



PERFORMANCE OF AGRO INDUSTRIAL WASTES UNDER DIFFERENT LEVELS ON GROWTH AND YIELD ATTRIBUTES OF MAIZE (GANGA 5)

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ABSTRACT Field experiments were conducted to evaluate the effects of lignite flyash at four levels viz., 10, 15, and 20t ha⁻¹ with or without pressmud, an agro industrial by product and RDF on Maize for consecutively four years during 2012-16. Lignite flyash @ 10t ha⁻¹ with pressmud exerted a remarkable influence on all the yield attributes, ultimately leading to increased grain yield of 42.5 percent over control. With regard to sole application of lignite flyash, LFA @ 5t ha⁻¹ registered significantly the highest values in plant height(89cm), LAI (4.3),DMP (61.0g pl⁻¹),cob length (15.4cm) cob diameter (5cm), grain number cob⁻¹ (340.5) and grain yield (5100 kg ha⁻¹). From this study it was concluded that application of LFA@ 10t ha⁻¹ with pressmud and RDF enhanced the grain yield in maize.

KEYWORDS : Lignite fly ash, pressmud, industrial wastes.

INTRODUCTION

Maize is one of the most important cereal crops in the world agriculture economy both as food for man and feed for animals. It is a miracle crop, having high yield potential, wider adaptability and it is grown throughout the world. There is no cereal on the earth which has so immense potentiality and that is why it is called as *Queen of Cereals*. The scarcity of organic manures in Agriculture had an impact on food grain production. It is necessary to find an alternate source of manure for crop production.

Wastes originating from sugar mill industries like pressmud, municipal town waste and thermal power units are finding their place in today's agriculture because they contain an array of plant nutrients which are essential for crops(Kumari mani muthu veeral,2006).

Lignite fly ash (LFA) disposal into the environment is one of the major concerns throughout the world mainly in developing countries. Lignite flyash contains a high amount of Si, which is essential for silicicolous plants such as maize along with low nitrogen and phosphorus content. Lignite fly ash on open land, which degrades the soil and endangers human health and the environment. Therefore, disposal and utilization of fly ash needs careful assessment to prevent conversion of arable land into landfills and accumulation of toxic metals in soil (Prem kishore *et al.*2009) Keeping this view, this research was planned to utilize the industrial wastes for the growth and yield of silica loving, maize crop.

MATERIALS AND METHODS

The field experiment was conducted in the Farmers field of kurinjipadi, cuddalore district, Tamil Nadu during 2012-16.The experimental soil is deep fairly drained clay with available N (228 kg ha⁻¹), P₂O₅(12.83 kg ha⁻¹) and K₂O (312.7 kg ha⁻¹), Organic matter (0.65%), The field experiments were conducted on Maize, Ganga 5 The weathered lignite fly ash was collected from Neyveli Lignite Corporation Ltd., Neyveli and The pressmud was collected from the sugar mill in Sethiathope, Cuddalore district. The experiments comprised of ten treatments viz., T₁ – Control, T₂ – Farmer's practice, T₃ – Lignite fly ash @ 5 t ha⁻¹ + RDF, T₄ – Lignite fly ash @ 5 t ha⁻¹ + Press mud + RDF, T₅ – Lignite fly ash @ 10 t ha⁻¹ + RDF, T₆ – Lignite fly ash @ 10 t ha⁻¹ + Press mud +

RDF, T₇ – Lignite fly ash @ 15 t ha⁻¹ + RDF, T₈ – Lignite fly ash @ 15 t ha⁻¹ + Press mud + RDF, T₉ – Lignite fly ash @ 20 t ha⁻¹ + RDF, T₁₀ – Lignite fly ash @ 20 t ha⁻¹ + Press mud + RDF. Experiments were conducted in Randomized block design with three replications. Lignite flyash and pressmud were applied as per the treatment schedule. Standard agronomic practices were adopted. Observation on plant height, yield attributes and yield were recorded at harvest.

RESULTS AND DISCUSSION

Growth and yield attributes of maize.

Application of lignite flyash @ 10t ha⁻¹ along with pressmud @ 12.5t ha⁻¹ on maize had a significant effect on plant height of the crop at harvest (Table 1). However, all the four levels of lignite flyash (5, 10, 15 and 20t ha⁻¹) recorded higher values over control (65 cm) in their effect on plant height.Among the various levels of lignite flyash, with pressmud LFA recorded the higher LAI and DMP (g/pl) at all the stages than without pressmud in maize. y The increase in plant height, LAI and DMP due to lignite flyash application as it is rich in silica which is essential for maize crop(silicicolous plants) for elongated sheaths and increased leaf area(Kumari mani muthu veeral,2011).

Incorporation of lignite flyash with pressmud and RDF had a significant effect on cob length and cob diameter. Of the various levels tried, lignite flyash @ 10t ha⁻¹ along with pressmud @ 12.5t ha⁻¹ and RDF had a pronounced effect on cob length (24cm) and highest cob diameter (6.36cm) as compared to application of lignite flyash @ 5,15 and 20 t ha⁻¹ (22,18 and 15cm) (6.20,6 and 5,80cm) with pressmud and RDF. The effects of various levels of lignite flyash alone were found to be on par with each other and were significantly superior over no lignite flyash application (control) in terms of cob length (11 cm) and cob diameter (2.80 cm) respectively. The influence of different levels of lignite flyash on the number of grains per cob and grain yield also found to be significant. The highest and the lowest number of grains per cob were recorded by 10t LFA ha⁻¹ with pressmud + RDF and control the values being 428.55 and 260.26 respectively. The effect of different levels of LFA on the test weight was found to be non significant.

Table 1: Effect of LFA, press mud and RDF on Growth and yield attributes in Maize(pooled data)

Treatment	Plant height (cm)	Leaf area index	Dry matter production/plant	Cob length (cm)	Cob diameter (cm)	Grain number/cob	Hundred grain weight (g)	Grain yield (kg ha ⁻¹)
T ₁	65	2.6	35.3	11	2.80	260.26	21.59	4129
T ₂	78	3.2	42.1	16.2	3.01	290.35	22.43	4318
T ₃	89	4.3	61.0	15.4	5.00	340.51	24.07	5100
T ₄	125	5.81	67.2	22	6.20	410.36	26.51	5618
T ₅	80	4.0	54	14.3	4.73	333.73	24.05	4808
T ₆	63	5.92	70.1	24	6.46	428.55	26.90	5884
T ₇	75	3.8	50	13.2	4.41	326.44	24.01	4615
T ₈	100	5.01	62.0	18	6.00	400.26	26.35	5470
T ₉	70	3.6	43	12.5	4.15	300.3	23.07	4404
T ₁₀	85	4.6	58.1	15	5.80	363.12	26.01	5218
SED	3.5	0.1	1.1	1.0	0.1	8.1	N. S	75.1
CD(p=0.05)	7.1	0.3	2.2	2.1	0.2	16.2	N.S	150.2

Lignite flyash has potentiality in crop production due to its efficacy in modification of soil health and crop performance. The supply of high concentration of beneficial elements (K, Na, Zn, Ca, Mg and Fe) in lignite flyash and pressmud leading to better aeration, root activity and nutrient absorption and the consequent complimentary effects would have resulted in higher yield and yield attributes in Maize (Prem kishore *et al.* 2009). Among the different treatments tried, the control recorded the lowest cob length, cob diameter, grains per cob and grain yield, the values being 11cm, 2.80cm, 260.26, 4129 kg ha⁻¹ respectively. It was due to lack of plant nutrients.

CONCLUSION

Taking into consideration, application of lignite flyash @ 10t ha⁻¹ along with pressmud @ 12.5t ha⁻¹ and RDF is recommended for maize crop, where ever industrial wastes are having the disposal problem.

REFERENCES

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