The study on charge fingerprint characteristics of red Oxisols was carried out on four soils namely Pak Chong series and Chok Chai series (Kandiustox), Ao Luk series and Tha Mai series (Kandiudox). These are well developed soils of different parent materials and environments. The method employed the analysis on 1) basic cation exchange capacity (CEC_B) determined by the amount of adsorbed calcium ion (Ca^{2+}), 2) total cation exchange capacity (CEC_T) determined by the amount of adsorbed calcium ion and aluminum ion (Al^{3+}) and 3) the anion exchange capacity (AEC) determined by the amount of adsorbed chloride ion (Cl^-) at pHs 3, 4, 5, 6, 7 and at natural pH of the soils using compulsive exchange method. Samples of surface soil (Ap, A) and subsoil (Bto) were used.

Results of the study revealed that all soils have the lowest and highest cation exchange capacity values at pHs 3 and 7 respectively. Whereas anion exchange capacity values are highest at pH 3 and lowest at pH 7. The charge fingerprints of most surface and subsurface soils indicate the decrease of cation exchange capacity values with depth which may be due to the decrease of organic matter content. The anion exchange capacity value increases with depth can be attributed to the increase of iron and aluminum oxides. The difference between total cation exchange capacity and basic cation exchange capacity in soils at pH values lower than 4 indicates the increasing trend of extracted aluminum at lower pH.

The charge fingerprints of these soils are related closely to clay content, organic matter and amount of iron oxide minerals. The soil pH acts as the control of the soil surface charges produced. At pH lower than 4 the pH dependent charges, particularly the positive ones, become dominant. This increases the anion exchange capacity of the soil at low pH. At the pH range of higher than 4 the soils are dominated by permanent charges that increase their negative charges, therefore the soils can adsorb more cations than anions. In natural condition, these soils favor cation exchange over anion exchange but the amount of adsorbed ions varies among them. Therefore, it is possible to apply the knowledge on charge fingerprints of these soils in basic soil fertilizer management. Addition of organic matter to increase their cation exchange capacity and determination on suitable kind and amount of fertilizer for the soils can be well based on characteristics of their charge fingerprints.

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