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# LAMPIRAN

**Lampiran 1.** Hasil Analisis *T-Independent* Kerapatan Biopelet

| Pengaruh perbedaan perbedaan hasil penggilingan arang | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Campuran 4:6 | Equal variances assumed | .000 | -.15333 | .00667 |
| | Equal variances not assumed | .000 | -.15333 | .00667 |
| Campuran 6:4 | Equal variances assumed | .001 | -.12000 | .01528 |
| | Equal variances not assumed | .016 | -.12000 | .01528 |
| Pengaruh persentase campuran | | t-test for Equality of Means | | |
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Hasil penggilingan HM | Equal variances assumed | .002 | -.02333 | .00333 |
| | Equal variances not assumed | .020 | -.02333 | .00333 |
| Hasil Penggilingan BM | Equal variances assumed | .573 | .01000 | .01633 |
| | Equal variances not assumed | .590 | .01000 | .01633 |

**Lampiran 2.** Hasil Analisis *T-Independent* kadar air biopelet

| Pengaruh perbedaan perbedaan hasil penggilingan arang | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Campuran 4:6 | Equal variances assumed | .015 | -1.06667 | .26145 |
| | Equal variances not assumed | .028 | -1.06667 | .26145 |
| Campuran 6:4 | Equal variances assumed | .006 | -1.75000 | .33549 |
| | Equal variances not assumed | .016 | -1.75000 | .33549 |
| Pengaruh komposisi campuran | | t-test for Equality of Means | | |
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |

| | | | | |
|---|---|---|---|---|
| Campuran hasil penggilingan HM | Equal variances assumed | .314 | -.31667 | .27524 |
| | Equal variances not assumed | .326 | -.31667 | .27524 |
| Campuran hasil penggiling BM | Equal variances assumed | .037 | -1.00000 | .32428 |
| | Equal variances not assumed | .066 | -1.00000 | .32428 |

**Lampiran 3.** Hasil Analisis *T-Independent* kadar abu biopelet

| Pengaruh perbedaan perbedaan hasil penggilingan arang | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Campuran 4:6 | Equal variances assumed | .004 | .67000 | .11116 |
| | Equal variances not assumed | .025 | .67000 | .11116 |
| Campuran 6:4 | Equal variances assumed | .004 | .43667 | .07102 |
| | Equal variances not assumed | .006 | .43667 | .07102 |
| Pengaruh komposisi campuran | | t-test for Equality of Means | | |
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Campuran hasil penggilingan HM | Equal variances assumed | .160 | .21667 | .12587 |
| | Equal variances not assumed | .181 | .21667 | .12587 |
| Campuran hasil penggiling BM | Equal variances assumed | .694 | -.01667 | .03944 |
| | Equal variances not assumed | .707 | -.01667 | .03944 |

**Lampiran 4.** Hasil Analisis *T-Independent* zat menguap biopelet

| Pengaruh perbedaan perbedaan hasil penggilingan arang | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Campuran 4:6 | Equal variances assumed | .120 | 1.97667 | 1.00254 |
| | Equal variances not assumed | .125 | 1.97667 | 1.00254 |
| Campuran 6:4 | Equal variances assumed | 4 | .008 | 4.49667 |

| | | | | |
|---|---|---|---|---|
| | Equal variances not assumed | 2.924 | .017 | 4.49667 |
| Pengaruh komposisi campuran | | t-test for Equality of Means | | |
| | | df | Sig. (2-tailed) | Mean Difference |
| Campuran hasil penggilingan HM | Equal variances assumed | 4 | .000 | -13.42667 |
| | Equal variances not assumed | 3.684 | .000 | -13.42667 |
| Campuran hasil penggilingan BM | Equal variances assumed | 4 | .000 | -10.90667 |
| | Equal variances not assumed | 2.965 | .001 | -10.90667 |

**Lampiran 5.** Hasil Analisis *T-Independent* kadar karbon tetap biopelet

| Pengaruh perbedaan perbedaan hasil penggilingan arang | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Campuran 4:6 | Equal variances assumed | .138 | -1.58000 | .85318 |
| | Equal variances not assumed | .145 | -1.58000 | .85318 |
| Campuran 6:4 | Equal variances assumed | .018 | -3.18333 | .82250 |
| | Equal variances not assumed | .038 | -3.18333 | .82250 |
| Pengaruh komposisi campuran | | t-test for Equality of Means | | |
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Campuran hasil penggilingan HM | Equal variances assumed | .000 | 13.52667 | .91012 |
| Campuran hasil penggilingan BM | Equal variances assumed | .000 | 11.92333 | .75903 |
| | Equal variances not assumed | .001 | 11.92333 | .75903 |

**Lampiran 6.** Hasil Analisis *T-Independent* nilai kalor biopelet

| Pengaruh perbedaan perbedaan hasil penggilingan arang | t-test for Equality of Means | | |
|---|---|---|---|
| | Sig. (2-tailed) | Mean Difference | Std. Error Difference |

| | | | | |
|---|---|---|---|---|
| Campuran 4:6 | Equal variances assumed | .983 | -5.36133 | 237.57508 |
| | Equal variances not assumed | .984 | -5.36133 | 237.57508 |
| Campuran 6:4 | Equal variances assumed | .796 | -85.19000 | 308.42327 |
| | Equal variances not assumed | .796 | -85.19000 | 308.42327 |

| Pengaruh komposisi campuran | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Campuran hasil penggilingan HM | Equal variances assumed | .174 | 536.99400 | 324.92998 |
| | Equal variances not assumed | .174 | 536.99400 | 324.92998 |
| Campuran hasil penggilingan BM | Equal variances assumed | .100 | 457.16533 | 214.44658 |
| | Equal variances not assumed | .155 | 457.16533 | 214.44658 |

**Lampiran 7.** Hasil Analisis *T-Independent* nilai keteguhan tekan biopelet

| Pengaruh perbedaan perbedaan hasil penggilingan arang | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | df | Sig. (2-tailed) | Mean Difference |
| Campuran 4:6 | Equal variances assumed | 4 | .007 | -1.57000 |
| | Equal variances not assumed | 2.085 | .034 | -1.57000 |
| Campuran 6:4 | Equal variances assumed | 4 | .004 | -1.41333 |
| | Equal variances not assumed | 3.143 | .009 | -1.41333 |

| Pengaruh komposisi campuran | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | df | Sig. (2-tailed) | Mean Difference |
| Campuran hasil penggilingan HM | Equal variances assumed | 4 | .049 | .35000 |
| | Equal variances not assumed | 2.580 | .081 | .35000 |
| Campuran hasil penggilingan BM | Equal variances assumed | 4 | .246 | .50667 |
| | Equal variances not assumed | 3.515 | .255 | .50667 |

**Lampiran 8.** Hasil Analisis *T-Independent* lama nyala biopelet

| Pengaruh perbedaan perbedaan hasil penggilingan arang | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | df | Sig. (2-tailed) | Mean Difference |
| Campuran 4:6 | Equal variances assumed | 4 | .130 | -4.80333 |
| | Equal variances not assumed | 2.002 | .198 | -4.80333 |
| Campuran 6:4 | Equal variances assumed | 4 | .010 | -3.05000 |
| | Equal variances not assumed | 2.124 | .040 | -3.05000 |
| Pengaruh komposisi campuran | | t-test for Equality of Means | | |
| | | df | Sig. (2-tailed) | Mean Difference |
| Campuran hasil penggilingan HM | Equal variances assumed | 4 | .639 | 1.28333 |
| | Equal variances not assumed | 2.008 | .662 | 1.28333 |
| Campuran hasil penggilingan BM | Equal variances assumed | 4 | .010 | 3.03667 |
| | Equal variances not assumed | 2.031 | .043 | 3.03667 |

**Lampiran 9.** Tabel Perhitungan Nilai Kadar Air

| Pengulangan | HM 4:6 | BM 4:6 | HM 6:4 | BM 6:4 |
|---|---|---|---|---|
| Sp1 | 3,75 | 4,20 | 3,42 | 4,98 |
| Sp2 | 3,22 | 4,33 | 3,55 | 5,97 |
| Sp3 | 2,95 | 4,59 | 3,90 | 5,17 |
| Rata-rata (%) | 3,31 | 4,37 | 3,62 | 5,37 |

**Lampiran 10.** Tabel Perhitungan Nilai Kadar Abu dan Zat Menguap

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FAKULTAS PETERNAKAN
UNIVERSITAS HASANUDDIN

**HASIL ANALISIS BAHAN**

| No | Kode Sampel | Zat Terbang (%) | Abu (%) |
|---|---|---|---|
| 1 | Sampel 1 | 44,89 | 3,07 |
| 2 | Sampel 2 | 45,69 | 3,17 |
| 3 | Sampel 3 | 46,97 | 3,44 |
| 4 | Sampel 4 | 58,35 | 3,13 |
| 5 | Sampel 5 | 60,91 | 2,94 |
| 6 | Sampel 6 | 58,57 | 2,96 |
| 7 | Sampel 7 | 55,59 | 2,64 |
| 8 | Sampel 8 | 54,35 | 2,51 |
| 9 | Sampel 9 | 54,40 | 2,57 |
| 10 | Sampel 10 | 44,85 | 2,58 |
| 11 | Sampel 11 | 44,48 | 2,54 |
| 12 | Sampel 12 | 42,29 | 2,55 |

Makassar, 30 Maret 2021
Analis

Muhammad Syahrul
Nip. 19790603 2001 12 1 001

**Lampiran 11.** Tabel Perhitungan Nilai Karbon Tetap

| Pengulangan | HM 4:6 | BM 4:6 | HM 6:4 | BM 6:4 |
|---|---|---|---|---|
| Sp1 | 48,28 | 48,37 | 35,09 | 36,79 |
| Sp2 | 47,91 | 48,65 | 32,59 | 37,16 |
| Sp3 | 46,64 | 50,57 | 34,57 | 37,85 |
| Rata-Rata | 47,61 | 49,19 | 34,09 | 37,27 |

**Lampiran 12.** Tabel Hasil Pengujian Nilai Kalor

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**LABORATORIUM MIPA TERPADU**
Jl. Ir. Sutami 36A, Kentingan, Surakarta, Jawa Tengah 57126

**Jenis analisis** : **Kalor Pembakaran**
**Sampel** : **Briket**
**Jenis sampel** : **Padat**
**Jumlah sampel** : **12**
**Operator** : **Agung Dwi Cahyo**
**Hari/Tanggal analisis** : **Rabu/ 21 April 2020**

**Hasil analisis** :

| No. | Kode sampel | Kalor pembakaran (kal/g) |
|---|---|---|
| 1 | Sampel 1 (HM 6:4) | 5742.572 |
| 2 | Sampel 2 (HM 6:4) | 5505.336 |
| 3 | Sampel 3 (HM 6:4) | 4975.796 |
| 4 | Sampel 4 (HM 4:6) | 6404.661 |
| 5 | Sampel 5 (HM 4:6) | 5651.031 |
| 6 | Sampel 6 (HM 4:6) | 5778.994 |
| 7 | Sampel 7 (BM 4:6) | 5872.927 |
| 8 | Sampel 8 (BM 4:6) | 5941.923 |
| 9 | Sampel 9 (BM 4:6) | 6035.920 |
| 10 | Sampel 10 (BM 6:4) | 5909.457 |
| 11 | Sampel 11 (BM 6:4) | 5249.582 |
| 12 | Sampel 12 (BM 6:4) | 5320.235 |

Operator,

Agung Dwi Cahyo

**Lampiran 13.** Proses Pembakaran Serpihan Kayu Pinus

**Lampiran 14.** Proses Karbonisasi Arang Kayu Pinus di Lubang Tanah

**Lampiran 15.** Proses Penjemuran Arang Setelah Proses Karbonisasi

**Lampiran 16.** Proses Penggilingan Arang Menggunakan Hammer Mill

**Lampiran 17.** Proses Pengayakan Serbuk Arang Kayu Pinus


**Lampiran 18.** Proses Penggilingan Arang Menggunakan Ball Mill

**Lampiran 19.** Proses Penjemuran Ampas Kopi

**Lampiran 20.** Proses Pencampuran Bahan Biopelet


**Lampiran 21.** Proses Pencetakan Biopelet Menggunakan Manual Pellet Press

**Lampiran 22.** Biopelet Setelah di Oven