

GREENHOUSE EVALUATION OF WHEAT YIELD AND
PHOSPHORUS UPTAKE IN RELATION TO LABILE-P, OLSEN-P AND
THEIR RATIO UNDER DIFFERENT CALCAREOUS SOIL
CONDITIONS

A. Rashid¹, T. Hussain¹ and A. Razaq²

ABSTRACT

Due to complex soil phosphate (P) chemistry, further improvement in the assessment of available soil P in crop production is needed. This study was conducted to determine whether the Olsen-P (NaHCO_3 extractant) or labile-P (HCO_3 -resin) test methods in combination with labile-P/Olsen-P ratio, working roughly as soil P buffering capacity, could improve the assessment of soil available P. Regression relationship of Olsen-P, labile-P and labile-P/Olsen-P ratio with wheat (*Triticum aestivum* L.) relative yield and P uptake were investigated using 19 alkaline calcareous soils collected from upper 30 cm layer with initial P treatment at the rates of 0, 30, 60 and 90 mg P kg⁻¹ soil before cropping in a greenhouse experiment. For relative yield, Olsen-P alone was observed the best test to use ($R^2 = 0.932$) and it was not affected by including labile-P/Olsen-P ratio ($R^2 = 0.935$). The critical levels of 13 and 23 mg P kg⁻¹ soil for the Olsen-P and labile-P respectively resulted in relative yield of about 75 percent. For P-uptake, both Olsen-P ($R^2 = 0.729$) and labile-P ($R^2 = 0.751$) methods showed almost similar relationships and inclusion of labile-P/Olsen-P ratio did not improve the R^2 values (with Olsen-P, $R^2 = 0.771$; with labile-P, $R^2 = 0.785$) for P uptake significantly for practical purposes. However, further work in this direction including soil characteristics (and P buffering capacity) is needed.