LAMPIRAN

Tabel1. Data Parameter Penelitian

Parameter	Tumpukan 10cm	Tumpukan 15cm	Tumpukan 20cm
Suhu Plenum (^{0}C)	95	91	103
Suhudiluar (^{0}C)	30	30	30
Suhuudarakeluar (^{0}C)	42	39	43
Kadar Air Awal (% bb)	22,4	22,8	24
Kadar Air Akhir (% bb)	13	13,6	13,5
BeratBasahBijiJagung (kg)	12	19	25
Lama Pengeringan (menit)	90	135	150
Jumlahtongkoljagung (kg)	3	5	8

Tumpukan 10 cm

BeratKeringAwal = BeratKeringAkhir

0.776 x 12 = 0.87 P

9.312 = 0.87 P

P = 10.703 kg

V = F - P

= 12 kg - 10.703 kg

= 1.297 kg

$$\text{Banyakudaradialirkan} = \frac{\text{Air yang diuapkan}}{\Delta \text{ H}}$$

$$= \frac{1.297 \text{ kg } H_2O}{\frac{0.021 kg}{kg Uk} H_2O}$$

$$= 64{,}85 \text{ kg Uk}$$

Kg Udara = (1 + H_1) x BanyakUdara

= (1 + 0.019 kg/kg Uk) x 56.39 kg Uk

= 66,08 kg

Debit =kecepatanaliranudara x LuasRuangPengering x Massa JenisUdara

= 0.04 m/s x 0.192 m^2 x 1.27 kg/m^3

= 0.00975 kg/s

$$\text{LamaPengeringan} = \frac{\text{Kg Udara}}{\text{Debit}}$$

$$= \frac{66{,}08\ \text{kg}}{0.00975\ \text{kgm2/s}}$$

$$= 6777{,}435\ \text{s}$$

$$= 1.88\ \text{jam}$$

Tumpukan 15 cm

BeratAwal = BeratAkhir

0.772 x 19 = 0.864 P

14.668 = 0.864 P

P = 16.97 kg

V = F - P

= 19 kg - 16.97 kg

= 2.03 kg

$$\text{Banyakudaradialirkan} = \frac{\text{Air yang diuapkan}}{\Delta\ \text{H}}$$

$$= \frac{2{,}03\ \text{kg}\ H_2O}{\frac{0.021 kg}{kgUk} H_2O}$$

$$= 96{,}66\ \text{kg Uk}$$

Kg Udara = (1 + H_1) x BanyakUdara

= (1 + 0.019 kg/kg Uk) x 92,27kg Uk

= 94,02 kg

$$\text{LamaPengeringan} = \frac{\text{Kg Udara}}{\text{Debit}}$$

$$= \frac{94{,}02 \text{ kg}}{0.00975 \text{ kgm2/s}}$$

$$= 9643{,}07 \text{ s}$$

$$= 2{,}67 \text{ jam}$$

Tumpukan 20 kg

BeratAwal = BeratAkhir

0.76 x 25 = 0.865 P

19 = 0.865 P

P = 21.96 kg

V = F - P

= 25 kg - 21.96 kg

= 3.04 kg

$$\text{Banyakudaradialirkan} = \frac{\text{Air yang diuapkan}}{\Delta \text{ H}}$$

$$= \frac{3{,}04 \text{ kg } H_2O}{\frac{0.026kg}{kgUk} H_2O}$$

$$= 116{,}92 \text{ kg Uk}$$

Kg Udara = (1 + H_1) x BanyakUdara

= (1 + 0.01 kg/kg Uk) x 116,92kg Uk

= 118,08 kg

$$\text{Lama Pengeringan} = \frac{\text{Kg Udara}}{\text{Debit}}$$

$$= \frac{118{,}08\ \text{kg}}{0.00975\ \text{kgm2/s}}$$

$$= 12110{,}76\ \text{s}$$

$$= 3{,}36\ \text{jam}$$

PerhitunganLajuPengeringan

LajuPengeringanpadatumpukan 10 cm

$$\text{Laju Pengeringan} = \frac{\text{Ka. awal} - \text{Ka. akhir}}{\text{Waktu(jam)}}$$

$$= \frac{22{,}4 - 13}{1{,}5}$$

$$= 6{,}266\ \%/\text{jam}$$

LajuPengeringanpadatumpukan 15 cm

$$\text{Laju Pengeringan} = \frac{\text{Ka. awal} - \text{Ka. akhir}}{\text{Waktu(jam)}}$$

$$= \frac{22{,}8 - 13{,}6}{2{,}2}$$

$$= 4{,}18182\ \%/\text{jam}$$

LajuPengeringanpadatumpukan20 cm

$$\text{Laju Pengeringan} = \frac{\text{Ka. awal} - \text{Ka. akhir}}{\text{Waktu(jam)}}$$

$$= \frac{24{,}0 - 13{,}5}{2{,}5}$$

$$= 4{,}2\ \%/\text{jam}$$

PerhitunganEffisiensiPengeringan

Tumpukan 10 cm

H_{fg}= (2,501 – (2, 361 x 10^{-3}) T) x 1000

H_{fg}= (2,501 – (2, 361 x 10^{-3}) 82,84) x 1000

H_{fg}= 2307 kJ/kg H_2O

Q_1= V x Hfg

= 1,29 kgH_2O x 2307 kJ/kg H_2O

= 2976,03 kJ = 1984,02 kJ/jam

Q_2 = m x Cp x ΔT

= 12 kg x 1,112 kJ/kg^{0}C x 10,64^{0}C

= 141,98 kJ = 94,65 kJ/jam

Qout = Q_1 + Q_2

= 1984,02 kJ/jam + 94,65 kJ/jam

= 2078,67 kJ/jam

Qinput = m.fs x Nbb

= 3kg/5400det x 3500 kkal/kg

= 10500 kkal/5400det

= 1,94kkal/det

= 8,12 kJ/det = 29232 kJ/jam

$$\text{Effisiensi} = \frac{\text{Qout}}{\text{Qin}} \text{ x } 100\ \%$$

$$= \frac{2078{,}67\ \text{kJ/jam}}{29232\ \text{kJ/jam}} \text{ x } 100\ \%$$

$$= 7{,}11\ \%$$

Tumpukan 15 cm

H_{fg}= (2,501 – (2, 361 x 10^{-3}) T) x 1000

H_{fg}= (2,501 – (2, 361 x 10^{-3}) 86,34) x 1000

H_{fg}= 2273,93 kJ/kg H_2O

Q_1= V x Hfg

= 2,03 kgH_2O x 2273 kJ/kg H_2O

= 4616,0779 kJ = 2098,217 kJ/jam

Q_2 = m x Cp x ΔT

= 19 kg x 1,112 kJ/kg^{0}C x 5,08^{0}C

= 107,33 kJ = 35,77 kJ/jam

Qout = Q_1 + Q_2

= 2098,217 kJ/jam + 35,77 kJ/jam

= 2133,987 kJ/jam

Qinput = m.fs x Nbb

= 5kg/8100det x 3500 kkal/kg

= 17500 kkal/8100det

= 2,16kkal/det

= 9,046 kJ/det = 32565,6 kJ/jam

$$\text{Effisiensi} = \frac{\text{Qout}}{\text{Qin}} \text{ x } 100\ \%$$

$$= \frac{1633{,}38\ \text{kJ/jam}}{32565{,}6\ \text{kJ/jam}} \text{ x } 100\ \%$$

$$= 6{,}553\ \%$$

Tumpukan 20 cm

H_{fg}= (2,501 – (2, 361 x 10^{-3}) T) x 1000

H_{fg}= (2,501 – (2, 361 x 10^{-3}) 60,65) x 1000

H_{fg}= 2358 kJ/kg H_2O

Q_1= V x Hfg

= 3,04 kgH_2O x 2358 kJ/kg H_2O

= 7168,32 kJ = 2867,32 kJ/jam

Q_2 = m x Cp x ΔT

= 25 kg x 1,112 kJ/kg^{0}C x 3,9^{0}C

= 108,42 kJ = 43,368 kJ/jam

Qout = Q_1 + Q_2

= 2867,32 kJ/jam + 43,368 kJ/jam

= 2910,68 kJ/jam

Qinput = m.fs x Nbb

= 7,5kg/9000det x 3500 kkal/kg

= 26250 kkal/9000det

= 2,91kkal/det

= 12,18 kJ/det = 43848 kJ/jam

$$\text{Effisiensi} = \frac{\text{Qout}}{\text{Qin}} \text{ x } 100\ \%$$

$$= \frac{2910{,}68\ \text{kJ/jam}}{43848\ \text{kJ/jam}} \text{ x } 100\ \%$$

$$= 6{,}63\ \%$$

Perhitunganeffisiensisecarateoritis

Tumpukan 10 cm

Q_1=beratkeringudara (h_2-h_1)

=64,85 (143-79)

=4150,40 kJ

Q_2 = Air yang diuapkan x Hfg

= 1,29 x 2307

= 2976,03 kJ

Q_3= m x Cp x ΔT

= 12 kg x 1,112 kJ/kg^{0}C x 10,64^{0}C

= 141,98 kJ

Q_4= Watt x t

= 75kJ/s X 1,5 jam

= 0,02 kJ/jam X 1,5 jam

= 0,03 kJ

$$\text{Effisiensi} = \frac{\text{Q2} + \text{Q3}}{\text{Q1} + \text{Q4}} \text{ x } 100\ \%$$

$$= \frac{2976{,}03 + 141{,}98}{4150{,}4 + 0{,}03} \text{ x } 100\ \%$$

$$= 0{,}7512 \text{ x } 100\ \%$$

$$= 75{,}12\ \%$$

Tumpukan 15 cm

Q_1=beratkeringudara (h_2-h_1)

=96,66 (148-80)

=6572,88 kJ

Q_2 = Air yang diuapkan x Hfg

= 2,02 x 2273,93

= 4593,33 kJ

Q_3 = m x Cp x ΔT

= 19 kg x 1,112 kJ/kg^{0}C x 5,08^{0}C

= 107,33 kJ

Q_4= Watt x t

= 75kJ/s X 1,5 jam

= 0,02 kJ/jam X 1,5 jam

= 0,03 kJ

$$\text{Effisiensi} = \frac{Q2 + Q3}{Q1 + Q4} \text{ x } 100\ \%$$

$$= \frac{4593{,}33 + 107{,}33}{6572{,}88 + 0{,}045} \text{ x } 100\ \%$$

$$= 0{,}7151 \text{ x } 100\ \%$$

$$= 71{,}51\ \%$$

Tumpukan 20cm

Q_1=beratkeringudara (h_2-h_1)

=116,92 (143-80)

=7365,96 kJ

Q_2 = Air yang diuapkan x Hfg

= 3,03 x 2358

= 7144,74 kJ

Q_3 = m x Cp x ΔT

= 25 kg x 1,112 kJ/kg^{0}C x 3,9^{0}C

= 108,42 kJ

Q_4= Watt x t

= 75kJ/s X 1,5 jam

= 0,02 kJ/jam X 1,5 jam

= 0,03 kJ

$$\text{Effisiensi} = \frac{Q2 + Q3}{Q1 + Q4} \text{ x } 100\ \%$$

$$= \frac{7144,74 + 108,42}{7365,96 + 0,05} \text{ x } 100\ \%$$

$$= 0,9846 \text{ x } 100\ \%$$

$$= 98,46\ \%$$

Tabel2.Penurunan Kadar Air danSuhupadatumpukan 10 cm

Waktu(menit)	Kadar air (%)	SuhuPlenum (°C)	Suhutumpukan(°C)	Suhuudarakeluar (°C)
0	22.4	30	30	30
15	21.2	92.5	59.5	38.5
30	20.3	93.5	77.5	45.5
45	19.7	96.5	84.5	48.5
60	17.5	100.5	89.5	50
75	16.9	107.5	98.5	55.5
90	13	110	99	57

Tabel3.SuhudanPenurunan Kadar Air padatumpukan 15 cm

Waktu (menit)	Kadar air (%)	Suhu Plenum (°C)	Suhutumpukan (°C)	Suhuudarakeluar (°C)
0	22.8	30	30	30
15	22.6	64.5	32.5	30
30	22.5	92	44.5	38
45	21.4	97.5	50	40
60	21	99	55.5	41
75	20.5	103.5	60.5	43
90	17.3	105	77.5	45
105	16.9	106	82.5	50
120	15.2	106.5	84	52
135	13.6	107	86	56

Tabel4.SuhudanPenurunan Kadar Air padatumpukan 20 cm

Waktu (menit)	Kadar air (%)	Suhu Plenum (°C)	Suhutumpukan (°C)	Suhuudarakeluar (°C)
0	24	30	30	30
15	22.2	80	38.5	35
30	21.3	92	43.5	41
45	18.7	102	50.5	44.5
60	18.6	104.5	57.5	45
75	17.6	107.5	60	45
90	17.2	108	66	44.5
105	15.9	110	67	45.5
120	15.6	110	67.5	45.5
135	14.5	110	71	45.5
150	13.5	110	75	45.5

FOTO – FOTO PENELITIAN

Gambar1.Bijijagungbasah (sebelumpengeringan)

Gambar2.Timbangan

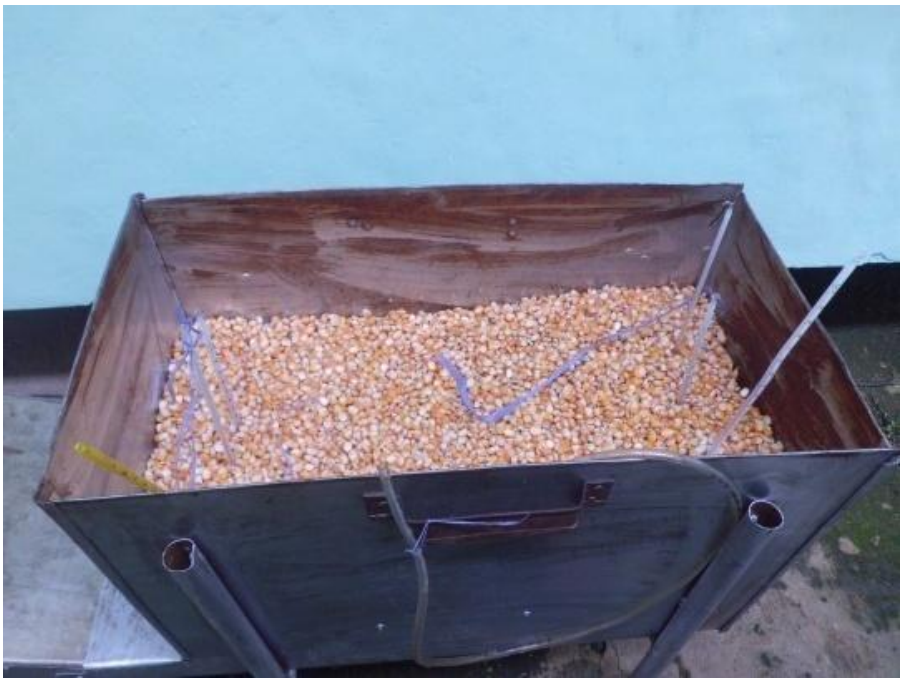
Gambar3.TongkolJagung

Gambar4. Grain Moisture Meter

Gambar5.Kipas

Gambar6.RuangPengering

Gambar7.TungkuPembakaran



Gambar8.Tumpukanbijijagungpadaruangpengering

Gambar9. Proses Pengeringan

Gambar10.Bijijagungsetelahdikeringkandengantumpukan 10 cm

Gambar11.Bijijagungsetelahdikeringkandengantumpukan 15 cm

Gambar12.Bijijagungsetelahdikeringkandengantumpukan 20 c