



## **DINAMIKA KONSISTENSI TANAH DAN ANALISIS DAYA PENGOLAHANNYA AKIBAT AMELIORAN *SLURRY BIOGAS***

### **INTISARI**

**Oleh:**

**C CANDRA PALUPI**

**17/410495/TP/11781**

*Slurry biogas* (SB) merupakan ampas akhir dari biogas. SB dapat dimanfaatkan sebagai pupuk organik yang mampu memperbaiki sifat-sifat tanah karena kandungan bahan organiknya. Penelitian ini dilakukan untuk mengukur dan memodelkan dinamika konsistensi tanah dan daya pengolahannya akibat perlakuan SB. Konsistensi dan daya pengolahan tanah dinilai dari nilai batas cair (BC), batas plastis (BP), batas lekat (BL), indeks plastisitas (IP), jangka olah (JO), dan indeks cair (IC). Penelitian dilakukan dengan 2 faktor perlakuan, yaitu jenis SB dan waktu inkubasi. Perlakuan SB terdiri dari kontrol (K), SB cair (P1), dan SB padat (P2). Dosis P1 dan P2 sama, yaitu 50 ton/Ha. Sedangkan perlakuan waktu inkubasi terdiri dari inkubasi 2 minggu (I1), 4 minggu (I2), 6 minggu (I3), 8 minggu (I4), 10 minggu (I5), dan 12 minggu (I6). Sehingga diperoleh 18 perlakuan. Masing-masing perlakuan diulang sebanyak 5 kali dengan Rancangan Acak Lengkap (RAL). Selama pengamatan, tanah pada kondisi laboratorium dan kadar air tanahnya dijaga pada 60%. Hasil uji anova menunjukkan bahwa amelioran SB berpengaruh signifikan terhadap BC, BP, BL, IP, dan IC. Sedangkan amelioran *slurry biogas* tidak berpengaruh signifikan terhadap JO. Akibat amelioran SB cair, BC turun 2%, IP turun 2%, IC naik 0,022, dan daya olah turun 1 HP dibandingkan K. Akibat amelioran SB padat, BC naik 3%, BP naik 3%, BL naik 2%, dan IC turun 0,074 dibandingkan K. Model matematika persamaan kinetik orde 1, dapat digunakan untuk mendeskripsikan dinamika konsistensi dan daya olah tanah ( $R^2 > 80\%$  dan  $X^2 < X^2$  tabel). Laju penurunan BL berturut-turut untuk K, P1, dan P2 adalah 0,022/hari; 0,032/hari; dan 0,049/hari. Laju penurunan JO berturut-turut untuk K, P1, dan P2 adalah 0,024/hari; 0,046/hari; dan 0,079/hari.

Kata kunci: *slurry biogas*, konsistensi tanah, daya pengolahan tanah



## **DYNAMICS SOIL CONSISTENCY AND POWER REQUIREMENT OF TILLAGE DUE TO BIOGAS SLURRY AMELIORANT**

### **ABSTRACT**

**By:**

**C CANDRA PALUPI**

**17/410495/TP/11781**

Biogas slurry (BS) is a waste of biogas. BS can be used as organic fertilizer that can improve soil properties due to its organic matter content. The study was intended to measure and model the dynamics of soil consistency and tillage power requirement due to BS ameliorant. Soil consistency and tillage power requirement were judged by the value of liquid limit (LL), plastic limit (PL), sticky limit (SL), plasticity index (PI), workability range (WR), and liquidity index (LI). The study was conducted with 2 treatment factors, BS type and incubation time. The BS type factors consisted of control (K), liquid BS (P1), and solid BS (P2). The incubation time factors consisted of 2 weeks incubation (I1), 4 weeks incubation (I2), 6 weeks incubation (I3), 8 weeks incubation (I4), 10 weeks incubation (I5), and 12 weeks incubation (I6). Each treatment was repeated 5 times in Completely Randomized Design (CRD). During observation, the soil was incubated under laboratory conditions keeping the moisture content around 60%. ANOVA test showed that BS ameliorant had a significant effect on LL, PL, SL, PI, and LI. While BS ameliorant did not have a significant effect on WR. Due to liquid BS ameliorant, LL decreased 2%, PI decreased 2%, LI increased 0.022, and tillage power requirement decreased 1 HP. Due to solid BS ameliorant, LL increased 3%, PL increased 3%, SL increased 2%, and LI decreased 0.074. Mathematic modeling with a first-order kinetic model was acceptable to describe dynamics of soil consistency and tillage power requirement ( $R^2 > 80\%$  and  $X^2 < X^2$  table). The consecutive reduction rate of SL for K, P1, and P2 are 0.022/day, 0.032/day, and 0.049/day. The consecutive reduction rate of WR for K, P1, and P2 0.024/day, 0.046/day, and 0.079/day.

Keywords: biogas slurry, soil consistency, tillage power requirement