Assimilation of Phosphate Fertilizer derived from Eppawala Rock Phosphate on the Vegetative Growth of Corn *(Zea mays* L.)

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Phosphorus is one of the most important macronutrient in plant nutrition and wellbeing. Repeated cultivation has caused drastic depletion of nutrients in agricultural lands necessitating routine addition of costly commercial fertilizers to crops. Rock phosphate deposit at Eppawala Sri Lankan, provides a rich source of phosphorus from which phosphate grade fertilizer could be produced by the acidulation with con. HC1. However, pH of the fertilizer is needed to be adjusted to plant tolerable levels to reduce acid toxicity. This research used CaO to adjust pH of rock phosphate derived fertilizer enabling rapid assimilation by plants. Approximately 100 g of the acidified product was added with a predetermined quantity of 3. 7 g of lime to adjust the final pH value to 6.02. XRF analysis was performed to identify the elements of the final fertilizer mixture before and after CaO addition. A pot experiment was performed to determine the assimilation of newly developed fertilizer by corn plants. The experiment was arranged in a complete randomized block design with five treatments and 180 experimental units. Treatments were: **Ti-** Pants without any amendments, T2-Plants with commercial fertilizers excluding phosphates, T3-Plants with commercial fertilizers including phosphate, T4-Plants with commercial fertilizers+developed fertilizer without pH adjustment, T5-Plants with commercial fertilizers+developed fertilizer with pH adjustment. Plant height, root surface area, biomass at flowering and leaf chlorophyll content were measured to determine the plant performance after fertilization. X-ray fluorescence (XRF) analysis revealed that developed fertilizer contained 11.4% P_2O_5, 16.5% MgO, 14.9% K_20 and 24.3% CaO as major constituents while providing plant with some important micronutrients such as, Mn, Fe, and Zn. Addition of lime was not only resulted in increasing the of pH to plant tolerable levels but also eliminated Cl and some heavy metal contaminants like As and Rh. Growth performance of T5 plants indicated that phosphate from developed fertilizer had readily assimilated by Corn plants. However, the commercial triple superphosphate used to supplement T3 plants showed significantly higher ($p=0.00$) performance over T5 plants. T4 plants supplemented with fertilizer without pH adjustment died prematurely while T5 plants showed normal growth suggesting pH adjustment with CaO was effective.

Key words: Rock phosphate, Phosphat fertilizer, pH adjustment, Plant assimilation