

RINGKASAN

Indonesia masuk kategori sepuluh negara penyumbang sampah terbesar di dunia dan 19,75% tersebut merupakan sampah plastik pada posisi nomor urut kedua. Permasalahan sampah plastik ini menjadi permasalahan yang belum terselesaikan selama bertahun-tahun. Plastik biodegradabel merupakan kemasan yang tersusun atas biopolimer yang ramah lingkungan dan mudah diuraikan oleh aktivitas mikroorganisme. Sodium alginat merupakan biopolimer yang umum digunakan dan dikembangkan dalam dunia pengemasan. Penggunaan sodium alginat dalam penelitian ini karena memiliki sifat yang aman, transparan dan mudah terurai. Secara umum bioplastik memiliki sifat yang mudah sobek dan tidak sekuat plastik konvensional. Oleh karena itu, pada penelitian ini dilakukan penambahan bahan pengisi terhadap bioplastik berbasis alginat. Penambahan bahan pengisi tersebut bertujuan untuk meningkatkan kemampuan mekanik bioplastik alginat. Jenis bahan pengisi yang digunakan adalah bentonit, PVA, dan silika yang di ekstrak dari sekam padi.

Penelitian ini dilaksanakan di Laboratorium Teknologi Pertanian, Universitas Jenderal Soedirman, Purwokerto. Penelitian berlangsung selama 6 bulan dimulai bulan Desember 2024 hingga Mei 2025. Rancangan penelitian yang digunakan pada penelitian ini adalah Rancangan Acak Lengkap (RAL) non faktorial. Jumlah perlakuan yang digunakan pada penelitian ini sebanyak 7, yaitu K = kontrol; K1 = silika 2%; K2 = bentonit 2%; K3 = PVA 2%; K4 = silika 1% + bentonit 1%; K5 = bentonit 1% + PVA 1%; K6 = PVA 1% + silika 1%. Variabel bebas pada penelitian adalah penambahan bahan pengisi seperti bentonit, PVA, dan silika serta kombinasi kedua bahan pengisi. Selain itu, variabel terikat yang diteliti berupa kadar air, kuat tarik, persen pemanjangan, warna (L , a^* , b^* , dan ΔE), dan transmisi uap air (WVTR).

Hasil penelitian menunjukkan bahwa penambahan bahan pengisi PVA meningkatkan kemampuan kuat tarik sebesar 1,30 Mpa. Penambahan bahan pengisi jenis bentonit juga memberikan pengaruh terutama dalam kenampakan visual atau warna. Di mana penambahan bentonit pada bioplastik alginat memiliki nilai L yang rendah sebesar 84,97 menunjukkan warna yang tidak transparan atau buram/pudar. Selain itu, penambahan bentonit juga menunjukkan warna bioplastik mengarah kuning dengan nilai b^* sebesar 0,74.

SUMMARY

Indonesia is categorized as the ten largest waste contributing countries in the world and 19.75% of this is plastic waste in the second position. This plastic waste problem has been an unresolved issue for years. Biodegradable plastic is a packaging composed of biopolymers that are environmentally friendly and easily decomposed by microbial activity. Sodium alginate is a biopolymer that is commonly used and developed in the world of packaging. The use of sodium alginate in this study is because it has safe, transparent and degradable properties. In general, bioplastic have properties that are easily torn and not as strong as conventional plastics. Therefore, in this study, the addition of filler to alginate-based bioplastic was carried out. The addition of fillers aims to improve the mechanical ability of alginate bioplastic. The types of fillers used are bentonite, PVA, and silica extracted from rice husks.

This research was conducted at the Agricultural Technology Laboratory, Jenderal Soedirman University, Purwokerto. The research lasted for 5 months starting from December 2024 to May 2025. The research design used in this study was a non-factorial Completely Randomized Design (RAL). The number of treatments used in this study were 7, namely K = control; K1 = silica 2%; K2 = bentonite 2%; K3 = PVA 2%; K4 = silica 1% + bentonite 1%; K5 = bentonite 1% + PVA 1%; K6 = PVA 1% + silica 1%. The independent variables in the study were the addition of filler such as bentonite, PVA, and silica as well as a combination of both filler. In addition, the dependent variables studied were moisture content, tensile strength, elongation at break, color (L, a, b*, and ΔE), and water vapor transmission rate (WVTR).*

The results showed that the addition of PVA filler increased the tensile strength by 1.30 Mpa. The addition of bentonite type filler also has an influence, especially in visual appearance or color. Where the addition of bentonite to alginate bioplastic has a low L value of 84.97 indicating a color that is not transparent or opaque / faded. In addition, the addition of bentonite also shows the color of bioplastic leads to yellow with a b value of 0.74.*