control sites. Yet, as comparison to the control, the dumpsite plant displayed a range of morphological anomalies in the epidermis of its leaves, including an irregular shape, the lack of trichomes, and a reduction in both quality and the size of its stomata. Thus, it is revealed that, changes in epidermal structures of L. cyclindrica and A. viridis grown on JMD dumpsite soils is an indication of HMs such as Zn and Pb present, as all detected differences in the epidermal structures of the test plant grown on dumpsite soil were likely caused by the high level of HMs present in the dumpsites.

Keywords: *Luffa cyclindrica, Amaranthus viridis,Cement dumpsite,Plant*

INTRODUCTION

Pollution is described as any undesired change in the physical, chemical and biological components of air, water and soil that may negatively impact the life or offer a probable health risk for any living creature. Pollutants emitted by industry are the principal source of environment contamination. The cement company has been substantially involved in the growth of dust pollution. It also causes the contamination of soil where cement mills are located. The production process of cement is one of the primary source to contribute heavy metals in environment

In the cement dust contaminated regions, cement dust compositions plays a key function for the development of plants. Economically *Luffa Cylinderica and Amaranthus viridis* is incredibly essential crop as it is exploited as a food and fodder for animals and human being. The current research article carried out the influence of cement kiln dust contaminated soil on germination behaviour, micro-morphological study and cyto morphological studies of *Luffa Cylinderica and Amaranthus viridis*. On the second day of germination test the seeds were recognised developing by the rupture of seed coat. On the 5 day seedling growth characteristics such as a germination %, seedling length (cm/seedling), fresh and dried weight of seedling (g/seedling) were measured and recorded.

MATERIALS AND METHODS

During this experiment, JMD dumpsite located in Jharkhand State of India with geographical coordinates of latitude 23.6913ºN and longitude 85.2722ºE was chosen as the sample site for the contaminated soil. Three pots (15 cm in height and 40 cm in diameter) were filled with 9kg (7cm layer) of the dumpsite soil in three distinct areas (A, B and C) with 1km distance difference following (Musa et al., 2017). The precise sites where the three samples were gathered was determined at random. For the control soil, a pot of comparable size was filled with equivalent soil acquired from salforest of Dalma. The soil was unconataminated and all the samples obtained were done in triplicate. Seeds of *Luffa Cylinderica and Amaranthus Viridis* were sowed in first week of July in the pots filled with combination of kiln dust and soil. 6 fresh pots were put up and each was filled with 5kg of soil. A soil was dried and then combines with particle pollution in fluctuating wet once in a day. ratio individually

RESULTS & DISCUSSIONS

Soil elements concentration (mg/kg): Iron, zinc, magnesium, calcium, chromium, lead, copper, nickel, nitrate, sulphur, phosphorus, and chloride were identified in soil samples from three regions near the JMD dumpsite (Cl-). The control had no (Ni) or (Cr) . The Marine Drive and Galudih Dumpsite in East Singhbhum also include heavy metals.

Table 1: Elemental composition of soil samples (**mg/kg**).

Parameters	Fe	Zn	Mg	Ca	Cr	Pb	Cu	Ni	Cd	NO3	S	P	Cl
Site A	37.75	50.00	38.75	44.75	30.00	75.00	21.50	2.50	ND	67.70	113.40	41.00	72.00
Site t B	42.25	15.75	39.00	66.75	35.00	25.25	12.25	2.25	ND	96.80	71.76	27.94	88.55
Site C	40.25	24.50	34.25	69.25	25.00	37.75	13.25	0.75	ND	136.20	37.03	45.53	62.00
Control	10.50	7.50	15.75	19.50	ND	15.00	2.25	ND	ND	30.00	15.50	17.14	15.00

Skin responses to *Amaranthus viridis*: A. viridis shows control characteristics in the form of polygonal epidermal structures on both the abaxial and adaxial sides, and a sinuous wall type. Anisocytic stomata are present. The form of a stoma is elliptical (oval). Coated with chloroplasts, the guard cells resemble the form of kidneys. Yet, a plant formed in soil samples from A, B, and C has polygonal epidermal structures, but plants grown in soil samples from B and C have irregular structures. Area A has circular walls, whilst Areas B and C have undulating ones. The majority of the stomata in A, B, and C are closed, yet these species all contain some anisocytic stomata as well. There are no cell inclusions in any of the samples (table 2). Epidermal structure varies between the control sample and the three sites, and experts assume this is related to the presence of heavy metals. Moreover, stomata are larger on abaxial surfaces. Foliar absorption through the stomata, the leaf cuticle, or both may be the principal route by which plants living in such polluted environs get these airborne toxins (Gostin, 2009). This shows that A. viridis's leaf epidermis is prone to the impacts of air pollution. The larger frequency of anisocytic stomata complex-types observed in A. viridis could be a signal that the plant requires bigger transpiration rates than normal to carry out biochemical activities in the presence of the dumpsite soil, which clogs the stomata pores. Oyeleke et al. (2004) revealed that if there are more subsidiary cells near the guard cells, the stoma may open more rapidly. It has been theorised that plants with stomata complex-type including many subsidiary cells (anomocytic types) have a key role in lowering carbon emissions.

Skin benefits of Luffa cylindrica: Relative to the The polygonal structures of the epidermis of A. viridis have curved walls on both the abaxial and adaxial sides. Anisocytic stomata are present. The shape of a stoma is elliptical (oval). Covered with chloroplasts, the guard cells have the shape of kidneys. Abaxial and adaxial epidermal structures of plants growing in soil at A, B, and C all display polygonal morphologies. Locations A and B have straight walls, whereas Location C has curved walls. The bulk of the stomata in A, B, and C are closed, however these species all present some anisocytic stomata as well. There are no cell inclusions in any of the samples (table 3). Stoma frequency is proportional to the amount of secondary cells around it. L. cylindrica's reactivity to the cement dust pollution may show adaptive traits. A increased number of subsidiary cells equates with a higher frequency of stomatal opening.

Table 2: Foliar Epidermal Attributes Found on Both the Adaxial and Abaxial Surfaces of *Luffa cylindrca*.

Plant specie	Surface	Shape Of Epidermal Cell	Epidermal Wall Type	Stomata Type	Cell Inclusions
(Site A)	Adaxial	Irregula	Curve	Anisocytic	Present
	Abaxial	Irregular	Curve	Anisocytic	Present
(Site B)	Adaxial	Polygonal	Straight	Anisocytic	Absent
	Adaxial	Polygonal	Straight	Anisocytic	Absent
(Site C)	Adaxial	Irregular	Straight	Anisocytic	Absent
	Abaxial	Irregular and Polygonal	Straight	Anomocytic	Absent
(Control)	Adaxial	Polygonal	Curve	Anisocytic	Absent
	Abaxial	Polygonal	Curve	Anisocytic	Absent

Table 3: Foliar Epidermal Attributes Found on Both the Adaxial and Abaxial Surfaces of *Amaranthus viridis*.

Plant specie	Surface	Shape Of Epidermal Cell	Epidermal Wall Type	Stomata Type	Cell Inclusions
(Site A)	Adaxial	Irregular	Undulating	Anisocytic	Present
	Abaxial	Irregular	Undulating	Anisocytic	Present
(Site B)	Adaxial	Polygonal	Curve	Anisocytic	Absent
	Abaxial	Polygonal	Curve	Anisocytic	Absent
(Site C)	Adaxial	Irregular	Undulating	Anisocytic	Absent
	Abaxial	Irregular and polygonal	Undulating	Anomocytic	Absent
(Control)	Adaxial	Polygonal	Sinuous	Anisocytic	Absent
	Abaxial	Polygonal	Sinuous	Anisocytic	Absent

CONCLUSION

Skin advantages of *Luffa cylindrica*: Compared to the The polygonal structures of the epidermis of A. viridis have curved walls on both the abaxial and adaxial sides. Anisocytic stomata are present. The form of a stoma is elliptical (oval) (oval) (oval) (oval). Coated with chloroplasts, the guard cells resemble the form of kidneys. Abaxial and adaxial epidermal structures of plants growing in soil at A, B, and C all have polygonal morphologies. Places A and B have straight walls, however Location C has curved walls. The majority of the stomata in A, B, and C are closed, yet these species all contain some anisocytic stomata as well. There are no cell inclusions in any of the samples (table 3). Stoma frequency is related to the quantity of secondary cells surrounding it. L. cylindrica's response to the cement dust pollution may indicate adaptive features. A larger number of subsidiary cells coincides with a higher frequency of stomatal opening.

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