SUMMARY
Cement is the most widely used building material throughout the world. In India both production and consumption of cement has increased greatly in recent years. Cement industry is an inorganic chemical industry releasing an enormous amount of cement dust into atmosphere. Thus cement dust is a particulate pollutant near the cement factories. The pollutants that are set free from their sources ultimately contaminate the soil. Soil is required by man for a number of purposes. For nation like India where majority depends on agriculture, preservation of original nature of the soil from getting polluted is very essential.

The Panyam Cements and mineral industries company ltd., manufactures the portland cement by mining the Narji Lime Stones of Panyam reserve forests. There is a scope for the establishment of more cement factories in Kurnool district considering the reserves of cement grade lime stone. The cement dust pollution has been reported to cause a shift in composition and frequency of soil and plant ecotypes. (Sree Rangaswamy et al., 1973).
Since the effect of cement dust on soil biochemical processes is not studied so far in detail the present study was undertaken to systematically investigate the changes in soil biochemical processes due to cement dust pollution which is an indication of soil fertility. Thus these studies provide an assessment of cement dust toxicity to soil which is essential for better management of polluted soil to improve crop production.

Soil collected at the base of the cement factory and at 2km distance from the factory are considered as cement dust polluted soils and soil collected at 4km distance from the cement factory is considered as control non polluted soil basing on the criteria laid by Anderson (1914); Sai et al., (1989); Shukla et al., (1990).

Increased pH to more alkaline is unfavourable for both microbial population and plant growth. As nearly 8% of the cement kiln dust is lime, the increase in the pH of polluted soil collected in the immediate vicinity of the factory may have been caused by the hydroxides of calcium and aluminium formed during hydration. (Startman and Van Hant, 1856; Pajen Kamp, 1861; Czaza, 1886). The increased electrical conductivity of the polluted soils compared to
control soil may be related to increased concentration of soluble salts of Ca, Mg, Na, K and P in the polluted soils.

A significant decrease in physical single value constants like percentage of porescape and percentage of water holding capacity are observed in the soil polluted at the base of the factory compared to control soil. Decrease in pore space in turn decreases WHC which render less soil air and soil water, which are unfavourable conditions for plant and microbial growth. The decreased pore space in polluted soils may be due to the occupation of cement dust pollutants.

A significant increase in the concentrations of exchangeable Ca, Mg, Na, K and available P is found in the polluted soils compared to the control soil. Which makes the polluted soils more saline and cause injuries to plant system. Further the increase over control is more significant in the soil collected at the base of the factory than at 2 km distance from the factory.

By the use of electrostatic precipitators and other ion settling instruments in factory may reduce the ions and particulates of cement dust by precipitation and minimize the effects of cement dust on soil.
There is a significant increase on the Al and Cr contents in the polluted soils compared to the control soil. Further the increase in the concentrations of Al and Cr over control is more pronounced at the base of the factory. Increased concentrations of Al and Cr in polluted soils may affect the soil enzyme activities and microorganisms and also uptake of nutrients by plants as they are having profound effect in N-mineralization nitrogen uptake and assimilation.

There is no significant change in the soil Ni concentrations in the polluted soils compared to control soil. Whereas Cd concentration is found to be below detectable level in polluted and control soils.

The increased organic carbon content in polluted soils can be attributed to the cement dust composition as it contains some unburnt carbon, (Sai and Mishra, 1987), and may be due to decreased decomposition of organic matter because of decreased microbial population.

The present study reveals a significant decrease in a total nitrogen content in polluted soils compared to control soil. Further, the decrease is more significant in
the soil collected at the base of the factory. Thus in order to improve nitrogen content in polluted soils nitrogen fertilizers may be added. Because of the high alkaline nature of the polluted soil which causes ammonia volatization, ammonium chloride or ammonium nitrate can be used to improve nitrogen content of soil. (Rao and Lalitha batra, 1983).

A significant increase in ammonia and decrease in nitrite and nitrite is observed in both polluted soils compared to control. The increase in ammonia in polluted soils may be due to less utilization of ammonia than that of ammonia production or/and immobilization of ammonia for nitrification by forming ammonium aluminium phosphates, as there is increased concentrations of Al and phosphates in the polluted soils.

To understand these variations in the inorganic nitrogen constituents in polluted soils ammonification, nitrification are examined and found significant decrease in these process. The decrease in ammonification may be due to decreased population of ammonifiers due to increased pH and also due to decreased protease activity found in the polluted soils.
The rate of nitirifaction is more significantly decreased in base of the factory. The decreased nitirification in the polluted soils maybe due to increased levels of Cr, Al, alkalinity.

Thus further experiments on the effect of cement dust on the nitrobacter species and Nitrosomonas species in pure cultures can reveal more detailed information.

The decreased activities of enzymes like dehydrogenase, amylase, invertase, protease and urease in polluted soils indicate decreased microbial activity due to cement dust pollution.