

## ABSTRACT

*This research, a study of use natural material extracts as chelating and reducing agents for manganese formate (MnF), Mn(COOH)<sub>2</sub>. The method used in this research is the hydrothermal synthesis method. Powdered manganese formate format (MnF), Mn(COOH)<sub>2</sub> was used as a source of manganese. The natural materials used for the fabrication of supercapacitor electrodes are: (1) orange peel (Citrus aurantifolia), (2) banana peel (Musa paradisiaca), and (3) mangosteen peel (Garcinia mangostana). The selection of this natural material is based on plant waste which has chelating and reducing abilities, materials are easy to find and environmentally friendly. The natural ingredients used have high chelating and reducing abilities where these materials were chosen because they have high antioxidants and contain OH as the main ingredient for reducing manganese. Cyclic voltammetry was used to measure the specific capacitance value of the synthesized thin layer of the working electrode. After getting the maximum specific capacity, characterization was carried out using SEM, XRD and FTIR. The thin layer of the electrode is tested the electrochemistry performance using cyclic voltammetry and obtain the maximum of specific capacitance in the mixture manganese formate (MnF), Mn(COOH)<sub>2</sub> with garciniapeel extract at ratio 1:2 mass 0.2 mg, at 41.6 F/g. Morphological characterization using SEM at magnification 5000 – 10000 times obtained the size of each particle is about 70-219 μm. On crystallinity characterization using XRD the activated carbon of extract peel Garcinia mangostana at an angle range of 2θ=5° to 90°. Then for thin layer testing with FTIR, the highest peak was found at 1600.92 cm<sup>-1</sup> referring to C=C with aromatic rings type.*

**Keywords:** *supercapacitor, manganese, chelating, reducing agent, specific capacitance, hydrothermal.*