UNIVERSITI TEKNOLOGI MARA

PEAT SOILS HUMIFICATION DEGREE ANALYZED BY FESEM EQUIPPED WITH ENERGY DISPERSIVE XRAY TECHNIQUE AS SUPPLEMENTAL FOR VON POST SCALE METHOD

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ABSTRACT

The humification process in peat soils involves the degradation of physical structure in organic matter and changes in chemical characteristics under aerobic and anaerobic conditions. To classify humification degree, the von Post Scale method is widely used by industries, researchers and students. However, this method often produces different results and interpretation due to different skills exhibit by individuals. This study hypothesized that there is a significant difference between physicochemical properties of peat soils in relation with different peat humification degree. The objectives of this study are to analyze the physicochemical properties of peat soils; to compare the humification degree between von Post Scale and FESEM-EDX technique, and to propose the basic humification classification technique for the Tasik Series. The peat samples with various degrees of decomposition were differentiate in the field using the von Post Scale method. Physical analyses were performed using the Munsell soil colour chart, core rings, oven-dried method, and syringe method to determine the soil colour, bulk density, moisture content, and fibre content, respectively. Soil chemical properties analyses conducted includes the soil pH in KCl and water, soil C/N ratio, soil exchangeable cations (Ca, Mg, and Na) and soil cation exchange capacity (CEC). The microstructural analysis was determined using FESEM, and the elemental analysis was derived using EDX. The results for physical analysis showed that the higher the peat humification degree, the peat soils become darker with increment in soil bulk density, lower soil water content as well as organic matter contents. On the other hand, the results of soil chemical analysis were inconsistent among samples. The data indicates that as peat soils' decomposition increases, the soil pH, nutrient availability, soil cation exchange capacity and soil exchangeable cations also increase whereas the soil C/N ratio showed a decreasing pattern. Owing to the FESEM analysis solely observed based on a minute scale, the characterization of basic humification degree was not able to be introduced due to the inconsistent and fluctuating results in microscopic, chemical, and elemental analysis. As such, bigger sample sizes are needed in the future to obtain better results.

Keywords: peat, humification degree, decomposition, microstructure, von Post Scale

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TABLE OF CONTENTS