Result of the statistical analysis also showed that at 0 hr incubation species and season significantly affected ($p<0.05$) disappearance of P, Mg and S from during both seasons. In rainy season, disappearance of P from grass ranged from 40.4 (*A. compressus*) to 70.4 % (*P. purpuphoides*), while in dry season disappearance of P varied from 22.5 (*P. purpuphoides*) to 57.5 % (*P. purpuphoides*. Among the legumes harvested in rainy season, *C. pubescens* had the lowest P disappearance (11.4 %), while *C. mucunoides* had the highest (65.7 %). Disappearance of P in dry season varied from 10.4 (*C. pubescens*) to 44.7 % of (*L. leucocephala*). Data on Mg disappearance of grass during rainy season showed that the lowest value was observed for *A. compressus* (4.4 %) while the highest was occurred in *P. maximum* (60.5 %). Similarly, in dry season the lowest disappearance of Mg was occurred in *A. compressus* (6.5 %) and the highest was noted in *P. maximum* (50.5 %). Among the legumes, *L. leucocephala* had the highest Mg disappearance (60.2 % in rainy and 52.7 % in dry season) while the lowest was found in *C. pubescens* (21.7 % in rainy and 20.9 % in dry season). Among grass species, the highest water solubility (disappearance at 0 hr incubation) of S was occurred in *P. purpuphoides* (40.5 % in rainy and 41.5 % in dry season) and the lowest was noted in *A. compressus* (20.2 % in rainy and 19.2 % in dry season). While in legumes, the lowest solubility of S was occurred in *A. mangium* (14.4 % in rainy and 14.2 % in dry season) and the highest was found in *C. pubescens* (68.7 % in rainy and 70.8 % in dry season). Previous study showed that Bermuda grass which belongs to same genus as carpet grass (*A. compressus*) had 52.9 % solubility in water (Emanuele and Staples, 1990). However other grass, such as *P. purpureum* had very low Ca solubility in water (below 5 %). The lower solubility of Ca in dry season could be due to the least effect of leaching on this element as reported by Collins (1985). Calcium is also not readily solubilized by water in most tropical and even temperate forages. This element is bound as calcium oxalate in legumes and either trapped or attached in the cell wall of grass and legumes (McManus, 1977 and Ward and Harbers, 1982. The water solubility of P in the present study varied from 10.4 to 70.4 %, this finding was relatively lower compared to the results of Bromfield and Jones, 1972 who reported that 60 – 83 % of total P in ground plant material is water-soluble fraction. The variation of water soluble fraction of P was also reported by several researchers; 65.5 % on subtropical forages on temperate forages (Emanuele and Staples, 1990; .Ibrahim et al, 1990; Ledoux and Martz, 1991; and Whitehead et al, 1985). The lower water solubility of P in this study might be caused by the forage used in this study had more P attached, trapped or crystallized in the cell walls. The trend in the rate of mineral water solubilities of grass and legumes harvested at rainy and dry seasons was: P > Mg > S > Ca. The same order was