Short term co-application of fly ash and lime milk sludge with biosolid in field: plant growth and nutrition

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Abstract
Biosolid production has increased dramatically in recent years in Turkey. Land application of biosolid is a means of disposal. Although there is some information regarding effects of applying a mixture of biosolid and fly ash on crop production, there is almost no information regarding effects of applying a mixture of biosolid and lime milk sludge from sugar factories. A three year field experiment with wheat was established. Heavy fly ash co-application (29 t/ha in first and 31 t/ha in second year) combined with biosolid application (7.7 t/ha in first and 4.0 t/ha in second year) significantly (P<0.05) reduced the seed yield compared to the control in the second year. However, relatively less lime milk sludge (4.3 t/ha in first and 7 t/ha in second year) with the same biosolid treatments significantly (P<0.05) increased yield compared to the control. The medium fly ash (14 t/ha in the first, 16 t/ha in the second, and 0 t/ha in the third year) and high lime milk sludge (17 t/ha in the first, 29 t/ha in the second, and 0 t/ha in the third year) co-applications significantly (P<0.05) increased seed yield compared to the control. The highest percent increases in seed yield by waste applications were 39 % in the second year and 37 % in the third year. While there were some significant (P<0.05) increases in the first and second years there were no significant (P>0.05) differences in the third year by co-applications of fly ash and lime milk in percent shoot nitrogen. Shoot contents of phosphorus and potassium significantly (P<0.05) decreased by heavy co-applications of fly ash and lime milk sludge.
Consequently, this study indicated that there should be a one year gap between waste applications since the extra application each year could potentially decrease the availability of plant nutrients and/or increase salinity. The residual effects of waste application are more pronounced at higher rates.

Key words: biosolid, fly ash, lime milk sludge, plant nutrients, field study

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