SYNTHESIS AND CHARACTERIZATION OF 2,4-DICHLOROPHENOXYACETIC ACID INTERLEAVED WITH CALCIUM-ALUMINIUM LAYERED DOUBLE HYDROXIDE BY COMPARISON OF CO-PRECIPITATION AND ION-EXCHANGE METHOD

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This Final Year Project Reported entitled **"Synthesis and Characterization of 2,4-Dichlorophenoxyacetic Acid Interleaved with Calcium-Aluminium Layered Double Hydroxide by Comparison of Co-Precipitation and Ion-Exchange Method"** was submitted by Fatin Haizira binti Mohd Hayazi, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Science, and was approved by

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ABSTRACT

SYNTHESIS AND CHARACTERIZATION OF 2,4-DICHLOROPHENOXYACETIC ACID INTERLEAVED WITH CALCIUM ALUMINIUM LAYERED DOUBLE HYDROXIDE

By using co-precipitation method, the herbicide named 2,4-dichlorophenoxyacetic acid or known as 2,4-D was successfully interleaved with Ca-Al layered double hydroxide forming nanocomposite of 2,4-D-Ca-Al-LDH. There were two methodologies used which were co-precipitation method and ion-exchange method. Co-precipitation method has shown a successfully interleaved of the anion with the host compared to the ion-exchange method. The interleaved of 2,4-D with Ca-Al LDH happened at 0.05 M and can be confirmed by Power X-Ray Diffraction (PXRD) and Attenuated Total Resonance Fourier Transform Infrared (ATR FTIR). From the PXRD results, the successful intercalation happened when the basal spacing increased from 8.67 Å to 17.59 Å and a new sharp and intense peak was formed due to the insertion of guest anion which was 2,4-D into the interlayer region of Ca-Al LDH. Results from PXRD was supported by FTIR spectrum, where the nitrate peak that was at 1350.01 cm^{-1} was disappeared that proved the intercalation was successfully achieved. The peak at 1643.17 cm^{-1} to 1625.73 cm^{-1} indicated the presence of C=O stretching and a new peak value due to the asymmetric stretching vibration of COO^- after interleaving process of 2,4-D into the inter gallery of Ca-Al LDH. From this research, the 2,4-D herbicide has been successfully interleaved into the interlayer region Ca-Al LDH using co-precipitation method at 0.05 M which is the optimum concentration for the successful intercalation of 2,4-dichlorophenoxyacetic acid into Ca-Al LDH.