

EFFECT OF INDIVIDUAL VERSUS INTEGRATED USE OF PHOSPHATIC FERTILIZERS ON P UPTAKE AND YIELD OF MAIZE AND WHEAT

S.M. Alam and S. Azam Shah*

ABSTRACT

Industrial by-products, filter cake (FC), poultry waste (PW) and dicalcium phosphate (DCP) were applied individually or after integration and evaluated against chemical fertilizers (SSP and DAP) as a P fertilizer source by growing maize and wheat in pots. Phosphorus was applied @ 75 mg P kg⁻¹ to maize (cv. Double Cross-Top) and also to following wheat. Maize was grown for 40 days while wheat was grown up to maturity. Application of DCP or FC produced dry matter yield (DMY) of maize equivalent to that obtained with SSP or DAP, while application of PW produced 34 and 19% higher DMY than SSP or DAP alone. Integrated use of FC and DCP in 2:1 P ratio or FC, PW and SSP in 1:1:1 P ratio produced 51 and 36% higher DMY, and improved P uptake by 39 and 27% over SSP alone. These combinations showed 57 and 40% higher P fertilizer efficiency and 83 and 58% higher agronomic efficiency over SSP alone. Assessment of residual plus applied fertilizer effect on following wheat (cv. Punjab-96) showed that except FC, all the P sources, individually or their integrated use, increased straw and grain yield as well as P uptake over control. Phosphorus applied as DAP, DCP or SSP produced equivalent grain yield but PW produced 18% higher grain yield than SSP. Integrating FC and SSP, DAP or DCP in 2:1 P ratio produced equivalent grain but significantly lower straw yield than SSP or DAP. Integrated use of FC, PW and SSP in 1:1:1 P ratio, however, produced 28% higher grain yield than SSP alone. Thus it may be concluded that as a P fertilizer source FC was inferior while DCP and PW were superior and equivalent to chemical fertilizers for the maize-wheat rotation system. However, their integrated use may minimize the cost of fertilizer, increase crop yield and improve soil productivity.