ABSTRAK

PEMANFAATAN SEKAM PADI DENGAN PENAMBAHAN PATI SINGKONG DALAM PEMBUATAN *BIOFOAM* MENGGUNAKAN METODE THERMOPRESSING SEBAGAI ALTERNATIF KEMASAN RAMAH LINGKUNGAN

(Reynaldi Agustino Putra, 2026, 61 Halaman, 13 Tabel, 12 Gambar, 3 Lampiran

Penggunaan kemasan *styrofoam* berbahan polimer sintetik non-biodegradabel yang meluas memicu masalah pencemaran lingkungan yang serius serta risiko kesehatan akibat migrasi zat karsinogenik. Penelitian ini bertujuan untuk menyintesis *Biofoam* sebagai alternatif kemasan ramah lingkungan yang aman dengan memanfaatkan limbah sekam padi dan pati singkong melalui metode *thermopressing*. Proses diawali dengan isolasi selulosa dari sekam padi menggunakan metode delignifikasi (NaOH 10%) dan *bleaching* (H_2O_2 30%). Adonan *Biofoam* dibuat dengan mencampurkan serat selulosa sekam padi dan pati singkong menggunakan cetakan plat datar pada suhu 180 °C selama 1 menit. Variabel bebas yang digunakan meliputi rasio massa selulosa sekam padi terhadap pati singkong (20:80, 30:70, 50:50, 70:30, dan 80:20) serta konsentrasi aditif Polivinil Alkohol (PVA) sebesar 10%, 15%, dan 17,5%. Sifat fungsional *Biofoam* dianalisis berdasarkan tiga parameter utama: kuat tarik, daya serap air, dan laju biodegradasi. Hasil penelitian menunjukkan bahwa peningkatan kadar pati singkong dan konsentrasi PVA berkontribusi signifikan pada pembentukan struktur matriks yang rapat melalui ikatan hidrogen dan gelatinisasi pati. Formulasi terbaik diperoleh pada rasio selulosa terhadap pati singkong 20:80 dengan kadar PVA 17,5%, yang menghasilkan nilai kuat tarik tertinggi sebesar 1,1772 MPa. Karakteristik ketahanan air terbaik diperoleh pada rasio 30:70 dengan kadar PVA 17,5% yang menghasilkan daya serap air terendah sebesar 10,62%. Seluruh sampel memiliki daya serap air di bawah ambang standar (< 26,12%) dan mampu terurai sempurna di dalam tanah dalam rentang 17,1 hingga 49,9 hari, memenuhi standar Baku Mutu SNI biodegradasi (< 60 hari). Dengan demikian, *Biofoam* berbasis sekam padi ini layak diaplikasikan sebagai alternatif kemasan pangan yang berkelanjutan dan ramah lingkungan.

Kata Kunci: sekam padi, pati singkong, *Biofoam*, polivinil alkohol, *thermopressing*, kemasan ramah lingkungan.

ABSTRACT

UTILIZATION OF RICE HUSK WITH THE ADDITION OF CASSAVA STARCH IN MAKING *BIOFOAM* USING THE THERMOPRESSING METHOD AS AN ENVIRONMENTALLY FRIENDLY PACKAGING ALTERNATIVE

(Reynaldi Agustino Putra, 2026, 61 Pages, 13 Tables, 12 Pictures 3 Appendixs

The widespread use of styrofoam packaging made of synthetic, non-biodegradable polymers triggers serious environmental pollution problems and poses health risks due to the migration of carcinogenic substances. This study aims to synthesize *Biofoam* as a safe and eco-friendly packaging alternative by utilizing agricultural waste of rice husk and cassava starch via the thermopressing method. The process began with the isolation of cellulose from rice husk using delignification (10% NaOH) and bleaching (30% H_2O_2) methods. The *Biofoam* mixture was prepared by combining rice husk cellulose fibers and cassava starch using a flat plate mold at a temperature of 180 °C for 1 minute. The independent variables investigated were the mass ratios of rice husk cellulose to cassava starch (20:80, 30:70, 50:50, 70:30, and 80:20) and the concentration of Polyvinyl Alcohol (PVA) additive at 10%, 15%, and 17.5%. The functional properties of the *Biofoam* were analyzed based on three primary parameters: tensile strength, water absorption, and biodegradation rate. The results indicated that the increase in cassava starch ratio and PVA concentration significantly contributed to the formation of a dense matrix structure through hydrogen bonding and starch gelatinization. The optimum formulation was achieved at a cellulose to cassava starch ratio of 20:80 with 17.5% PVA, yielding the highest tensile strength of 1.1772 MPa. The best water resistance characteristics were obtained at a 30:70 ratio with 17.5% PVA, which produced the lowest water absorption of 10.62%. All samples exhibited water absorption below the standard threshold (< 26.12%) and were completely degraded in soil burial tests within 17.1 to 49.9 days, satisfying the SNI quality standard for biodegradation limits (< 60 days). Consequently, this rice-husk-based *Biofoam* is viable for application as a sustainable and green food packaging alternative.

Keywords: rice husk, cassava starch, *biofoam*, polyvinyl alcohol, thermopressing, eco-friendly packaging.