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**Title:** Studies of elemental analysis and natural radioactivity of some commonly-used fertilizers in Saudi Arabia

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**Abstract:** A selected number of commonly used local fertilizer samples were studied for elemental analysis using slow neutron activation analysis and natural gamma ray spectroscopy. A slow neutron flux of about  $2.5 \times 10^6$  n/cm<sup>2</sup>-s was available, which was obtained by slowing down 2.5 MeV neutrons from the D(d,n)He-3 reaction at the KFUPM 350 keV Ion Accelerator. The induced activities were measured by a HP-GMX detector and a PC-based data acquisition and analysis system. Calibration curves were established for the elements present in the fertilizer samples by activating certified standards of similar matrix from NIST and IAEA. From the calibration curves, the absolute concentrations of the elements K, Mn, V, Al, Na, and Cl were determined. The K concentration varied from 0 to 16.5 wt.%. The Mn concentration was between 27-57 ppm; V concentration between 93-320 ppm; Al concentration between 1481-2547 ppm, Na concentration between 797-3507 ppm, and the Cl concentration between 0-1700 ppm. The amounts of natural gamma rays from K-40, U-238, and Th-232 were determined by measuring their natural radioactivities using a 5"x5" NaI(Tl) detector. The results of K from both methods were found to be similar. Radium equivalent natural radioactivities of the fertilizer samples were calculated to be in the range from 26 to 420 Bq/kg.