

Use of coconut water for increasing available phosphorus of Eppawala Apatite

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Abstract

Eppawala apatite has low available phosphorus which acts as a barrier to use it as an efficient phosphorus fertilizer. Acidulation is a process which commonly uses to increase available phosphorus in apatite. Biological acidulation is a more environmentally and economically friendly process than chemical acidulation. Coconut water (CW) is a household waste in Sri Lanka with pH < 5.5. CW contains acids such as citric, acetic acids. The objective of this study was to increase the available phosphorus in apatite using CW due to its acidic nature. CW was subjected to ferment under controlled air by covering the CW contained container for three days with monitoring pH. Then apatite + soil mixture was treated in three different ways as Fresh CW, One-day fermented CW, two-days fermented CW using two different types of CW volumes; (a) first, with a minimum CW [Sample (g): CW (mL) = 6:1] to wet the sample (promoting aerobic fermentation) and (b) second with an excess CW [Sample (g): CW (mL) = 3:1] to cover the sample (suppressing aerobic fermentation). Apatite + Soil mixture was used as a controlled sample. Randomized complete block design (RCBD) was used with 3 replicates as an experimental design. Two percent citric acid-soluble phosphate content was measured using the vandomolybdate method with 2-day intervals for 10 days. Data were analyzed by using two-way ANOVA with a 95 % confidence interval. The results revealed that it is having a significant difference ($p < 0.05$) of available phosphorus between the controlled and all other CW treated samples which type (a). The highest available phosphorus content (1.52 %) was reported in fresh CW treated samples (controlled showed 0.95-1.1 % of available phosphorus) and it was decreased with time. Results concluded that CW can be used to increase the available phosphorus content with a considerable level in apatite.

Keywords: Available phosphorus, Coconut water, Eppawala apatite

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