



Soil nitrogen, potassium forms and yield of potato as affected by N and K levels

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ABSTRACT

A field experiment was conducted on a sandy loam soil during *Rabi* season of 2009-10 with a view to study the effect of levels of nitrogen (0, 60, 120 and 180 kg N ha⁻¹) and potassium (0, 60, 120 and 180 kg K₂O ha⁻¹) on soil nitrogen, potassium forms and yield of potato. The tuber yield and uptake by potato was significantly increased with nitrogen, potassium and their interactions. The highest tuber yield (223.9 kg ha⁻¹) was recorded by combined application of nitrogen 180 kg ha⁻¹ + potassium 180 kg ha⁻¹ (N₃K₃) which was at par with nitrogen 180 kg ha⁻¹ + potassium 120 kg ha⁻¹ (N₃K₂). The total uptake of N and K by potato at harvest was highest with N₃K₃ combination and the per cent increase being 139.4 and 142.8, respectively over N₀K₀. The contents of different forms of nitrogen (Ammoniacal and nitrate nitrogen) and potassium (Water soluble K, exchangeable K, 1N HNO₃ K and non exchangeable K) was significantly influenced by levels of nitrogen, potassium and their interactions. Correlation studies revealed that the different forms of nitrogen and potassium contributed to increase in tuber yield, total N and K uptake by potato.

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Key words : Forms of N and K, Yield, uptake, Potato

INTRODUCTION

Potato produces more dry matter per unit area per unit time compared to cereals. This high rate of dry matter production results in large amount of nutrient removal per unit time and most of the soils are unable to meet the demand. Hence, nutrient application from external sources as fertilizers becomes essential. Potato production depends on many factors, among them judicious application of N and K plays a vital role.

Nitrogen is the first limiting nutrient in potato production that greatly influences crop growth and tuber yield. A mature crop of potato yielding 25 to 30 tonnes ha⁻¹ removes 120 to 140 kg N ha⁻¹ (Patel and Patel, 2001). The Indian soils are generally deficient in organic matter thus unable to release N at the rate required to maintain adequate N supply to the growing plant. Nitrogen is an essential constituent of various metabolically active compounds of cell like amino acids, proteins, nucleic acids, enzymes and plays an important role in plant metabolism.

Therefore, application of nitrogen in the form of fertilizers becomes indispensable to meet N needs of the crop.

Potato crop is a heavy feeder of soil potassium and the tuber removes 1 to 5 times the amount of nitrogen and 4 to 5 times the amount of phosphate. Potato also acts as an indicator crop for K availability because of its high K requirement (Fageria *et al.*, 1997). Potassium plays a vital role in enzyme activation, water regulations, translocation of assimilates, photosynthesis, protein and starch synthesis. Potassium is also known as 'Quality element' because of its influence on size, shape, color, taste and shelf life.

Keeping in view the significance of N and K on productivity of potato, an experiment was conducted to study the effect of nitrogen and potassium on forms of N and K and yield of potato grown on an Alfisol.

MATERIALS AND METHODS

A field experiment was conducted on a sandy loam

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