

ASSESSMENT OF NUTRIENT LOADING ON ATTAPULGITE BLENDS AND THEIR POTENTIAL RELEASE FROM THE SOIL: A PRELIMINARY STUDY

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Abstract

Attapulgit (APA) had been used by industry for more than 40 years before it was recognized as a distinct clay mineral. Its chemical composition and some of its properties were sufficiently similar to montmorillonite to cause this confusion (Grim, 1953). With the realization that APA was indeed a unique mineral, considerable efforts have been expended over the years by industry to take advantage of its characteristic properties in industrial applications but not from an agricultural point of view. The main objective of this study was to develop the most suitable APA blend with the application of different fertilisers for broad acre agriculture usage.

Nine blends were developed after mixing of different fertilisers (on the basis of % nutrient) with 100 gm of APA ((T0 (APA, Control), T1 (CAN + K₂SO₄), T2 (Calcium ammonium nitrate (CAN) + K₂SO₄ + Trace elements), T3 ((Double super phosphate (DSP)), T4 (DSP + Trace), T5 (Di-ammonium phosphate(DAP)), T6 (DAP + Trace), T7 (CAN + K₂SO₄ + DSP + DAP + Urea), T8 (CAN + K₂SO₄ + DSP + DAP + Urea + Trace)) with 3 replicates. The blended material was dried at 40° C in a fan forced oven and samples were prepared to a C-fraction (i.e. <150 µm size) for blending. The blends were analysed for chemical properties such as pH (H₂O), electrical conductivity (EC), total nitrogen (TN), total phosphorus (TP), water soluble phosphorus (WSP) and trace elements.

The results show that all the blends are moderate to mildly alkaline except T4 (pH 5.86) which is slightly acidic in character. The percent TN content was significantly higher for T6 blend (0.84 %) compared to other blends, which is due to higher N percent in DAP (18 %) compared to no N in T3 and T4 (DSP). Similarly TP was also found to be higher in T5 and T6 blend compared to other blends which is due to the higher percent P content in DAP (46 %) compared to DSP (17 %). Water soluble P content was not significantly differing between T3 and T4 whereas significant a difference was observed between T5 and T6.

Higher nutrient load on T4 and T6 blends and their neutral to acidic nature suggest that these blends could be more useful from an agriculture point of view. The above findings indicate the usefulness of application of attapulgit blends in improving soil structure and nutrient supply potential particularly available P of sandy soils, when compared to sand and attapulgit application. Short time interval did not affect the availability of nutrient from the soil but there is still a need to assess nutrient availability from the blends on the basis of longer time interval.

Keyword: Attapulgit, Nutrient loading, nutrient retention.