Summary
SUMMARY

The physico-chemical characteristics of soil amended with different levels of fly ash and brick-kiln dust were analysed before and after growing *B. juncea* and *L. usitatissimum*, separately. Eight proportions (0, 5, 15, 30, 45, 60, 75, & 100%) of both the pollutants were considered to study their impact on growth, productivity and biochemical aspects of both the oilseed crops.

The physical characteristics like water holding capacity, particle density, pore space, saturation percentage and sticky point of soil when amended with fly ash increased significantly at all the levels before sowing the crops. There was a gradual significant decrease in bulk density, moisture content and ignition percentage with an increase in fly ash level, in comparison to control; at 100% level of fly ash their values were lowest. Analysis of chemical properties of fly ash amended soil before sowing showed gradual increase in pH, EC, contents of sulphate and chloride, total carbonate and bicarbonate as the concentration of fly ash increased in soil. Cation exchange capacity, increased only up to 15% level, after than it declined, and thus highest value of CEC was at 15% level. Nitrogen and organic carbon were present in very low
amount at 100% level of fly ash. Significant reductions had occurred in amended soil as the level of fly ash increased. Potassium and phosphorus contents were increased significantly at all the levels, in comparison to control. The amount of heavy metals viz. Zn, Mg, Mn and Pb, in the soil significantly increased at all the doses of fly ash. Similar increasing or decreasing trends in the values of physico-chemical properties were also observed in brick-kiln dust amended soil as was observed in fly ash except in cation exchange capacity. The values of CEC were maximum at 45% brick-kiln dust level while in fly ash amended soil it was highest at 15% level.

After harvesting *B. juncea* and *L. usitatissimum*, from fly ash and brick-kiln dust amended soils, the trend of increasing and decreasing values of physico-chemical properties were same as before sowing but in heavy metals, the trend varied. However, the values of these properties were lower in soil after harvesting than before sowing the both oilseed crops, due to uptake by plants for their nutritional requirement. However, the amount (A) of a particular element was taken up by plant and the remaining amount (B) present in soil after harvesting the crops were almost equal to that of the amount (C) of the same element present in amended soil before sowing (A+B=C).
On observing, the impact of different levels of fly ash and brick-kiln dust on growth, yield, photosynthetic pigments, total protein and oil properties and uptake of NPK, heavy metals, the results showed that certain doses of fly ash and brick-kiln dust were beneficial for the above mentioned parameters, as compared to control. Thereafter, a harmful effect was noticed. The growth and productivity of *B. juncea* and *L. usitatissimum* grown in fly ash amended soil were increased from 5 to 60% levels. Onward to 60% there was a decrease in all the parameters. Fly ash level of 15% appeared to be best suited for both crops. Amendment of soil with different concentrations of brick-kiln dust also increased plant growth of both the crops. However, all the considered parameters were maximum at 45% level. The subsequent higher levels of dust were harmful to the plant and therefore the values of the parameters considered decreased gradually. Higher concentrations, 75 and 100% of fly ash and 100% of brick-kiln dust were totally harmful for both the crops. When both particulates were compared, it was found that fly ash was better than brick-kiln dust as only 15% level of fly ash had given good results against 45% level of brick-kiln dust.