

## **ABSTRAK**

### **ANALISIS KUALITAS PRODUK PUPUK ORGANIK PADAT HASIL OLAHAN LUMPUR PADAT PABRIK KELAPA SAWIT DAN APLIKASINYA PADA TANAMAN TOMAT DAN CABAI**

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Penelitian ini bertujuan untuk menganalisis kualitas pupuk organik padat yang dihasilkan dari lumpur padat pabrik kelapa sawit serta mengevaluasi efektivitasnya terhadap pertumbuhan tanaman tomat dan cabai. Lumpur padat kelapa sawit diproses menjadi pupuk organik padat dengan penambahan aktivator berbahan dasar tanaman Zingiberaceae, minyak nabati, dolomit, dan minyak hewani. Uji laboratorium dilakukan untuk mengukur parameter fisikokimia pupuk, termasuk kadar C-organik, pH, kadar air, kandungan hara makro (N, P, K), hara mikro (Fe, Zn), serta keberadaan logam berat sesuai dengan baku mutu Keputusan Menteri Pertanian RI No. 261 Tahun 2019. Hasil penelitian menunjukkan bahwa pupuk organik padat yang dihasilkan memiliki kandungan C-organik sebesar 25,14%, pH 4,59, dan kadar air 18,34%, yang seluruhnya memenuhi standar baku mutu. Kandungan unsur mikro seperti Fe 1205,19 ppm dan Zn 26,68 ppm juga sesuai dengan standar. Namun, kandungan hara makro (N = 0,36%, P = 0,24%, K = 0,60%) masih di bawah batas minimum ( $\geq 2\%$ ), yang kemungkinan disebabkan oleh kurang optimalnya proses dekomposisi serta rendahnya rasio C/N. Aplikasi pupuk organik padat pada tanaman tomat dan cabai menunjukkan peningkatan pertumbuhan tanaman, terutama pada parameter tinggi tanaman, jumlah daun, dan jumlah cabang, dibandingkan dengan perlakuan tanpa pupuk. Dengan demikian, pemanfaatan lumpur padat kelapa sawit sebagai pupuk organik padat memiliki potensi dalam meningkatkan kesuburan tanah dan pertumbuhan tanaman, tetapi masih memerlukan perbaikan formulasi untuk meningkatkan kandungan hara makro agar lebih efektif sebagai pupuk pembenah tanah.

Kata kunci : Pupuk organik padat, lumpur kelapa sawit, hara makro dan mikro.

## **ABSTRACT**

### **ANALYSIS QUALITY SOLID ORGANIC FERTILIZER FROM PALM OIL MILL SLUDGE AND APPLICATION ON TOMATO AND CHILI PLANTS**

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This study aims to analyze the quality of solid organic fertilizer produced from palm oil mill sludge and evaluate its effectiveness in promoting the growth of tomato and chili plants. The sludge was processed into solid organic fertilizer by adding activators derived from Zingiberaceae plants, vegetable oil, dolomite, and animal oil. Laboratory tests were conducted to measure the physicochemical properties of the fertilizer, including organic carbon content, pH, moisture content, macronutrients (N, P, K), micronutrients (Fe, Zn), and heavy metal presence, following the standards set by Indonesian Minister of Agriculture Regulation No. 261 of 2019. The results showed that the produced solid organic fertilizer contained 25.14% organic carbon, a pH of 4.59, and a moisture content of 18.34%, all of which met the standard requirements. The micronutrient levels, including Fe (1205.19 ppm) and Zn (26.68 ppm), were also within the acceptable range. However, the macronutrient content (N = 0.36%, P = 0.24%, K = 0.60%) was below the minimum threshold ( $\geq 2\%$ ), likely due to suboptimal decomposition processes and an imbalanced C/N ratio. The application of solid organic fertilizer on tomato and chili plants resulted in improved plant growth, particularly in plant height, leaf number, and branching, compared to untreated plants. Thus, utilizing palm oil mill sludge as a solid organic fertilizer has the potential to enhance soil fertility and plant growth. However, further formulation improvements are needed to increase macronutrient content, making it more effective as a soil amendment.

**Keywords:** Solid organic fertilizer, palm oil sludge, macronutrients and micronutrients.