

LAMPIRAN A

Pengujian Kadar Abu

Pengujian Kadar Abu (2 jam)

a = Berat Awal

b = Berat Akhir

c = Massa Sampe

$$\frac{a - b}{c} \times 100\%$$

1. Sampel A

Serbuk Kayu : Daun Jati
100% : 0

Massa Sampel = 5 gram

Berat Awal = 39,28

Berat Akhir = 39,64 – 39,28 = 0,36

$$\frac{a - b}{c} \times 100\% = \frac{0,36}{5} \times 100\% = 7\%$$

2. Sampel B

Serbuk Kayu : Daun Jati
0 : 100%

Massa Sampel = 5 gram

Berat Awal = 41,86

Berat Akhir = 42,94 – 41,86 = 1,08

$$\frac{a - b}{a} \times 100\% = \frac{1,08}{5} \times 100\% = 22\%$$

3. Sampel C

Serbuk Kayu : Daun Jati
80% : 20%

Massa Sampel = 5 gram

Berat Awal = 42,55

Berat Akhir = 43,08 – 42,55 = 0,53

$$\frac{a - b}{a} \times 100\% = \frac{0,53}{5} \times 100\% = 11\%$$

4. Sampel D

Serbuk Kayu : Daun Jati
20% : 80%

Massa Sampel = 5 gram

Berat Awal = 41,08

Berat Akhir = 42,09 – 41,08 = 1,01

$$\frac{a - b}{a} \times 100\% = \frac{1,01}{5} \times 100\% = 20\%$$

5. Sampel E

Serbuk Kayu : Daun Jati
60% : 40%

Massa Sampel = 5 gram

Berat Awal = 37,55

Berat Akhir = 38,22 – 37,55 = 0,67

$$\frac{a - b}{a} \times 100\% = \frac{0,67}{5} \times 100\% = 13\%$$

6. Sampel F

Serbuk Kayu : Daun Jati
40% : 60%

Massa Sampel = 5 gram

Berat Awal = 42,72

Berat Akhir = 43,55 – 42,72 = 0,83

$$\frac{a - b}{a} \times 100\% = \frac{0,83}{5} \times 100\% = 17\%$$

7. Sampel G

Serbuk Kayu : Daun Jati
50% : 50%

Massa Sampel = 5 gram

Berat Awal = 40,34

Berat Akhir = 42,09 – 40,34 = 1,75

$$\frac{a - b}{a} \times 100\% = \frac{1,75}{5} \times 100\% = 35\%$$

Pengujian Kadar Abu (3 Jam)

a = Berat Awal

b = Berat Akhir

c = Massa Sampel

$$\frac{a - b}{c} \times 100\%$$

8. Sampel H

Serbuk Kayu : Daun Jati
100% : 0

Massa Sampel = 5 gram

Berat Awal = 39,00

Berat Akhir = 42,24 – 39,00 = 3,24

$$\frac{a - b}{c} \times 100\% = \frac{3,24}{5} \times 100\% = 64\%$$

9. Sampel I

Serbuk Kayu : Daun Jati
0 : 100%

Massa Sampel = 5 gram

Berat Awal = 39,99

Berat Akhir = 40,06 – 39,99 = 0,07

$$\frac{a - b}{c} \times 100\% = \frac{0,07}{5} \times 100\% = 1\%$$

10. Sampel J

Serbuk Kayu : Daun Jati
80% : 20%

Massa Sampel = 5 gram

Berat Awal = 39,39

Berat Akhir = 39,39 – 39,39 = 0,54

$$\frac{a - b}{c} \times 100\% = \frac{0,54}{5} \times 100\% = 11\%$$

11. Sampel K

Serbuk Kayu : Daun Jati
20% : 80%

Massa Sampel = 5 gram

$$\text{Berat Awal} = 38,72$$

$$\text{Berat Akhir} = 39,90 - 38,72 = 1,18$$

$$\frac{a - b}{c} \times 100\% = \frac{1,18}{5} \times 100\% = 24\%$$

12. Sampel L

Serbuk Kayu : Daun Jati
60% : 40%

Massa Sampel = 5 gram

$$\text{Massa Sampel} = 32,29$$

$$\text{Berat Akhir} = 40,12 - 39,29 = 0,83$$

$$\frac{a - b}{c} \times 100\% = \frac{0,83}{5} \times 100\% = 17\%$$

13. Sampel M

Serbuk Kayu : Daun Jati
40% : 60%

Massa Sampel = 5 gram

$$\text{Berat Awal} = 41,26$$

$$\text{Berat Akhir} = 42,34 - 41,26 = 1,1$$

$$\frac{a - b}{c} \times 100\% = \frac{1,1}{5} \times 100\% = 22\%$$

14. Sampel N

Serbuk Kayu : Daun Jati
50% : 50%

Massa Sampel = 5 gram

$$\text{Berat Awal} = 46,36$$

$$\text{Berat Akhir} = 47,28 - 46,36 = 0,92$$

$$\frac{a - b}{c} \times 100\% = \frac{0,92}{5} \times 100\% = 18\%$$

Pengujian Nilai Kerapatan

Pengujian Densitas Briket Variasi Waktu (2 Jam)

M = Massa Sampel

r^2 = Jari – Jari

t = Tinggi

$$\rho = \frac{M}{V} = \frac{M}{\pi \cdot r^2 \cdot t}$$

1. Sampel A

Serbuk Kayu : Daun Jati
100% : 0

M = 53,14 gram

$r^2 = 42,4 = 4,2$ cm

t = 38,1 = 3,8 cm

$$\begin{aligned}\rho &= \frac{M}{V} = \frac{53,14}{\frac{22}{7} \cdot 2,1 \cdot 3,8} \\ &= \frac{53,14}{52,67} = 1 \frac{\text{g}}{\text{cm}^3}\end{aligned}$$

2. Sampel B

Serbuk Kayu : Daun Jati
0 : 100%

M = 50,10 gram

$r^2 = 42,4 = 4,2$ cm

t = 41,7 = 4,1 cm

$$\begin{aligned}\rho &= \frac{M}{V} = \frac{50,10}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 4,1} \\ &= \frac{50,10}{56,82} = 0,88 \frac{\text{g}}{\text{cm}^3}\end{aligned}$$

3. Sampel C

Serbuk Kayu : Daun Jati
80% : 20%

$$M = 49,75 \text{ gram}$$

$$r^2 = 42,4 = 4,2 \text{ cm}$$

$$t = 47,3 = 4,7 \text{ cm}$$

$$\begin{aligned} \rho &= \frac{M}{V} = \frac{49,75}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 4,7} \\ &= \frac{49,75}{51,23} = 0,97 \frac{\text{g}}{\text{cm}^3} \end{aligned}$$

4. Sampel D

Serbuk Kayu : Daun Jati
20% : 80%

$$M = 51,13 \text{ gram}$$

$$r^2 = 42,4 = 4,2 \text{ cm}$$

$$t = 39,0 = 3,9 \text{ cm}$$

$$\begin{aligned} \rho &= \frac{M}{V} = \frac{51,13}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 3,9} \\ &= \frac{51,13}{54,05} = 0,94 \frac{\text{g}}{\text{cm}^3} \end{aligned}$$

5. Sampel E

Serbuk Kayu : Daun Jati
60% : 40%

$$M = 49,23 \text{ gram}$$

$$r^2 = 42,4 = 4,2 \text{ cm}$$

$$t = 39,3 = 3,9 \text{ cm}$$

$$\begin{aligned} \rho &= \frac{M}{V} = \frac{49,23}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 3,9} \\ &= \frac{49,23}{54,05} = 0,91 \frac{\text{g}}{\text{cm}^3} \end{aligned}$$

6. Sampel F

Serbuk Kayu : Daun Jati
40% : 60%

$$M = 50,09 \text{ gram}$$

$$r^2 = 42,4 = 4,2 \text{ cm}$$

$$t = 39,1 = 3,9 \text{ cm}$$

$$\rho = \frac{M}{V} = \frac{50,09}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 3,9}$$

$$= \frac{50,09}{54,05} = 0,92 \frac{\text{g}}{\text{cm}^3}$$

7. Sampel G
 Serbuk Kayu : Daun Jati
 50% : 50%
 M = 51,92 gram

$$r^2 = 42,4 = 4,2 \text{ cm}$$

$$t = 39,1 = 3,9 \text{ cm}$$

$$\rho = \frac{M}{V} = \frac{51,92}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 3,9}$$

$$= \frac{51,92}{54,05} = 0,97 \frac{\text{g}}{\text{cm}^3}$$

Pengujian Densitas Briket Variasi Waktu (3 Jam)

M = Massa Sampel

r^2 = Jari – jari

t = Tinggi

$$\rho = \frac{M}{V} = \frac{M}{\pi \cdot r^2 \cdot t}$$

8. Sampel H

Serbuk Kayu : Daun Jati
100% : 100%

M = 45,70 gram

$r^2 = 42,4 = 4,2$ cm

t = 43,0 = 4,3 cm

$$\begin{aligned}\rho &= \frac{M}{V} = \frac{45,70}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 4,3} \\ &= \frac{45,70}{59,59} = 0,77 \frac{\text{g}}{\text{cm}^3}\end{aligned}$$

9. Sampel I

Serbuk Kayu : Daun Jati
0 : 100%

M = 47,81 gram

$r^2 = 42,4 = 4,2$ cm

t = 41,0 = 4,1 cm

$$\begin{aligned}\rho &= \frac{M}{V} = \frac{47,81}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 4,1} \\ &= \frac{47,81}{56,82} = 0,84 \frac{\text{g}}{\text{cm}^3}\end{aligned}$$

10. Sampel J

Serbuk Kayu : Daun Jati
80% : 20%

M = 49,39 gram

$r^2 = 42,4 = 4,2$ cm

t = 43,6 = 4,3 cm

$$\rho = \frac{M}{V} = \frac{43,39}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 4,3}$$

$$= \frac{43,39}{59,59} = 0,83 \frac{\text{g}}{\text{cm}^3}$$

11. Sampel K
Serbuk Kayu : Daun Jati
20% : 80%

$$M = 49,51 \text{ gram}$$

$$r^2 = 42,4 = 4,2 \text{ cm}$$

$$t = 41,4 = 4,1 \text{ cm}$$

$$\rho = \frac{M}{V} = \frac{49,51}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 4,1}$$

$$= \frac{49,51}{56,82} = 0,87 \frac{\text{g}}{\text{cm}^3}$$

12. Sampel L
Serbuk Kayu : Daun Jati
60% : 40%

$$M = 49,37 \text{ gram}$$

$$r^2 = 42,4 = 4,2 \text{ cm}$$

$$t = 42,5 = 4,2 \text{ cm}$$

$$\rho = \frac{M}{V} = \frac{49,37}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 4,2}$$

$$= \frac{49,37}{58,21} = 0,85 \frac{\text{g}}{\text{cm}^3}$$

13. Sampel M
Serbuk Kayu : Daun Jati
40% : 60%

$$M = 48,49 \text{ gram}$$

$$r^2 = 42,4 = 4,2 \text{ cm}$$

$$t = 41,0 = 4,1 \text{ cm}$$

$$\rho = \frac{M}{V} = \frac{48,94}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 4,1}$$

$$= \frac{48,94}{56,82} = 0,86 \frac{\text{g}}{\text{cm}^3}$$

14. Sampel N

Serbuk Kayu : Daun Jati
50% : 50%

$M = 49,23$ gram

$r^2 = 42,4 = 4,2$ cm

$t = 41,5 = 4,1$ cm

$$\begin{aligned}\rho &= \frac{M}{V} = \frac{49,23}{\frac{22}{7} \cdot 2,1 \cdot 2,1 \cdot 4,1} \\ &= \frac{49,23}{56,82} = 0,87 \frac{\text{g}}{\text{cm}^3}\end{aligned}$$

Pengujian Laju Pembakaran Briket

Pengujian Laju Pembakaran Briket Variasi Waktu (2 Jam)

a : Massa Sampel (gram)

b : Waktu Sampel Habis (menit)

1. Sampel A

Serbuk Kayu : Daun Jati
100% : 0

a : 4,99 gram

b : 102 gram

$$\begin{aligned}\text{Pembakaran} &= \frac{4,99}{102} \times 100\% \\ &= 4,89 \frac{\text{g}}{\text{menit}}\end{aligned}$$

2. Sampel B

Serbuk Kayu : Daun Jati
0% : 100%

a : 5,00 gram

b : 93 menit

$$\begin{aligned}\text{Pembakaran} &= \frac{5,00}{93} \times 100\% \\ &= 5,37 \frac{\text{g}}{\text{menit}}\end{aligned}$$

3. Sampel C

Serbuk Kayu : Daun Jati
80% : 20%

a : 4,99 gram

b : 101 menit

$$\begin{aligned}\text{Pembakaran} &= \frac{4,99}{101} \times 100\% \\ &= 4,94 \frac{\text{g}}{\text{menit}}\end{aligned}$$

4. Sampel D

Serbuk Kayu : Daun Jati
20% : 80%

a : 5,00 gram

b : 91 menit

$$\begin{aligned}\text{Pembakaran} &= \frac{5,00}{91} \times 100\% \\ &= 5,49 \frac{\text{g}}{\text{menit}}\end{aligned}$$

5. Sampel E
 Serbuk Kayu : Daun Jati
 60% : 40%
 a : 5,01 gram
 b : 93 menit
 Pembakaran = $\frac{5,01}{93} \times 100\%$
 = $5,38 \frac{\text{g}}{\text{menit}}$
6. Sampel G
 Serbuk Kayu : Daun Jati
 40% : 60%
 a : 5,01 gram
 b : 97 menit
 Pembakaran = $\frac{5,01}{97} \times 100\%$
 = $5,16 \frac{\text{g}}{\text{menit}}$
7. Sampel H
 Serbuk Kayu : Daun Jati
 50% : 50%
 a : 5,00 gram
 b : 79 menit
 Pembakaran = $\frac{5,00}{79} \times 100\%$
 = $6,32 \frac{\text{g}}{\text{menit}}$

Pengujian Laju Pembakaran Briket Variasi Waktu (3 Jam)

a : Massa Sampel (gram)

b : Waktu Sampel Habis Terbakar (menit)

8. Sampel H

Serbuk Kayu : Daun Jati
100% : 0

a : 5,00 gram

b : 103 menit

$$\begin{aligned}\text{Pembakaran} &= \frac{5,00}{103} \times 100\% \\ &= 4,85 \frac{\text{g}}{\text{menit}}\end{aligned}$$

9. Sampel I

Serbuk Kayu : Daun Jati
0% : 100%

a : 5,01 gram

b : 86 menit

$$\begin{aligned}\text{Pembakaran} &= \frac{5,01}{86} \times 100\% \\ &= 5,82 \frac{\text{g}}{\text{menit}}\end{aligned}$$

10. Sampel J

Serbuk Kayu : Daun Jati
80% : 20%

a : 5,01 gram

b : 91 menit

$$\begin{aligned}\text{Pembakaran} &= \frac{5,01}{91} \times 100\% \\ &= 5,55 \frac{\text{g}}{\text{menit}}\end{aligned}$$

11. Sampel K

Serbuk Kayu : Daun Jati
20% : 80%

a : 5,01 gram

b : 72 menit

$$\begin{aligned}\text{Pembakaran} &= \frac{5,01}{72} \times 100\% \\ &= 6,95 \frac{\text{g}}{\text{menit}}\end{aligned}$$

12. Sampel L
 Serbuk Kayu : Daun Jati
 60% : 40%
 a : 5,00 gram
 b : 93 menit
 Pembakaran = $\frac{5,00}{93} \times 100\%$
 = $5,37 \frac{\text{g}}{\text{menit}}$

13. Sampel M
 Serbuk Kayu : Daun Jati
 40% : 60%
 a : 5,00 gram
 b : 80 menit
 Pembakaran = $\frac{5,00}{80} \times 100\%$
 = $6,25 \frac{\text{g}}{\text{menit}}$

14. Sampel N
 Serbuk Kayu : Daun Jati
 50% : 50%
 a : 5,01 gram
 b : 71 menit
 Pembakaran = $\frac{5,01}{71} \times 100\%$
 = $7,05 \frac{\text{g}}{\text{menit}}$

Lampiran B
Dokumentasi Kegiatan Penelitian
Bahan Yang Digunakan



Lampiran B. 1 Serbuk Kayu, Daun Jati Kering, Molase (Sumber: Peneliti)

Alat Yang Digunakan



Lampiran B. 2 Pirolisis, Grinder, Ayakan 60 mesh (Sumber: Peneliti)



Lampiran B. 3 Timbangan Digital, Gelas Beker, Loyang (Sumber: Peneliti)



Lampiran B. 4 Alat Pencetak, *Furnace*, gas Penyembur (Sumber:Peneliti)



Lampiran B. 5 Oven, Plastik Zipper (Sumber: Peneliti)

Proses Pembuatan Briket



Lampiran B. 6 Pengarangan, Penghalusan, Pengayakan (Sumber: Peneliti)



Lampiran B. 7 Penimbangan, Molase, Pencampuran (Sumber: Peneliti)



Lampiran B. 8 Pengadukan, Cetakan, Pencetakan (Sumber: Peneliti)

Lampiran C
Produk Briket



Lampiran C. 1 Briket Serbuk Kayu dan Daun Jati Kering (Sumber: Peneliti)

BIODATA MAHASISWA



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Riwayat Pendidikan

TK Kemala Bhayangkari 15 : 2002
SD Negeri Gunung Simping 02 : 2003 - 2009
SMP Islam Al-Irsyad Cilacap : 2009 - 2012
SMK Dr. Soetomo Cilacap : 2012-2015

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