

*BIOLITE: Compostable Bioplastic from Raja Banana Peel Waste (Musa paradisiaca L.) and Microcrystalline Cellulose from Bagasse (Saccharum officinarum L.) with Addition of Granular Organic Fertilizer as Nutrition Enhancer in Plants*

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## **ABSTRACT**

Plastic is a material needed in everyday life because it is lightweight, transparent, strong, waterproof, and very affordable. It takes 1,000 years for plastic to decompose completely. On the other hand, plastic has a huge impact on the environment, from water and air pollution to soil organisms. Therefore, it is important to find a way to overcome this problem. Bioplastic technology that combines starch from raja banana waste, Microcrystalline Cellulose (MCC) from bagasse, and granular organic fertilizer is an innovation developed to deal with conventional plastic problems because it is easily degraded scientifically. The purpose of this study was to examine the effect of variation in the concentration of raja banana peel waste starch and bagasse MCC on the physical characteristics of bioplastics. Testing the effectiveness of bioplastics with the addition of granular organic fertilizer, as well as obtaining the best formulation of characteristics and effectiveness This research includes the manufacture of MCC from bagasse, extraction of raja banana peel starch, manufacture and testing of BIOLITE. The test results show that the P2M1 bioplastic sample has met the bioplastic standards in the parameters of tensile strength (1.83 mPa), elongation (24.17%), moisture content (73.28%), biodegradability (100% in 10 days), absorbency (34.45%), thickness (0.23 mm). These results indicate that BIOLITE has strong properties, can degrade easily, and is effective for use as a nutritional enhancer for plants.

**Keywords:** BIOLITE, microcrystalline cellulose (MCC), starch, and granulated organic fertilizer.

## **ABSTRAK**

Plastik merupakan material yang dibutuhkan dalam kehidupan sehari-hari karena ringan, transparan, kuat, tahan air, dan sangat terjangkau. Dibutuhkan 1.000 tahun agar plastik dapat terurai sempurna. Di sisi lain, plastik berdampak besar terhadap lingkungan, mulai dari pencemaran air, udara, hingga organisme tanah. Oleh karena itu, penting ditemukan cara untuk mengatasi permasalahan ini. Teknologi bioplastik yang menggabungkan pati asal limbah pisang raja, microcrystalline cellulose (MCC) asal ampas tebu, dan pupuk organik granul (POG) merupakan inovasi yang dikembangkan untuk menangani masalah plastik konvensional karena mudah terdegradasi secara ilmiah. Tujuan penelitian ini adalah mengkaji pengaruh variasi konsentrasi pati limbah kulit pisang raja dan MCC ampas tebu terhadap karakteristik fisik bioplastik. Menguji efektivitas bioplastik dengan penambahan POG, serta mendapatkan formulasi karakteristik dan efektivitas terbaik Penelitian ini mencakup pembuatan MCC dari ampas tebu, ekstraksi pati kulit pisang raja, pembuatan dan pengujian BIOLITE. Hasil pengujian menunjukkan sampel bioplastik P2M1 telah memenuhi standar bioplastik pada parameter kuat tarik (1,83 mPa), elongasi (24,17%), kadar air (73,28%), kemampuan biodegradasi (100% dalam 10 hari), daya serap (34,45%), ketebalan (0,23 mm). Hasil tersebut menunjukkan bahwa BIOLITE memiliki sifat kuat, mampu terdegradasi dengan mudah, serta efektif untuk dijadikan sebagai penambah nutrisi pada tanaman

**Kata Kunci:** BIOLITE, microcrystalline cellulose (MCC), pati, dan pupuk organik granul (POG).