

spectrometer (SPS7700, Seiko Instruments Inc., Chiba, Japan) after digesting with nitric acid. Selenium (Se) was analyzed through the fluorometric detection of the 2, 3 Diamino-naphthalene (DAN) according to the procedure of Watkinson (1966). The spectrofluoro photometer used was RF-1500 (Shimadzu Co).

#### Statistical analysis

Data on micro mineral concentration of forages and their distribution in fiber fraction (NDF and ADF) were analyzed using General Linear Model procedure using StatView® (SAS, 1999).

#### Results and discussion

##### Micro mineral concentration of forages

There was significant difference ( $P < 0.05$ ) in micro mineral concentration of grass and legume forages within species and seasons (Table 1). In rainy season, Zn concentration of grass varied from 33.7 (*P. maximum*) to 44.4 mg kg<sup>-1</sup> (*A. compressus*); Fe from 148 (*P. purpuphoides*) to 498.1 mg kg<sup>-1</sup> (*A. compressus*); Mn from 136.8 (*P. maximum*) to 572 mg kg<sup>-1</sup> (*P. purpuphoides*); Cu from 5.6 (*P. maximum*) to 10.1 mg kg<sup>-1</sup> DM (*P. purpuphoides*) and Se concentration from 0.10 (*P. purpuphoides*) to 0.20 mg kg<sup>-1</sup> (*P. maximum*), respectively. The concentration of these elements slightly decreased in dry season, in which Zn concentration varied from 29.9 (*P. maximum*) to 34.2 mg kg<sup>-1</sup> (*A. compressus*); Fe from 131.5 (*P. purpuphoides*) to 511.4 mg kg<sup>-1</sup> (*A. compressus*); Mn from 69.0 (*P. purpuphoides*) to 208.7 mg kg<sup>-1</sup> (*A. compressus*); Cu from 8.5 (*P. purpuphoides*) to 9.7 mg kg<sup>-1</sup> DM (*A. compressus*) and Se concentration from 0.09 (*A. compressus*) to 0.12 mg kg<sup>-1</sup> (*P. purpuphoides*),

respectively. Similar with grass, data on legume showed that concentration of micro mineral in rainy season was relatively higher than in dry season. The highest concentration of Zn, Cu and Se were found in *C. pubescens* during rainy season (40.2, 16.6 and 0.405 mg kg<sup>-1</sup>), while the highest concentrations of Fe and Mn were found in *C. mucunoides* (589.6 mg Fe kg<sup>-1</sup> in dry season and 49.2 mg Mn kg<sup>-1</sup> in rainy season). The lowest concentrations of Zn and Cu were observed in *A. mangium* during dry season (25.0 and 3.8 mg kg<sup>-1</sup>), Fe and Mn in *L. leucocephala* (138.8 and 22.2 mg/kg) and the lowest Se concentration was noted in *C. mucunoides* (0.071 mg kg<sup>-1</sup>) during dry season. The results also show that 75 % of the observed legumes were deficient in Zn and Mn, and 62.5 % deficient in Cu and 50 % deficient in Se. Concentrations of the micro elements both in grass and legumes in the present study were within the ranges for the tropical forages as reported by several researchers (Evitayani *et al.*, 2004, Fujihara *et al.*, 1992, Prabowo *et al.*, 1991, and Serra *et al.*, 1994).

The mean of Zn concentration of grass (34.7 mg kg<sup>-1</sup> DM) and legume forages (31.1 mg kg<sup>-1</sup> DM) were almost similar with study of Minson (1990) which obtained value of 36 mg Zn kg<sup>-1</sup> DM in pasture. The mean Fe and Cu concentrations were significantly higher ( $P < 0.01$ ) in legumes (287.1; 10.4 mg kg<sup>-1</sup> DM) than in grass (278.9; 9.0 mg kg<sup>-1</sup> DM). This finding was in agreement with the study of Minson (1990) and Miller (1984) who reported that concentration of some micro minerals are normally higher in legume than in grass. In across, Mn concentration had significantly higher ( $P < 0.001$ ) in grass (241.2 mg kg<sup>-1</sup> DM) compared to legumes (33.7 mg kg<sup>-1</sup> DM). These findings were in agreement with previous study reported by Fleming