

## DAFTAR LAMPIRAN

Lampiran 1 Data produksi tanaman lempuyang tahun 2018 – 2020

No	Provinsi	Lempuyang (Kg)			
		2018	2019	2020	Jumlah
1	Jawa Timur	4.189.650	3.562.945	3.863.247	11.615.842
2	Jawa Tengah	2.104.406	1.333.095	1.524.054	4.961.555
3	Jawa Barat	1.379.218	259.362	477.359	2.115.939
4	Di Yogyakarta	587.224	614.267	598.544	1.800.035
5	Lampung	262.997	286.913	150.335	700.245
6	Riau	215.220	224.703	177.649	617.572
7	Sulawesi Selatan	185.701	134.585	16.454	336.740
8	Banten	24.312	9.281	133.957	167.550
9	Nusa Tenggara Barat	46.124	39.926	52.213	138.263
10	Sumatera Selatan	49.966	9.920	17.181	77.067
11	Sumatera Utara	11.105	20.200	24.192	55.497
12	Bengkulu	8.538	38.454	6.470	53.462
13	Kalimantan Tengah	17.021	16.458	13.728	47.207
14	Kalimantan Barat	27.248	10.364	6.860	44.472
15	Jambi	10.881	12.556	12.685	36.122
16	Papua	1.769	2.501	30.500	34.770
17	Sumatera Barat	5.993	8.184	7.844	22.021
18	Kalimantan Timur	2.085	1.976	9.023	13.084
19	Sulawesi Tengah	1.216	6.755	4.911	12.882
20	Sulawesi Tenggara	1.545	5.477	5.090	12.112
21	Aceh	7.551	2.755	281	10.587
22	Nusa Tenggara Timur	979	2.914	2.645	6.538
23	Kalimantan Selatan	5.645	110	502	6.257
24	Kalimantan Utara	294	1.393	2.155	3.842
25	Papua Barat	0	187	3.635	3.822
26	Dki Jakarta	1.748	1.413	519	3.680
27	Kep. Bangka Belitung	188	139	2.234	2.561
28	Sulawesi Barat	351	1.001	1.171	2.523
29	Sulawesi Utara	1.333	1.022	52	2.407
30	Maluku	674	0	0	674
31	Kep. Riau	13	200	420	633
32	Bali	0	0	0	0
33	Gorontalo	0	0	0	0
34	Maluku Utara	0	0	0	0
	Jumlah	9.150.995	6.609.056	7.145.910	22.905.961

Permisalan :

Apabila 5 kg rimpang lempuyang menghasilkan limbah batang sebanyak 3 kg maka limbah yang dihasilkan selama tahun 2018-2020 adalah 13.743.576,6 kg batang dan dengan hasil rendemen 2,8 % menggunakan metode *water retting* didapatkan hasil serat sekitar 384.820,145 kg serat. Dan pertahun bisa menghasikan sertat sekitar 11.032,141-153.736,716 kg serat.

- $\frac{3}{5} \times 22.905.961 = 13.743.576,6 \text{ kg batang lempuyang}$
- $2,8 \% \times 13.743.576,6 = 384.820,145 \text{ kg serat batang lempuyang}$



Lampiran 2 Data pengujian kehalusan serat

No	Berat (g)	Tex	$(x_i - \bar{x})^2$	Jumlah serat	Panjang serat (cm)
1	0,01813	4,028888889	0,002805075	150	3
2	0,017675	3,927777778	0,02373882	150	3
3	0,0193	4,288888889	0,042864335	150	3
Jumlah	0,055105	12,24555556	0,06940823		
Rata-rata	0,0183683	4,081851852	0,023136077		
S			0,186290406		
CV			4,563869841		

- $$\text{Tex} = \frac{\text{berat (g)}}{(\text{panjang serat (m)} \times \text{jumlah serat})} \times 1000$$

- Standar Deviasi

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n - 1}} = \sqrt{\frac{0,06940823}{3 - 1}} = 0,186290406$$

- Koefisien Variasi

$$cv = \frac{s}{\bar{x}} \times 100\% = \frac{0,186290406}{4,081851852} \times 100\% = 4,56\%$$

- Standar Error

$$\text{error} = \frac{t \times cv}{\sqrt{n}} = \frac{0,186290406}{\sqrt{3}} = 5,164505$$

Lampiran 3 Data pengujian panjang serat

No	Panjang (cm)	Panjang (cm)x80%	$(x_i - \bar{x})^2$
1	90	72	87,0489
2	88,3	70,64	63,5209
3	71	56,8	34,4569
4	86,8	69,44	45,8329
5	80,5	64,4	2,9929
6	65,5	52,4	105,4729
7	73,6	58,88	14,3641
8	71	56,8	34,4569
Jumlah	626,7	501,36	388,1464
Rata-rata	78,3375	62,67	48,5183
S			7,446441144
CV			11,88%

- Panjang berkas serat = panjang serat (cm) x 80%

- Standar Deviasi

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n - 1}} = \sqrt{\frac{388,1464}{8 - 1}} = 7,446441144$$

- Koefisien Variasi

$$cv = \frac{s}{\bar{x}} \times 100 \% = \frac{7,446441144}{62,67} \times 100 \% = 11,88 \%$$

- Standar Error

$$error = \frac{s}{\sqrt{n}} = \frac{7,446441144}{\sqrt{8}} = 0,08233797$$

Lampiran 4 Data pengujian kekuatan tarik dan mulur serat

- KEKUATAN

No	Kekuatan (N)	Berat (mg)	Panjang (cm)	Kehalusan (Tex)	Tenacity (g/Tex)
1	102,85	50,73	5	1014,6	10,34387735
2	68,57	31,9	5	638	10,96698868
3	58,92	20,75	5	415	14,4873371
4	67,11	41,12	5	822,4	8,326798618
5	99,48	32,6	5	652	15,56904971
6	139,09	40,25	5	805	17,63087844
7	85,46	30,18	5	603,6	14,44732963
8	68,57	37,59	5	751,8	9,306915104
9	92,24	35,13	5	702,6	13,39630643
Jumlah	782,29	320,25		6405	114,4754811
Rata-rata	86,92111111 1	35,583333 3		711,666666 7	12,71949789

No	Tenacity (g/Tex)	Tenacity (g/denier)	$(x_i - \bar{x})^2$
1	10,34387735	1,149319706	0,06967374
2	10,96698868	1,218554297	0,037917143
3	14,4873371	1,609704123	0,038583401
4	8,326798618	0,925199846	0,238219839
5	15,56904971	1,729894412	0,100246241
6	17,63087844	1,958986493	0,297798257
7	14,44732963	1,605258848	0,036856821
8	9,306915104	1,034101678	0,143774337
9	13,39630643	1,488478492	0,005655183
Jumlah	114,4754811	12,71949789	0,968724962
Rata-rata	12,71949789	1,413277544	0,107636107
S			0,347980776
CV			24,62225323

- $Tex = \frac{berat(g)}{panjang(m)} \times 1000$
- $Tenacity \frac{g}{denier} = \frac{g}{tex} : 9$

- Standar Deviasi

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n - 1}} = \sqrt{\frac{0,968724962}{9 - 1}} = 0,347980776$$

- Koefisien Variasi

$$cv = \frac{s}{\bar{x}} \times 100 \% = \frac{0,347980776}{1,413277544} \times 100 \% = 24,62\%$$

- Standar Error

$$error = \frac{s}{\sqrt{n}} = \frac{0,347980776}{\sqrt{9}} = 16,08654$$

- MULUR

No	Mulur (%)	$(x_i - \bar{x})^2$
1	4,8	1,376711111
2	7,2	1,504711111
3	6,4	0,182044444
4	3,6	5,632711111
5	5,4	0,328711111
6	6	0,000711111
7	6	0,000711111
8	4,76	1,472177778
9	9,6	13,15271111
Jumlah	53,76	23,6512
Rata-rata	5,973333	2,627911111
S		1,719418506
CV		28,78490803

- Standar Deviasi

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n - 1}} = \sqrt{\frac{23,6512}{9 - 1}} = 1,719418506$$

- Koefisien Variasi

$$cv = \frac{s}{\bar{x}} \times 100 \% = \frac{1,719418506}{5,973333} \times 100 \% = 28,78 \%$$

- Standar Error

$$error = \frac{s}{\sqrt{n}} = \frac{1,719418506}{\sqrt{9}} = 18,80614$$

Lampiran 5 Data pengujian MC/MR

No	Berat basah (g)	Berat kering (g)	MC (%)	$(x_i - \bar{x})^2$	MR (%)	$(x_i - \bar{x})^2$
1	3,106	2,77	10,81777205	0,423596717	12,1299639	0,527582
2	3,059	2,754	9,97057862	- 0,423596717	11,07480029	-0,52758
Jumlah	6,165	5,524	20,78835067	1,77636E-15	23,20476419	1,78E-15
Rata-Rata	3,0825	2,762	10,39417534	8,88178E-16	11,60238209	8,88E-16
S				4,21468E-8		4,21E-8
CV				4,5485E-7		3,63E-7

- $MC = \frac{\text{Berat basah} - \text{berat kering}}{\text{berat basah}} \times 100\%$

- $MR = \frac{\text{Berat basah} - \text{berat kering}}{\text{berat kering}} \times 100\%$

- Standar Deviasi MC

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n - 1}} = \sqrt{\frac{1,77636E - 15}{2 - 1}} = 4,21468E - 8$$

- Koefisien Variasi MC

$$cv = \frac{s}{\bar{x}} \times 100 \% = \frac{4,21468E - 8}{10,39417534} \times 100 \% = 4,05485E - 7 \%$$

- Standar Error

$$error = \frac{t \times cv}{\sqrt{n}} = \frac{1,96 \times 4,05485E - 7}{\sqrt{2}} = 5,6197E - 7$$

- Standar Deviasi MR

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n - 1}} = \sqrt{\frac{1,78E - 15}{2 - 1}} = 4,21E - 8$$

- Koefisien Variasi MR

$$cv = \frac{s}{\bar{x}} \times 100 \% = \frac{4,21E - 8}{11,60238209} \times 100 \% = 3,63E - 7 \%$$

- Standar Error

$$error = \frac{t \times cv}{\sqrt{n}} = \frac{1,96 \times 3,63E - 7}{\sqrt{2}} = 5,03453E - 7 \%$$

Lampiran 6 Data pengujian koefisien friksi

No	Koefisien Friksi ( $\mu$ )	$(x_i - \bar{x})^2$
1	0,48	0,001764
2	0,44	0,000004
3	0,43	0,000064
4	0,45	0,000144
5	0,39	0,002304
jumlah	2,19	0,00428
Rata-rata	0,438	0,000856
S		0,032710854
CV		7,468231614

- Standar Deviasi koefisien friksi

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n - 1}} = \sqrt{\frac{0,00428}{5 - 1}} = 0,032710854$$

- Koefisien Variasi koefisien friksi

$$cv = \frac{s}{\bar{x}} \times 100 \% = \frac{0,032710854}{0,438} \times 100 \% = 7,47 \%$$

- Standar Error koefisien friksi

$$error = \frac{t \times cv}{\sqrt{n}} = \frac{1,96 \times 7,468231614}{\sqrt{5}} = 6,546194 \%$$