

Safe Disposal of Processed Industrial Biomass as Alternative Organic Manure in Agriculture

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Abstract : It is necessary to dispose of generated industrial wastes in the proper way to overcome the further pollution for a safe environment. Waste can be used in agriculture for good quality higher food production. In order to evaluate the effect and rate of processed industrial biomass on yield, contents, uptake and soil status in maize, a field experiment was conducted during 2009 - 2011 at Anand on loamy sand soil for two years. The treatments of different levels of NPK i.e. 100% RD, 75% RD and 50% RD were kept to study the possibility of reduction in fertilizer application with the use of processed biomass (BM) in different proportion with FYM. (Where, RD= Recommended dose, FYM= Farm Yard Manure, BM= Processed Biomass.) The significantly highest grain yield of maize was recorded under the treatment of 75% NPK + BM application @ 10t ha⁻¹. The higher (10t ha⁻¹) and lower (5t ha⁻¹) application rate of BM with full dose of NPK was found beneficial being at par with the treatment 75% NPK along with BM application @ 10t ha⁻¹. There is saving of 25% recommended dose of NPK when combined with BM application @ 10.0t ha⁻¹ or 50% saving of organics when applied with full dose (100%) of NPK. The highest straw yield (7734 kg ha⁻¹) of maize on pooled basis was observed under the treatment of recommended dose of NPK along with FYM application at 7.5t ha⁻¹ coupled with BM application at 2.5t ha⁻¹. It was also observed that highest straw yield was at par under all the treatments except control and application of 100% recommended dose of NPK coupled with BM application at 7.5t ha⁻¹. The Fe content of maize straw were found altered significantly due to different treatments on pooled basis and it was noticed that biomass application at 7.5t ha⁻¹ along with recommended dose of NPK showed significant enhancement in Fe content of straw over other treatments. Among heavy metals, Co, Pb and Cr contents of grain were found significantly altered due to application of different treatments variably during the pooled. While, Ni content of maize grain was not altered significantly due to application of different organics. However, at higher rate of BM application i.e. of 10t ha⁻¹, there was slight increase in heavy metal content of grain/ straw as well as DTPA heavy metals in soil; although the increase was not alarming Thus, the overall results indicated that the application of BM at 5t ha⁻¹ along with full dose of NPK is beneficial to get higher yield of maize without affecting soil / plant health adversely. It also indicated that the 5t BM ha⁻¹ could be utilized in place of 10t FYM ha⁻¹ where FYM availability is scarce. The 10t BM ha⁻¹ helps to reduce a load of chemical fertilizer up to 25 percent in agriculture. The lower use of agro-chemicals always favors safe environment. However, the continuous use of biomass needs periodical monitoring to check any buildup of heavy metals in soil/ plant over the years.

Keywords : alternate use of industrial waste, heavy metals, maize, processed industrial biomass

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