

**Nurul Devi Yanti. NPM. 220331100046. Analisis Tekno-Ekonomi Valorisasi Sampah Organik Menjadi Pelet Ikan Berbantu Teknologi Enzim. Dibawah bimbingan R. Arief Firmansyah, S.TP., M.Si dan Hamzah Fansuri S. ST., M. T.**

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### **ABSTRAK**

*Peningkatan timbulan sampah organik di kawasan perkotaan memerlukan strategi pengelolaan yang tidak hanya mampu mengurangi volume limbah, tetapi juga memberikan nilai tambah ekonomi. Salah satu alternatif yang dapat diterapkan adalah valorisasi sampah organik menjadi pelet ikan berbantu teknologi enzim. Penelitian ini bertujuan untuk menganalisis kelayakan teknis dan ekonomi proses valorisasi sampah organik menjadi pelet ikan berbantu teknologi enzim. Penelitian dilakukan melalui pendekatan simulasi menggunakan data teknis dan finansialekonomi produksi pelet ikan yang memanfaatkan limbah organik TPS 3R Tambak Wedi, Surabaya, serta tepung darah dari limbah rumah potong hewan. Analisis teknis meliputi ketersediaan bahan baku, kapasitas produksi, dan rendemen, sedangkan analisis ekonomi meliputi Cost of Manufacturing (COM), Harga Pokok Produksi (HPP), Gross Margin (GM), Net Margin (NM), Return on Investment (ROI), Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP), dan analisis sensitivitas. Hasil penelitian menunjukkan bahwa 800 kg limbah organik per hari menghasilkan 230 kg bahan kering yang dapat diolah menjadi 394,58 kg pelet pada Formulasi 1 dan 438,97 kg pelet pada Formulasi 2 serta 3. Rendemen yang diperoleh masing-masing sebesar 77,20% dan 85,89%. Analisis ekonomi menunjukkan bahwa Formulasi 1 memiliki COM sebesar Rp2.847.390.691 per tahun, HPP sebesar Rp12.030 per unit, dan harga jual sebesar Rp19.500 per unit. Nilai profitabilitas Formulasi 1 meliputi GM 65%, NM 48,85%, ROI 73%, NPV Rp4.071.457.191,14, IRR 19,94%, dan PP 1 tahun 5 bulan. Meskipun Formulasi 2 dan 3 menghasilkan NPV yang lebih tinggi, nilai IRR keduanya masih berada di bawah batas kelayakan sebesar 11%. Hasil analisis sensitivitas menunjukkan bahwa Formulasi 1 tetap memenuhi seluruh kriteria kelayakan pada berbagai skenario perubahan parameter ekonomi. Formulasi 1 merupakan alternatif terbaik karena memiliki tingkat profitabilitas, periode pengembalian investasi, dan stabilitas finansial yang lebih baik dibandingkan formulasi lainnya.*

**Kata Kunci : Analisis tekno-ekonomi, valorisasi, sampah organik, pelet ikan, teknologi enzim, profitabilitas.**

**Nurul Devi Yanti. NPM. 220331100046. *Techno-Economic Analysis of Valorization of Organic Waste into Fish Pellets Assisted by Enzyme Technology*. Under the guidance of R. Arief Firmansyah, S.TP., M.Si dan Hamzah Fansuri S. ST., M. T.**

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### **ABSTRAK**

*The increasing generation of organic waste in urban areas requires management strategies that not only reduce waste volume but also create economic value. One potential approach is the valorization of organic waste into fish feed pellets assisted by enzymatic technology. This study aimed to evaluate the technical and economic feasibility of producing fish feed pellets from organic waste using enzymatic technology. The research was conducted through a simulation approach based on technical and financial data of fish pellet production utilizing organic waste from the Tambak Wedi 3R Waste Processing Facility (TPS 3R), Surabaya, and blood meal derived from slaughterhouse waste. The technical analysis included raw material availability, production capacity, and yield, while the economic analysis covered Cost of Manufacturing (COM), Cost of Goods Manufactured (HPP), Gross Margin (GM), Net Margin (NM), Return on Investment (ROI), Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP), and sensitivity analysis. The results showed that 800 kg of organic waste per day produced 230 kg of dried material, which could be processed into 394.58 kg of pellets in Formulation 1 and 438.97 kg of pellets in Formulations 2 and 3. The corresponding yields were 77.20% and 85.89%, respectively. Economic analysis indicated that Formulation 1 had a COM of IDR 2,847,390,691 per year, an HPP of IDR 12,030 per unit, and a selling price of IDR 19,500 per unit. The profitability indicators of Formulation 1 were GM of 65%, NM of 48.85%, ROI of 73%, NPV of IDR 4,071,457,191.14, IRR of 19.94%, and a payback period of 1 year and 5 months. Although Formulations 2 and 3 generated higher NPVs, their IRR values of 10.27% and 10.83%, respectively, remained below the minimum feasibility threshold of 11%. Sensitivity analysis further demonstrated that Formulation 1 consistently satisfied all feasibility criteria under various economic scenarios. In conclusion, the valorization of organic waste into fish feed pellets using enzymatic technology is technically and economically feasible. Formulation 1 was identified as the most favorable alternative due to its superior profitability, shorter investment payback period, and greater financial stability compared with the other formulations.*

**Keyword : Techno-economic analysis, valorization, organic waste, fish pellets, enzyme technology, profitability.**