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# PREDICTING SLAKING SENSITIVITY OF HUMID TROPIC SOILS UNDER INTENSE RAINFALL USING SOIL PROPERTIES AND CLAY ACTIVITY

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**Statement:** Aggregate breakdown by slaking is one of the first steps in the soil loss and degradation processes in the humid tropics characterized by annual wet and dry periods. The soil susceptibility to slaking under high intensity tropical rainfall is theorized to be controlled by soil properties such as clay content (Cl), organic matter content (OM), exchangeable sodium percentage (ESP) and cation exchange capacity (CEC). However, mineralogy and Atterberg's limits can strongly influence the impact of the aforementioned soil properties on aggregate slaking. It is therefore hypothesized that soil aggregates with a combination of Cl>45%, OM>5%, CEC>25%, ESP<2% and clay activity (ACT) <0.75 would be the most resistant to slaking and have the greatest water stability under rapid wetting.

**Methodology & Theoretical Orientation:** The water stable aggregates by rapid wetting (WSAr) via wet sieving, soil analyses, Atterberg's limits and the slaking sensitivity (SS) of 20 agriculturally and ecologically important soils in Trinidad were completed. The soil property influence and the influence of the level of the property on slaking sensitivity were ranked. The total slaking sensitivity of a soil was obtained by summing the product of the property rank and the level rank.

**Findings:** Regression analysis indicates an overall weak but positive relationship ($r^2$=0.22) between Cl and WSAr. A strong relationship between plasticity index (PI) and Cl ($r_2$=0.77), indicates that ACT is a good predictor of clay mineralogy behaviour as the PI and LL are linearly correlated at 92%.

**Conclusion & Significance:** Mineralogy and ACT are more robust predictors of SS and WSAr and therefore the major controls of aggregate slaking in tropical soils that are subjected to intense rainfall after periods of dry spell

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