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# Bio-nutritional Analysis of Blackgram Cultivated around Cement Factory

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**Abstract**
The natural environment is made up of air, water and soil. The release of emission of industrial waste into anyone of the components of the environment causes pollution. Industrial pollution significantly threatens the inherent right of people, to the enjoyment of a safe and secure environment. The effect of environmental pollution on poor nutrient constituents of black gram cultivated in and around the Cement factory are assessed and correlated. Correlation co-efficient analysis of the bio-nutritional parameters of black gram showed 0.01 and 0.05 level of positive significant.

**Keywords:** Cement dust, black gram, bio-nutritional analysis, pods, leaves, branches

## Introduction
Cement dust is a common particulate air pollutant around the cement factories and construction sites. Even though cement is very useful to mankind for building purposes, badly affects the vegetation produces considerable heavy metal accumulation in the soil, leaves, stem and fruits (Asubiojo *et al*., 1991; Ade- Ademilua and Umebese, 2007). The fall out of cement dust areas lead to changes in the soil characteristics and plant structure affects the plant growth with the formation of crusts on leaves, branches, flowers and fruits. These changes reflect irreparable habitat degradation. The cement polluted plants are directly affected through leaf stomata and indirectly by changing the pH of the soil (Singh, 1981)

## Materials and Methods
Experimental field work was carried out around the cement factory of Tirunelveli District. The cultivated black gram around the vicinity of the factory i.e. 3-10 km was treated as polluted and beyond 10 km as control plants.

## Result and Discussion
### Bio-nutritional Analysis of Black gram
The polluted and control rice plants around the Thalaiyuth Cement Factory reported reduction of bio nutrients for instance starch, carbohydrate, total amino acid, Vitamin-A and Vitamin – A1 in summer and monsoon. Starch content in the cement polluted rice fruits varied from the minimum of 0.59±0.414 in monsoon to the maximum of 0.64±0.414 in summer. On the other hand, starch content in the control fruits varied from the minimum of 0.92±0.016 during summer to the maximum of 0.99±0.006 in monsoon (Christudhas and Suja, 2017). The present study showed Chlorophyll 'a' content of the cement polluted black gram leaves varied from 0.52 ± 0.001 in summer to 0.54 ± 0.002 in monsoon and control leaves varied from 0.84 ± 0.019 in summer to 0.89 ± 0.002. Chlorophyll 'b' content of the cement polluted black gram leaves varied from 0.26 ± 0.001 in monsoon to 0.27 ± 0.005 in summer and control leaves varied from 0.06 ± 0.004 in monsoon to 0.09 ± 0.016 in summer. Total chlorophyll content of the cement polluted black gram leaves varied from 0.79 ± 0.006 in summer to 0.80 ± 0.001 in monsoon and control leaves varied from 0.93 ± 0.003 in summer to 0.94 ± 0.002 in monsoon. Carbohydrate content of the black gram leaves varied from 0.52 ± 0.002 in summer to 0.54 ± 0.008 in monsoon and control leaves varied from

0.87 ± 0.002 in summer to 0.89 ± 0.001 in monsoon. Carbohydrate content of the cement polluted blackgram fruits varied from 0.36 ± 0.002 in summer to 0.40 ± 0.001 in monsoon and control fruit varied from 0.78 ± 0.001 in summer to 0.82 ± 0.005 in monsoon. Free sugar content of the cement polluted black gram leaves varied from 0.30 ± 0.001 in summer to 0.31 ± 0.007 in summer and control leaves varied from 0.59 ± 0.008 in summer to 0.61 ± 0.014 in monsoon (Table: 1).

**Table: 1** Nutritional Bio-chemical parameters of Blackgram

| S.No | N.B.P | $A_1$ | $A_2$ | $A_3$ | $A_4$ |
|---|---|---|---|---|---|
| 1 | Chl. a (L) | 0.84 ± 0.019 | 0.52 ± 0.001 | 0.89 ± 0.002 | 0.54 ± 0.002 |
| 2 | Chl. b (L) | 0.09 ± 0.016 | 0.27 ± 0.005 | 0.06 ± 0.004 | 0.26 ± 0.001 |
| 3 | T. Chl (L) | 0.93 ± 0.003 | 0.79 ± 0.006 | 0.94 ± 0.002 | 0.80 ± 0.001 |
| 4 | Car (L) | 0.87 ± 0.002 | 0.52 ± 0.002 | 0.89 ± 0.001 | 0.54 ± 0.008 |
| 5 | Car (L) | 0.78 ± 0.001 | 0.36 ± 0.002 | 0.82 ± 0.005 | 0.40 ± 0.001 |
| 6 | F (L) | 0.59 ± 0.008 | 0.30 ± 0.001 | 0.61 ± 0.014 | 0.31 ± 0.007 |

**Correlation co-efficient of Bio-nutritional analysis - Blackgram**

The earlier studies reported that the bio-nutritional analysis of *Oryza sativa* plants at the cement polluted sites showed significant reduction of Starch, Carbohydrate, Total aminoacid, Vitamin A and Vitamin B1 are positively correlated (0.99)** at 0.01 level of significant whereas, (0.87)* showed 0.05 level of significant (Christudhas and Suja, 2017). The present study showed Chlorophyll 'a' content of blackgram leaves are positively correlated $0.87^{*}$ ($A_2$ -$A_1$) & $0.86^{*}$ ($A_3$-$A_4$) at 0.05 level of significant. Chlorophyll 'b' content of the blackgram leaves are positively correlated $0.87^{*}$ ($A_2$ -$A_1$) at 0.05 level of significant whereas, $0.98^{**}$ ($A_3$-$A_4$) showed 0.01 level of significant. Total chlorophyll content of the blackgram leaves are positively correlated $0.98^{**}$ ($A_2$ -$A_1$) at 0.01 level of significant whereas, $0.88^{*}$ ($A_3$-$A_4$) showed 0.05 level of significant. Carbohydrate content of the blackgram leaves are positively correlated $0.86^{*}$($A_2$ -$A_1$) and $0.88^{*}$ ($A_3$-$A_4$) at 0.05 level of significant. Carbohydrate content of the blackgram fruits are positively correlated $0.87^{*}$($A_2$ -$A_1$) and $0.86^{*}$ ($A_3$-$A_4$) at 0.05 level of significant (Table: 2). Morphological parameters via tiller length, number of leaves, length of inflorescence, number of paddy, weight of paddy and moisture content revealed minimum production in the cement polluted soil observed during summer and maximum production in monsoon. The morphological parameters are positively correlated at 0.01 and 0.05 level of significant (Jemila *et al.*, 2015).

**Table: 2** Correlation Co-efficient of Nutritional Bio-chemical parameters

| S.No | N.B.P | $A_1$- $A_3$ | $A_2$ - $A_1$ | $A_3$ - $A_4$ | $A_4$ - $A_2$ |
|---|---|---|---|---|---|
| 1 | Chl. a (L) | -0.18 | $0.87^{*}$ | $0.86^{**}$ | 0.01 |
| 2 | Chl. b (L) | -0.21 | $0.87^{*}$ | $0.98^{*}$ | -0.02 |
| 3 | T. Chl. (L) | -0.02 | $0.99^{**}$ | $0.88^{*}$ | -0.22 |
| 4 | Car (L) | 0.01 | $0.86^{*}$ | $0.88^{*}$ | -0.08 |
| 5 | Car (L) | 0.01 | $0.87^{*}$ | $0.86^{*}$ | $0.96^{**}$ |
| 6 | F (L) | 0.01 | $0.86^{*}$ | $0.86^{*}$ | $0.87^{*}$ |

**Conclusion**

Bio-nutritional analysis of the cultivated cucumber around the cement factory revealed that the fall out of cement dust on the plants reflect that the cultivation of blackgram around the cement factory is dangerous, as far as the health of consumers is concerned.

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