

Lampiran 1. Tabel Data Pengujian

Lampiran 1. 1 Data Pengujian Pada Absorber Aspal Percobaan 1

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV (ml)	Δm (gram)	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)		
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar											
				1	2		Dalam		Luar														
10:00	501	395,8	395,8	47,2	48,2	47,7	45,2	54,8	50,1	50,1	50	50,1	33,7	-	34	35,3	-		7,15	34,14			
10:20	522	412,4	404,1	49,8	50,1	50,0	46,4	59,2	45,5	60,3	52,8	52,9		-		37,7	-						
10:40	531	419,5	409,2	65,5	65,6	65,6	60,5	66,1	62,1	64,7	63,3	63,4		-		37,1	-						
11:00	523	413,2	410,2	61,3	61,4	61,4	59,7	59,7	60,6	59,0	59,7	59,8		-		38,3	-						
11:20	546	431,3	414,4	71,4	71,5	71,5	58,0	60,2	58,8	59,6	59,1	59,2		33,6	38,9	83	83	81					
11:40	500	395,0	411,2	73,1	73,2	73,2	53,4	56,8	56,7	53,9	55,1	55,3		34,9	38,6	129	46	44					
12:00	560	442,4	415,7	71,3	71,5	71,4	68,1	64,1	70,6	61,8	66,1	66,2		35,5	39,6	176	47	45					
12:20	545	430,6	417,5	72,5	72,6	72,6	73,6	65,4	75,3	64,1	69,5	69,7		34,3	43,8	237	61						
12:40	575	454,3	421,6	72,3	71,9	72,1	79,2	55,8	71,2	65,0	67,5	68,1		36,3	44,5	299	62						
13:00	560	442,4	423,7	76,8	75,3	76,1	61,7	62,5	63,4	61,8	62,1	62,6		35,7	41,4	367	68						
13:20	545	430,6	424,3	78,1	77,9	78,0	63,7	62,9	64,7	62,9	63,3	63,8		34,1	42,7	487	120						
13:40	420	331,8	416,6	71,0	70,1	70,5	61,8	63,2	62,9	63,3	62,5	63,1		32,3	41,6	545	58						
14:00	389	306,9	408,2	62,0	62,1	62,1	59,3	59,1	60,9	58,3	59,2	59,6		31,1	40,3	586	41						
rata-rata		408,16		67,07										60,78									

Lampiran 1. 4 Data Pengujian Pada Absorber Aspal Percobaan 2

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV (ml)	Δm (gram)	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar									
				1	2		Dalam		Luar												
10:00	454	358,7	358,7	41,2	41,4	41,3	42,6	42,7	44,8	44,6	43,675	44,7	32,3	-	33	35,4	-		7,4	17,64	
10:20	468	369,7	364,2	45,5	45,6	45,6	43,6	43,9	46,1	46,2	44,95	46,15		-		36,1	-				
10:40	485	383,2	370,5	57,7	57,4	57,6	49,0	49,2	50,2	50,9	49,825	50,55		-		37,1	-				
11:00	501	395,8	376,8	60,4	60,5	60,5	50,2	50,1	52,1	52,7	51,275	52,4		-		38,6	-				
11:20	486	383,9	378,3	69,4	69,6	69,5	58,1	58,3	58,7	58,6	58,425	58,65		32,2	38,8	52	52	50			
11:40	530	418,7	385,0	70,1	70,3	70,2	54,7	54,7	55,2	55,3	54,975	55,25		33,4	38,4	91	39	38			
12:00	547	432,1	391,7	68,4	68,5	68,5	60,4	60,5	61,2	61,8	60,975	61,5		34,2	39,1	136	45	44			
12:20	510	402,9	393,1	70,1	70,2	70,2	65,8	65,7	67,0	67,1	66,4	67,05		34,3	39,2	186	50				
12:40	572	451,9	399,7	68,1	68,2	68,2	70,1	70,2	70,3	70,5	70,275	70,4		35,1	40,2	237	51				
13:00	501	395,8	399,3	65,4	65,6	65,5	68,5	68,6	69,4	69,5	69	69,45		35,6	41,7	378	141				
13:20	479	378,4	397,4	68,3	68,4	68,4	62,6	62,7	64,2	64,1	63,4	64,15		32,9	42,1	402	24				
13:40	503	397,4	397,4	69,7	58,4	64,1	53,2	53,1	54,7	54,8	53,95	54,75		32,2	40,2	453	51				
14:00	397	313,6	390,9	59,7	59,5	59,6	51,8	51,7	52,3	52,4	52,05	52,35		31	39,4	475	22				
rata-rata		390,93				62,22					56,86										

Lampiran 1. 5 Data Pengujian Pada Absorber Batu Kali Percobaan 2

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV (ml)	Δm (gram)	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar									
				1	2		Dalam		Luar												
10:00	500	395	395	68.2	70	69.1	56.8	55	58	52.7	55.9	55.35	32,1	-	35	39	-	-	7,43	34,39	
10:20	586	462.9	428.95	79.5	80.1	79.8	61.3	59.4	62.1	55	60.35	58.55		-		42.6	-	-			
10:40	597	471.6	443.1	80.1	80.5	80.3	61.8	62	63.1	56.8	61.9	59.95		32.4		44.2	60	60			
11:00	599	473.2	450.6	77.2	77.9	77.5	62.1	64.5	63.8	61.5	63.3	62.65		32.9		46.5	132	72			
11:20	606	478.7	456.2	83.3	84.5	83.9	67.2	65.4	65.8	62.8	66.3	64.3		33.8		46.8	192	60			57
11:40	587	463.7	457.5	84.1	84.5	84.3	69.3	68.2	66.2	64.9	68.75	65.55		33.9		46.9	289	97			71
12:00	612	483.4	461.2	84	84	84	66.9	67.4	66.6	62.8	67.15	64.7		34		47.1	335	46			58
12:20	493	389.4	452.2	82.1	84	83	66.9	66.1	67.2	63.9	66.5	65.55		35		46.9	419	84			
12:40	601	474.7	454.7	83.2	84.2	83.7	67.6	69.3	68.4	65.2	68.45	66.8		37.6		46.7	476	57			
13:00	534	421.8	451.4	81.8	82.9	82.3	66.2	64.8	67.5	63.9	65.5	65.7		36.8		44.9	531	55			
13:20	507	400.5	446.8	81	81.3	81.1	63.7	63.6	61.6	64	63.65	62.8		37.3		46	584	53			
13:40	501	395.7	442.5	75.1	75.8	75.4	61.9	60.2	63.8	60.3	61.05	62.05		37		44.6	651	67			
14:00	183	144.5	419.6	66.8	69	67.9	56.5	58.1	60.2	55.5	57.3	57.85		34.7		41.4	685	34			
rata-rata																					

Lampiran 1. 6 Data Pengujian Pada Absorber Cangkang Kerang Darah Percobaan 2

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV (ml)	Δm (gram)	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar									
				1	2		Dalam		Luar												
10:00	490	387.81	387.8	67.2	69	68.1	55.8	54	57	51.7	55.9	54.35	32,1	-	33	38	-		7,33	34,39	
10:20	576	455	421.4	78.5	79.1	78.8	60.3	58.4	61.1	54	59.35	57.55		-		41.6	-				
10:40	587	463.7	435.5	79.1	79.5	79.3	60.8	61	62.1	55.8	60.9	58.95		31.4		43.2	50	50			
11:00	589	465.3	442.9	76.2	76.9	76.5	61.1	63.5	62.8	60.5	62.3	61.65		31.9		45.5	122	72			
11:20	596	470.8	448.5	82.3	83.5	82.9	66.2	64.4	64.8	61.8	65.3	63.3		32,8		45.8	182	60			48
11:40	577	455.8	449.7	83.1	83.5	83.3	68.3	67.2	65.2	63.9	67.75	64.55		32.9		45.9	279	97			70
12:00	602	475.5	453.4	83	83	83	65.9	66.4	65.6	61.8	66.15	63.7		33		46.1	325	46			58
12:20	483	381.5	444.4	81.1	83	82	65.9	65.1	66.2	62.9	65.5	64.55		34		45.9	409	84			
12:40	591	466.8	446.9	82.2	83.2	82.7	66.6	68.3	67.4	64.2	67.45	65.8		36.6		45.7	466	57			
13:00	524	413.9	443.6	80.8	81.9	81.3	65.2	63.8	66.5	62.9	64.5	64.7		35,8		43.9	521	55			
13:20	497	392.6	438.9	80	80.3	80.1	62.7	62.6	60.6	63	62.65	61.8		36.3		45	574	53			
13:40	491	387.8	434.7	74.1	74.8	74.4	60.9	59.2	62.8	59.3	60.05	61.05		36		43.6	641	67			
14:00	173	136.6	411.7	66.8	69	67.9	56.5	58.1	60.2	54.5	57.3	57.85		33,7		40.4	675	34			
rata-rata																					

Lampiran 2. Tabel Perhitungan Pengujian

Lampiran 2. 1 Data Pengujian Dan Perhitungan Absorber Aspal Pada Percobaan 1

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV (ml)	Δm (gram)	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)		
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar											
				1	2		Dalam		Luar														
10:00	501	395,8	395,8	47,2	48,2	47,7	45,2	54,8	50,1	50,1	50	50,1	33,7	-	34	35,3	-		7,15	34,14			
10:20	522	412,4	404,1	49,8	50,1	50,0	46,4	59,2	45,5	60,3	52,8	52,9		-		37,7	-						
10:40	531	419,5	409,2	65,5	65,6	65,6	60,5	66,1	62,1	64,7	63,3	63,4		-		37,1	-						
11:00	523	413,2	410,2	61,3	61,4	61,4	59,7	59,7	60,6	59,0	59,7	59,8		-		38,3	-						
11:20	546	431,3	414,4	71,4	71,5	71,5	58,0	60,2	58,8	59,6	59,1	59,2		33,6	38,9	83	83	81					
11:40	500	395,0	411,2	73,1	73,2	73,2	53,4	56,8	56,7	53,9	55,1	55,3		34,9	38,6	129	46	44					
12:00	560	442,4	415,7	71,3	71,5	71,4	68,1	64,1	70,6	61,8	66,1	66,2		35,5	39,6	176	47	45					
12:20	545	430,6	417,5	72,5	72,6	72,6	73,6	65,4	75,3	64,1	69,5	69,7		34,3	43,8	237	61						
12:40	575	454,3	421,6	72,3	71,9	72,1	79,2	55,8	71,2	65,0	67,5	68,1		36,3	44,5	299	62						
13:00	560	442,4	423,7	76,8	75,3	76,1	61,7	62,5	63,4	61,8	62,1	62,6		35,7	41,4	367	68						
13:20	545	430,6	424,3	78,1	77,9	78,0	63,7	62,9	64,7	62,9	63,3	63,8		34,1	42,7	487	120						
13:40	420	331,8	416,6	71,0	70,1	70,5	61,8	63,2	62,9	63,3	62,5	63,1		32,3	41,6	545	58						
14:00	389	306,9	408,2	62,0	62,1	62,1	59,3	59,1	60,9	58,3	59,2	59,6		31,1	40,3	586	41						
rata-rata		408,16		67,07										60,78									

$$\dot{V}_{alat} = \frac{\text{Total volume air tawar (mL)}}{t}$$

$$= \frac{586 \text{ ml}}{4 \text{ jam}} = 146,5 \text{ ml/jam}$$

$$\dot{V} = \frac{\text{Total volume air tawar (mL)}}{t}$$

$$= \frac{586 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,0406944 \text{ ml/s} = 4,06 \times 10^{-5} \text{ l/s}$$

$$= 4,06 \times 10^{-8} \text{ m}^3/\text{s}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{81}{83} = 0,975903 \frac{\text{g}}{\text{cm}^3} = 975,90 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{44}{46} = 0,913043 \frac{\text{g}}{\text{cm}^3} = 956,52 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{45}{47} = 0,95745 \frac{\text{g}}{\text{cm}^3} = 957,45 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 963,290 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 963,290 \text{ kg/m}^3 \times 4,06 \times 10^{-8} \text{ m}^3/\text{s} = 0,00003920 \text{ kg/s}$$

$$A_d = \text{Panjang(m)} \times \text{Lebar(m)} = 0,97\text{m} \times 0,765\text{m} = 0,74205\text{m}^2$$

$$C_{p\text{air}} = 67^\circ\text{C} = 4,188 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,188 \text{ kJ/kgK} \times (67^\circ\text{C} - 60,7^\circ\text{C}) = 26,38 \text{ kJ/kg}$$

$$G_{rata-rata} = 408,16 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00003920 \text{ kg/s} \times 26,38 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 408,16 \text{ W/m}^2} \times 100\% = 34,14 \%$$

Lampiran 2. 2 Data Pengujian Dan Perhitungan Absorber Batu Kali Pada Percobaan 1

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV (ml)	Δm (gram)	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar									
				1	2		Dalam		Luar												
10:00	526	415.5	415.5	56.3	58.4	57.3	52.5	52.15	51.55	52.68	52.325	52.115	31,7	-	35.3	37,3	-	-	7,63	51,68	
10:20	539	425.8	420.65	63.2	65.2	64.2	62	63.5	63	63.78	62.75	63.39		-		39,7	-	-			
10:40	540	426.6	422.6	69.1	71.9	70.5	67.8	67.5	67.5	68.2	67.65	67.85		-		40	-	-			
11:00	560	442.4	427.5	62.8	61.1	61.9	60.55	59	59.6	60.25	59.775	59.925		-		40,3	-	-			
11:20	556	439.2	429.9	71.2	69	70.1	63.5	62.8	60.9	61.8	63.15	61.35		36,2		40,9	91	91			88
11:40	164	129.5	379.8	70.8	68.1	69.4	58	56.2	57.1	57.9	57.1	57.5		36,9		40,6	129	38			37
12:00	519	410	384.1	69.2	67.7	68.4	65.9	66.5	67	65.68	66.2	66.34		35,5		40,6	188	59			57
12:20	526	415.5	388	71.7	74	72.8	67.6	67.7	67.8	67.7	67.65	67.75		35,3		45,8	250	62			
12:40	134	105.8	356.7	72.9	73.4	73.1	56.6	57.7	57.8	56.5	57.15	57.15		36,3		38,5	307	57			
13:00	484	382.3	359.2	73.5	75.7	74.6	63.9	64.1	65	65.4	64	65.2		36,7		42,4	368	61			
13:20	468	369.7	360.2	76.5	74.6	75.5	66.9	64.5	65.8	66.8	65.7	66.3		36,1		44,7	441	73			
13:40	392	309.6	355.9	70.8	74.2	72.5	63.9	64.5	65.5	66.5	64.2	66		32,3		42	502	61			
14:00	434	342.8	354.9	64.5	60.4	62.4	59.5	59.2	60	59.7	59.35	59.85	33	42,3	571	69					
rata-rata																					

$$V_{alat} = \frac{\text{Total Volume air tawar (mL)}}{t}$$

$$= \frac{571 \text{ ml}}{4 \text{ jam}} = 142,75 \text{ ml/jam}$$

$$\dot{V} = \frac{\text{Total Volume air tawar (mL)}}{t}$$

$$= \frac{571 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,0396528 \text{ ml/s} = 3,96 \times 10^{-5} \text{ l/s}$$

$$= 3,96 \times 10^{-8} \text{ m}^3/\text{s}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{88}{91} = 0,967033 \frac{\text{g}}{\text{cm}^3} = 967,03 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{37}{38} = 0,973684 \frac{\text{g}}{\text{cm}^3} = 973,68 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{57}{59} = 0,966102 \frac{\text{g}}{\text{cm}^3} = 966,10 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 968,936 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 968,936 \text{ kg/m}^3 \times 3,96 \times 10^{-8} \text{ m}^3/\text{s} = 0,00003836 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97 \text{ (m)} \times 0,765 \text{ (m)} = 0,74205 \text{ (m}^2\text{)}$$

$$C_{p\text{air}} = 68,6 \text{ }^\circ\text{C} = 4.191 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4.191 \text{ kJ/kgK} \times (68,6^\circ\text{C} - 62,07^\circ\text{C}) = 27,36 \text{ kJ/kg}$$

$$G_{rata-rata} = 354,9 \text{ W/m}^2$$

Efisiensi Destilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$\frac{0,00003836 \text{ kg/s} \times 27.36 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 354,9 \text{ W/m}^2} \times 100\% = 51.68$$

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Lampiran 2. 3 Data Pengujian Dan Perhitungan Absorber Cangkang Kerang Darah Pada Percobaan 1

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV (ml)	Δm (gram)	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar									
				1	2		Dalam		Luar												
10:00	516	407	407	55.3	57.4	56.3	51.5	51.15	50.55	51.68	51,325	51.115	33,7	-	34,03	34,7	-		7,53	33,66	
10:20	579	457.41	432.2	62.2	64.2	63.2	61	62.5	62	62.78	61,75	62.39		-		36,7	-				
10:40	520	410.8	425.07	68.1	70.9	69.5	66.8	66.5	66.5	67.2	66,65	66.85		-		37	-				
11:00	550	434.5	427.42	61.8	60.1	60.9	59.55	56	58.6	59.25	58,775	58.925		-		39,3	-				
11:20	546	431.34	428.21	70.2	68	69.1	62.5	61.8	59.9	60.8	62,15	60.35		35,3		39,9	81	81			79
11:40	154	121.66	377.11	69.8	67.1	68.4	57	55.2	56.1	56.9	56,1	56.5		35,9		39,6	119	38			36
12:00	509	402.11	380.6	68.2	66.7	67.4	64.9	65.5	66	64.68	65,2	65.34		34,5		39,6	178	59			57
12:20	516	407.64	384	70.7	73	71.8	66.6	66.7	66.8	66.7	66,65	66.75		34,3		44,8	240	62			
12:40	124	97.96	352.2	71.9	72.4	72.1	55.6	56.7	56.8	55.5	56,15	56.15		35,3		37,5	297	57			
13:00	474	374.46	354.4	72.5	74.7	73.6	62.9	63.1	64	64.4	63	64.2		35,7		41,4	358	61			
13:20	458	361.82	355.1	75.5	73.6	74.5	65.9	63.5	64.8	65.8	64,7	65.3		35,1		41,7	431	73			
13:40	382	301.78	350.7	69.8	73.2	71.5	62.9	63.5	64.5	65.5	63,2	65		31,3		41	492	61			
14:00	424	334.96	349.49	63.5	59.4	61.4	58.5	58.2	59	58.7	58,5	58.85	32	41,3	561	69					
rata-rata																					

$$\dot{V}_{alat} = \frac{\text{Total volume air tawar (mL)}}{t}$$

$$= \frac{561 \text{ ml}}{4 \text{ jam}} = 140,25 \text{ ml/jam}$$

$$\dot{V} = \frac{\text{Total volume air tawar (mL)}}{t}$$

$$= \frac{561 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,0389583 \text{ ml/s} = 3,89 \times 10^{-5} \text{ l/s}$$

$$= 3,89 \times 10^{-8} \text{ m}^3/\text{s}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{79}{81} = 0,975308642 \frac{\text{g}}{\text{cm}^3} = 975,30 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{36}{38} = 0,947368421 \frac{\text{g}}{\text{cm}^3} = 947,36 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{57}{59} = 0,966101695 \frac{\text{g}}{\text{cm}^3} = 966,10 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 962,92 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 962,92 \text{ kg/m}^3 \times 3,89 \times 10^{-8} \text{ m}^3/\text{s} = 0,00003475 \text{ kg/s}$$

$$A_d = \text{Panjang(m)} \times \text{Lebar(m)} = 0,97 \text{ m} \times 0,765 \text{ m} = 0,74205 \text{ m}^2$$

$$C_{p\text{air}} = 67,73^\circ\text{C} = 4,191 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,191 \text{ kJ/kgK} \times (67,73^\circ\text{C} - 61,07^\circ\text{C}) = 27,91 \text{ kJ/kg}$$

$$G_{rata-rata} = 349,49 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00003475 \text{ kg/s} \times 27,91 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 349,49 \text{ W/m}^2} \times 100\% = 33,66$$

Lampiran 2. 4 Data Pengujian Dan Perhitungan Absorber Aspal Pada Percobaan 2

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV (ml)	Δm (gram)	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar									
				1	2		Dalam		Luar												
10:00	454	358,7	358,7	41,2	41,4	41,3	42,6	42,7	44,8	44,6	43,675	44,7	32,3	-	33	35,4	-		7,4	17,64	
10:20	468	369,7	364,2	45,5	45,6	45,6	43,6	43,9	46,1	46,2	44,95	46,15		-		36,1	-				
10:40	485	383,2	370,5	57,7	57,4	57,6	49,0	49,2	50,2	50,9	49,825	50,55		-		37,1	-				
11:00	501	395,8	376,8	60,4	60,5	60,5	50,2	50,1	52,1	52,7	51,275	52,4		-		38,6	-				
11:20	486	383,9	378,3	69,4	69,6	69,5	58,1	58,3	58,7	58,6	58,425	58,65		32,2	38,8	52	52	50			
11:40	530	418,7	385,0	70,1	70,3	70,2	54,7	54,7	55,2	55,3	54,975	55,25		33,4	38,4	91	39	38			
12:00	547	432,1	391,7	68,4	68,5	68,5	60,4	60,5	61,2	61,8	60,975	61,5		34,2	39,1	136	45	44			
12:20	510	402,9	393,1	70,1	70,2	70,2	65,8	65,7	67,0	67,1	66,4	67,05		34,3	39,2	186	50				
12:40	572	451,9	399,7	68,1	68,2	68,2	70,1	70,2	70,3	70,5	70,275	70,4		35,1	40,2	237	51				
13:00	501	395,8	399,3	65,4	65,6	65,5	68,5	68,6	69,4	69,5	69	69,45		35,6	41,7	378	141				
13:20	479	378,4	397,4	68,3	68,4	68,4	62,6	62,7	64,2	64,1	63,4	64,15		32,9	42,1	402	24				
13:40	503	397,4	397,4	69,7	58,4	64,1	53,2	53,1	54,7	54,8	53,95	54,75		32,2	40,2	453	51				
14:00	397	313,6	390,9	59,7	59,5	59,6	51,8	51,7	52,3	52,4	52,05	52,35		31	39,4	475	22				
rata-rata		390,93				62,22					56,86										

$$\dot{V}_{alat} = \frac{\text{Total volume air tawar (mL)}}{t}$$

$$= \frac{475 \text{ ml}}{4 \text{ jam}} = 188,75 \text{ ml/jam}$$

$$\dot{V} = \frac{\text{Total volume air tawar (mL)}}{t}$$

$$= \frac{475 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,032986 \text{ ml/s} = 3,29 \times 10^{-5} \text{ l/s}$$

$$= 3,29 \times 10^{-8} \text{ m}^3/\text{s}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{50}{52} = 0,961538 \frac{\text{g}}{\text{cm}^3} = 961,53 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{38}{39} = 0,974358 \frac{\text{g}}{\text{cm}^3} = 974,35 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{44}{45} = 0,977777 \frac{\text{g}}{\text{cm}^3} = 977,77 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 971,216 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 971,216 \text{ kg/m}^3 \times 3,29 \times 10^{-8} \text{ m}^3/\text{s} = 0,00003195 \text{ kg/s}$$

$$A_d = \text{Panjang(m)} \times \text{Lebar(m)} = 0,97\text{m} \times 0,765\text{m} = 0,74205\text{m}^2$$

$$C_{p_{air}} = 62,22^\circ\text{C} = 4,186 \text{ kJ/kgK}$$

$$h = C_{p_{air}} \times \Delta T = 4,186 \text{ kJ/kgK} \times (62,22^\circ\text{C} - 56,86^\circ\text{C}) = 22,43 \text{ kJ/kg}$$

$$G_{rata-rata} = 390,93 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00003195 \text{ kg/s} \times 22,43 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 390,93 \text{ W/m}^2} \times 100\% = 17,64 \%$$

Lampiran 2. 5 Data Pengujian Dan Perhitungan Absorber Batu Kali Pada Percobaan 2

Pukul	E_{globe} (lux) x 100	E_{globe} (W/m ²) (X0,0079)	$E_{\text{rata-rata}}$ (W/m ²)	T_{abs} (°C)			T_{kaca} (°C)						T_{in}	T_{out}	T_{avg}	T_{ling}	Volume Air Tawar (ml)	ΔV (ml)	Δm (gram)	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar									
				1	2		Dalam		Luar												
10:00	500	395	395	68.2	70	69.1	56.8	55	58	52.7	55.9	55.35	32,1	-	35	39	-	-	7,43	34,39	
10:20	586	462.9	428.95	79.5	80.1	79.8	61.3	59.4	62.1	55	60.35	58.55		-		42.6	-	-			
10:40	597	471.6	443.1	80.1	80.5	80.3	61.8	62	63.1	56.8	61.9	59.95		32.4		44.2	60	60			
11:00	599	473.2	450.6	77.2	77.9	77.5	62.1	64.5	63.8	61.5	63.3	62.65		32.9		46.5	132	72			
11:20	606	478.7	456.2	83.3	84.5	83.9	67.2	65.4	65.8	62.8	66.3	64.3		33.8		46.8	192	60			57
11:40	587	463.7	457.5	84.1	84.5	84.3	69.3	68.2	66.2	64.9	68.75	65.55		33.9		46.9	289	97			71
12:00	612	483.4	461.2	84	84	84	66.9	67.4	66.6	62.8	67.15	64.7		34		47.1	335	46			58
12:20	493	389.4	452.2	82.1	84	83	66.9	66.1	67.2	63.9	66.5	65.55		35		46.9	419	84			
12:40	601	474.7	454.7	83.2	84.2	83.7	67.6	69.3	68.4	65.2	68.45	66.8		37.6		46.7	476	57			
13:00	534	421.8	451.4	81.8	82.9	82.3	66.2	64.8	67.5	63.9	65.5	65.7		36.8		44.9	531	55			
13:20	507	400.5	446.8	81	81.3	81.1	63.7	63.6	61.6	64	63.65	62.8		37.3		46	584	53			
13:40	501	395.7	442.5	75.1	75.8	75.4	61.9	60.2	63.8	60.3	61.05	62.05		37		44.6	651	67			
14:00	183	144.5	419.6	66.8	69	67.9	56.5	58.1	60.2	55.5	57.3	57.85		34.7		41.4	685	34			
rata-rata																					

$$V_{alat} = \frac{\text{Total Volume air tawar (mL)}}{t}$$

$$= \frac{549 \text{ ml}}{4 \text{ jam}} = 137,25 \text{ ml/jam}$$

$$\dot{V} = \frac{\text{Total Volume air tawar (mL)}}{t}$$

$$= \frac{549 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,03812 \text{ ml/s} = 3,81 \times 10^{-5} \text{ l/s}$$

$$= 3,81 \times 10^{-8} \text{ m}^3/\text{s}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{85}{88} = 0,965909 \frac{\text{g}}{\text{cm}^3} = 965,90 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{36}{37} = 0,973684 \frac{\text{g}}{\text{cm}^3} = 973,68 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{58}{60} = 0,966102 \frac{\text{g}}{\text{cm}^3} = 966,10 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 968,56 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 968,56 \text{ kg/m}^3 \times 3,81 \times 10^{-8} \text{ m}^3/\text{s} = 0,00003690 \text{ kg/s}$$

$$A_d = \text{Panjang (m)} \times \text{Lebar (m)} = 0,97 \text{ (m)} \times 0,765 \text{ (m)} = 0,74205 \text{ (m}^2\text{)}$$

$$C_{p\text{air}} = 62,87^\circ\text{C} = 4,185 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,185 \text{ kJ/kgK} \times (62,87^\circ\text{C} - 60,7^\circ\text{C}) = 9,08 \text{ kJ/kg}$$

$$G_{rata-rata} = 354,9 \text{ W/m}^2$$

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100\%$$

$$= \frac{0,00003690 \text{ kg/s} \times 9.08 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 354,9 \text{ W/m}^2} \times 100\% = 49.72 \%$$

Lampiran 2. 6 Data Pengujian Dan Perhitungan Absorber Cangkang Kerang Darah Pada Percobaan 2

Pukul	E_{globe} (lux) x 100	E_{globe} (W/m ²) (X0,0079)	$E_{\text{rata-rata}}$ (W/m ²)	T_{abs} (°C)			T_{kaca} (°C)						T_{in}	T_{out}	T_{avg}	T_{ling}	Volume Air Tawar (ml)	ΔV (ml)	Δm (gram)	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar									
				1	2		Dalam		Luar												
10:00	490	387.81	387.8	67.2	69	68.1	55.8	54	57	51.7	55.9	54.35	32,1	-	33	38	-		7,33	34,39	
10:20	576	455	421.4	78.5	79.1	78.8	60.3	58.4	61.1	54	59.35	57.55		-		41.6	-				
10:40	587	463.7	435.5	79.1	79.5	79.3	60.8	61	62.1	55.8	60.9	58.95		31.4		43.2	50	50			
11:00	589	465.3	442.9	76.2	76.9	76.5	61.1	63.5	62.8	60.5	62.3	61.65		31.9		45.5	122	72			
11:20	596	470.8	448.5	82.3	83.5	82.9	66.2	64.4	64.8	61.8	65.3	63.3		32,8		45.8	182	60			48
11:40	577	455.8	449.7	83.1	83.5	83.3	68.3	67.2	65.2	63.9	67.75	64.55		32.9		45.9	279	97			70
12:00	602	475.5	453.4	83	83	83	65.9	66.4	65.6	61.8	66.15	63.7		33		46.1	325	46			58
12:20	483	381.5	444.4	81.1	83	82	65.9	65.1	66.2	62.9	65.5	64.55		34		45.9	409	84			
12:40	591	466.8	446.9	82.2	83.2	82.7	66.6	68.3	67.4	64.2	67.45	65.8		36.6		45.7	466	57			
13:00	524	413.9	443.6	80.8	81.9	81.3	65.2	63.8	66.5	62.9	64.5	64.7		35,8		43.9	521	55			
13:20	497	392.6	438.9	80	80.3	80.1	62.7	62.6	60.6	63	62.65	61.8		36.3		45	574	53			
13:40	491	387.8	434.7	74.1	74.8	74.4	60.9	59.2	62.8	59.3	60.05	61.05		36		43.6	641	67			
14:00	173	136.6	411.7	66.8	69	67.9	56.5	58.1	60.2	54.5	57.3	57.85		33,7		40.4	675	34			
rata-rata																					

$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{675 \text{ ml}}{4 \text{ jam}} = 168,75 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{675 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,04687 \text{ ml/s} = 4,68 \times 10^{-5} \text{ l/s} \\ &= 4,46 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{48}{50} = 0,96 \frac{\text{g}}{\text{cm}^3} = 960 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{70}{72} = 0,972222 \frac{\text{g}}{\text{cm}^3} = 972,22 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{58}{60} = 0,966667 \frac{\text{g}}{\text{cm}^3} = 966,67 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 966,2933 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 966,2933 \frac{\text{kg}}{\text{m}^3} \times 4,68 \times 10^{-8} \text{ m}^3/\text{s} = 0,000045222 \text{ kg/s}$$

$$A_d = \text{Panjang(m)} \times \text{Lebar(m)} = 0,97\text{m} \times 0,765\text{m} = 0,74205\text{m}^2$$

$$C_{p\text{air}} = 78,5^\circ\text{C} = 4,198 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,198 \text{ kJ/kgK} \times (78,5^\circ\text{C} - 62,62^\circ\text{C}) = 66,66 \text{ kJ/kg}$$

$$G_{rata-rata} = 411,7 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\begin{aligned}\eta_d &= \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \% \\ &= \frac{0,00004522 \text{ kg/s} \times 66,66 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 411,7 \text{ W/m}^2} \times 100\% = 34,39 \%\end{aligned}$$

Lampiran 2. 7 Data Pengujian Dan Perhitungan Absorber Aspal Pada Percobaan 3

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV	Δm	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar									
				1	2		Dalam		Luar												
10:00	525	414,8	414,8	48,7	49,1	48,9	46,1	46,2	47,3	47,2	46,7	47,25	33,9	-	35	36,2	-		7,5	34,14	
10:20	535	422,7	418,7	50,8	50,9	50,9	47,4	47,2	48,1	48,3	47,75	48,2		-		38,1	-				
10:40	545	430,6	422,7	67,5	67,4	67,5	62,5	62,3	63,7	63,8	63,075	63,75		-		38,2	-				
11:00	569	449,5	429,4	62,4	62,5	62,5	60,7	60,8	61,1	61,2	60,95	61,15		-		39,1	-				
11:20	596	470,8	437,7	72,1	72,3	72,2	58,1	58,2	59,1	59,3	58,675	59,2		34,6	39,8	91	91	89			
11:40	512	404,5	432,1	75,1	75,4	75,3	56,8	56,9	57,7	57,6	57,25	57,65		35,9	39,4	147	56	55			
12:00	575	454,3	435,3	73,4	73,5	73,5	70,1	70,2	72,1	72,3	71,175	72,2		36,5	40,1	195	48	47			
12:20	567	447,9	436,9	74,2	74,5	74,4	74,2	74,1	75,1	75,2	74,65	75,15		35,3	44,8	254	59				
12:40	586	462,9	439,8	71,3	71,4	71,4	78,7	78,9	78,9	79,0	78,875	78,95		37,1	44,8	315	61				
13:00	578	456,6	441,5	77,9	77,8	77,9	70,1	70,2	71,2	71,3	70,7	71,25		34,7	41,6	378	63				
13:20	565	446,4	441,9	79,1	79,2	79,2	65,8	65,7	66,7	66,8	66,25	66,75		34,5	42,8	435	57				
13:40	440	347,6	434,0	72,1	72,3	72,2	65,8	65,7	66,7	66,8	66,25	66,75		32,6	42,1	512	77				
14:00	395	312,1	424,7	65,5	65,6	65,6	60,1	60,2	61,6	60,5	60,6	61,05		31,8	40,5	594	82				
rata-rata		424,66				68,54					63,30										

$$\begin{aligned}\dot{V}_{alat} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{594 \text{ ml}}{4 \text{ jam}} = 148,5 \text{ ml/jam}\end{aligned}$$

$$\begin{aligned}\dot{V} &= \frac{\text{Total volume air tawar (mL)}}{t} \\ &= \frac{594 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,04125 \text{ ml/s} = 4,125 \times 10^{-5} \text{ l/s} \\ &= 4,125 \times 10^{-8} \text{ m}^3/\text{s}\end{aligned}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{89}{91} = 0,978021 \frac{\text{g}}{\text{cm}^3} = 978,02 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{55}{56} = 0,982142 \frac{\text{g}}{\text{cm}^3} = 982,14 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{47}{48} = 0,979166 \frac{\text{g}}{\text{cm}^3} = 979,16 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 979,763 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 979,763 \text{ kg/m}^3 \times 4,125 \times 10^{-8} \text{ m}^3/\text{s} = 0,00004041 \text{ kg/s}$$

$$A_d = \text{Panjang(m)} \times \text{Lebar(m)} = 0,97\text{m} \times 0,765\text{m} = 0,74205\text{m}^2$$

$$C_{p\text{air}} = 68,54^\circ\text{C} = 4,189 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,189 \text{ kJ/kgK} \times (68,54^\circ\text{C} - 63,30^\circ\text{C}) = 21,95 \text{ kJ/kg}$$

$$G_{rata-rata} = 424,66 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00004041 \text{ kg/s} \times 21,95 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 424,66 \text{ W/m}^2} \times 100\% = 28,14 \%$$

Lampiran 2. 8 Data Pengujian Dan Perhitungan Absorber Batu Kali Pada Percobaan 3

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV	Δm	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)		
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar											
				1	2		Dalam		Luar														
10:00	328	259.1	259.1	51.8	52	51.9	53.8	51.2	54.2	54.6	52.5	54.4	33,8	-	36,8	36.5	-	-	7,52	25,71			
10:20	200	158	208.55	50.6	50.6	50.6	49	50.9	52.4	51.3	49.95	51.85		-		37	-	-					
10:40	394	311.2	242.7	54	54.4	54.2	54.9	52.7	54.7	50.5	53.8	52.6		-		37	-	-					
11:00	223	176.1	226.1	54.6	54.6	54.6	51.3	49.2	51.4	50.1	50.25	50.75		-		36.6	-	-					
11:20	244	192.7	219.4	55.6	56.5	56	51.8	50.4	52.2	51.5	51.1	51.85				36.1	-	-					
11:40	521	411.5	251.4	68.4	68.6	68.5	60	60.7	61.7	60.8	60.35	61.25				36.9	-	-					
12:00	523	413.1	274.5	68.9	69.3	69.1	61.8	61.3	61.9	61	61.55	61.45		33,8		37.3	36,8	37.8			44	44	41
12:20	353	278.8	275	67.6	68.2	67.9	56	56.3	56.2	55.5	56.15	55.85				37.5		37.5			82	38	37
12:40	140	110.6	256.7	57.5	58.1	57.8	50.3	50.4	49.4	48	50.35	48.7				35.7		36.1			121	39	37
13:00	463	365.7	267.6	67.6	68	67.8	56.4	56.3	51.5	52.6	56.35	52.05				34.3		37			151	30	
13:20	459	362.6	276.3	66.2	67.5	66.8	58.8	56.3	57.6	57.8	57.55	57.7				36.3		37.8			191	40	
13:40	303	239.3	273.2	65	66.8	65.9	58.2	56.2	59.6	56.7	57.2	58.15				38.2		37			231	40	
14:00	88	69.5	257.5	58.8	58.3	58.5	49.8	47.4	49.2	47.8	48.6	48.5		38.4		37.9	292	61					
rata-rata																							

$$\dot{V}_{alat} = \frac{\text{Total volume air tawar (mL)}}{t}$$

$$= \frac{292 \text{ ml}}{4 \text{ jam}} = 73 \text{ ml/jam}$$

$$\dot{V} = \frac{\text{Total volume air tawar (mL)}}{t}$$

$$= \frac{292 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,02027 \text{ ml/s} = 2 \times 10^{-5} \text{ l/s}$$

$$= 2 \times 10^{-8} \text{ m}^3/\text{s}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{41}{44} = 0,931818 \frac{\text{g}}{\text{cm}^3} = 931,18 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{37}{38} = 0,973684 \frac{\text{g}}{\text{cm}^3} = 973,68 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{37}{39} = 0,948717 \frac{\text{g}}{\text{cm}^3} = 948,71 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 951,40 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 951,40 \text{ kg/m}^3 \times 2 \times 10^{-8} \text{ m}^3/\text{s} = 0,00001908 \text{ kg/s}$$

$$A_d = \text{Panjang(m)} \times \text{Lebar(m)} = 0,97\text{m} \times 0,765\text{m} = 0,74205\text{m}^2$$

$$C_{p\text{air}} = 60,73^\circ\text{C} = 4,185 \text{ kJ/kgK}$$

$$h = C_{p\text{air}} \times \Delta T = 4,185 \text{ kJ/kgK} \times (60,73^\circ\text{C} - 54,28^\circ\text{C}) = 27 \text{ kJ/kg}$$

$$G_{rata-rata} = 457,5 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00001908 \text{ kg/s} \times 27 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 457,5 \text{ W/m}^2} \times 100\% = 25,71 \%$$

Lampiran 2. 9 Data Pengujian Dan Perhitungan Absorber Cangkang Kerang Darah Pada Percobaan 9

Pukul	E _{globe} (lux) x 100	E _{globe} (W/m ²) (X0,0079)	E _{rata-rata} (W/m ²)	T _{abs} (°C)			T _{kaca} (°C)						T _{in}	T _{out}	T _{avg}	T _{ling}	Volume Air Tawar (ml)	ΔV	Δm	pH Air Tawar yang dihasilkan	Efisiensi Distilasi (%)
				Titik		Rata- rata	Titik				Rata- rata kaca dalam	Rata- rata kaca luar									
				1	2		Dalam		Luar												
10:00	318	251.22	251.22	50.8	51	50.9	52.8	50.2	53.2	53.6	51.5	53.4	31,8	-	33,8	35,5	-	--	7,41	23,01	
10:20	190	150.1	200.6	49.6	49.6	49.6	48	49.9	51.4	50.3	48.95	50.85		-		36	-	-			
10:40	384	303.36	234.8	53	53.4	53.2	53.9	51.7	53.7	49.5	52.8	51.6		-		36	-	-			
11:00	213	168.27	218.2	53.6	53.6	53.6	50.3	48.2	50.4	49.1	49.25	49.75		-		35,6	-	-			
11:20	234	184.86	211.5	54.6	55.5	55	50.8	49.4	51.2	50.5	50.1	50.85		-		35,1	-	-			
11:40	511	403.69	243.5	67.4	67.6	67.5	59	59.7	60.7	59.8	59.35	60.25		-		35,9	-	-			
12:00	513	405.27	266.6	67.9	68.3	68.1	60.8	60.3	60.9	60	60.55	60.45		36,3		36,8	34	34			32
12:20	343	270.97	267.2	66.6	67.2	66.9	55	55.3	55.2	54.5	55.15	54.85		36,5		36,5	72	38			36
12:40	130	102.7	248.93	56.5	57.1	56.8	49.3	49.4	48.4	47	49.35	47.7		34,7		35,1	111	39			37
13:00	453	357.87	259.8	66.6	67	66.8	55.4	55.3	50.5	51.6	55.35	51.05		33,3		36	141	30			
13:20	449	354.71	268.44	65.2	66.5	65.8	57.8	55.3	56.6	56.8	56.55	56.7		35,3		36,8	181	40			
13:40	293	231.47	265.3	64	61.8	64.9	57.2	55.2	58.6	55.7	56.2	57.15		37,2		36	221	40			
14:00	78	61.62	249.68	57.8	57.3	57.5	48.8	46.4	48.2	46.8	47.6	47.5	37,4	36,9	282	61					
rata-rata																					

$$\dot{V}_{alat} = \frac{\text{Total volume air tawar (mL)}}{t}$$

$$= \frac{282 \text{ ml}}{4 \text{ jam}} = 70,5 \text{ ml/jam}$$

$$\dot{V} = \frac{\text{Total volume air tawar (mL)}}{t}$$

$$= \frac{282 \text{ ml}}{4 \text{ jam} \times 60 \text{ menit} \times 60 \text{ s}} = 0,01958 \text{ ml/s} = 1,9 \times 10^{-5} \text{ l/s}$$

$$= 1,9 \times 10^{-8} \text{ m}^3/\text{s}$$

$$\rho = \frac{\dot{m}_p}{\dot{V}} \rightarrow \dot{m}_p = \rho \times \dot{V}$$

$$\rho_1 = \frac{\Delta m}{\Delta v} = \frac{32}{34} = 0,9411764 \frac{\text{g}}{\text{cm}^3} = 941,17 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_2 = \frac{\Delta m}{\Delta v} = \frac{36}{38} = 0,973684 \frac{\text{g}}{\text{cm}^3} = 973,68 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_3 = \frac{\Delta m}{\Delta v} = \frac{37}{39} = 0,948717 \frac{\text{g}}{\text{cm}^3} = 948,71 \frac{\text{kg}}{\text{m}^3}$$

$$\rho_{rata-rata} = 945,74 \text{ kg/m}^3$$

$$\dot{m}_p = \rho \times \dot{V}$$

$$= 945,74 \text{ kg/m}^3 \times 1,9 \times 10^{-8} \text{ m}^3/\text{s} = 0,00001796 \text{ kg/s}$$

$$A_d = \text{Panjang(m)} \times \text{Lebar(m)} = 0,97\text{m} \times 0,765\text{m} = 0,74205\text{m}^2$$

$$C_{p_{air}} = 59,75^\circ\text{C} = 4,185 \text{ kJ/kgK}$$

$$h = C_{p_{air}} \times \Delta T = 4,185 \text{ kJ/kgK} \times (59,75^\circ\text{C} - 53,28^\circ\text{C}) = 27,07 \text{ kJ/kg}$$

$$G_{rata-rata} = 249,68 \text{ W/m}^2$$

Efisiensi Distilasi :

$$\eta_d = \frac{\dot{m}_p \times h_{fg}}{A_d \times G} \times 100 \%$$

$$= \frac{0,00001796 \text{ kg/s} \times 27,07 \times 10^3 \text{ J/kg}}{0,74205 \text{ m}^2 \times 249,68 \text{ W/m}^2} \times 100\% = 23,01 \%$$

Lampiran 3. Tabel Data Referensi yang Digunakan

Lampiran 3. 1 Tabel Termodinamika Yang Digunakan

Temp. T °C	Sat. Press. P_{sat} kPa	Specific volume m^3/kg		Internal energy kJ/kg			Enthalpy kJ/kg			Entropy $kJ/kg-K$		
		Sat. Liquid v_f	Sat. Vapor v_g	Sat. Liquid u_f	Evap. u_{fg}	Sat. Vapor u_g	Sat. Liquid h_f	Evap. h_{fg}	Sat. Vapor h_g	Sat. Liquid s_f	Evap. s_{fg}	Sat. Vapor s_g
0.01	0.6117	0.001000	206.00	0.000	2374.9	2374.9	0.001	2500.9	2500.9	0.0000	9.1556	9.1556
5	0.8725	0.001000	147.03	21.019	2360.8	2381.8	21.020	2489.1	2510.1	0.0763	8.9487	9.0249
10	1.2281	0.001000	106.32	42.020	2346.6	2388.7	42.022	2477.2	2519.2	0.1511	8.7488	8.8999
15	1.7057	0.001001	77.885	62.980	2332.5	2395.5	62.982	2465.4	2528.3	0.2245	8.5559	8.7803
20	2.3392	0.001002	57.762	83.913	2318.4	2402.3	83.915	2453.5	2537.4	0.2965	8.3696	8.6661
25	3.1698	0.001003	43.340	104.83	2304.3	2409.1	104.83	2441.7	2546.5	0.3672	8.1895	8.5567
30	4.2469	0.001004	32.879	125.73	2290.2	2415.9	125.74	2429.8	2555.6	0.4368	8.0152	8.4520
35	5.6291	0.001006	25.205	146.63	2276.0	2422.7	146.64	2417.9	2564.6	0.5051	7.8466	8.3517
40	7.3851	0.001008	19.515	167.53	2261.9	2429.4	167.53	2406.0	2573.5	0.5724	7.6832	8.2556
45	9.5953	0.001010	15.251	188.43	2247.7	2436.1	188.44	2394.0	2582.4	0.6386	7.5247	8.1633
50	12.352	0.001012	12.026	209.33	2233.4	2442.7	209.34	2382.0	2591.3	0.7038	7.3710	8.0748
55	15.763	0.001015	9.5639	230.24	2219.1	2449.3	230.26	2369.8	2600.1	0.7680	7.2218	7.9898
60	19.947	0.001017	7.6670	251.16	2204.7	2455.9	251.18	2357.7	2608.8	0.8313	7.0769	7.9082
65	25.043	0.001020	6.1935	272.09	2190.3	2462.4	272.12	2345.4	2617.5	0.8937	6.9360	7.8296
70	31.202	0.001023	5.0396	293.04	2175.8	2468.9	293.07	2333.0	2626.1	0.9551	6.7989	7.7540
75	38.597	0.001026	4.1291	313.99	2161.3	2475.3	314.03	2320.6	2634.6	1.0158	6.6655	7.6812
80	47.416	0.001029	3.4053	334.97	2146.6	2481.6	335.02	2308.0	2643.0	1.0756	6.5355	7.6111
85	57.868	0.001032	2.8261	355.96	2131.9	2487.8	356.02	2295.3	2651.4	1.1346	6.4089	7.5435
90	70.183	0.001036	2.3593	376.97	2117.0	2494.0	377.04	2282.5	2659.6	1.1929	6.2853	7.4782
95	84.609	0.001040	1.9808	398.00	2102.0	2500.1	398.09	2269.6	2667.6	1.2504	6.1647	7.4151
100	101.42	0.001043	1.6720	419.06	2087.0	2506.0	419.17	2256.4	2675.6	1.3072	6.0470	7.3542
105	120.90	0.001047	1.4186	440.15	2071.8	2511.9	440.28	2243.1	2683.4	1.3634	5.9319	7.2952
110	143.38	0.001052	1.2094	461.27	2056.4	2517.7	461.42	2229.7	2691.1	1.4188	5.8193	7.2382
115	169.18	0.001056	1.0360	482.42	2040.9	2523.3	482.59	2216.0	2698.6	1.4737	5.7092	7.1829
120	198.67	0.001060	0.89133	503.60	2025.3	2528.9	503.81	2202.1	2706.0	1.5279	5.6013	7.1292

Lampiran 3. 2 Tabel Densitas Air Yang Digunakan

Temp.	Density (0-100°C at 1 atm, >100 °C at <u>saturation pressure</u>)					Specific weight		Thermal expansion coefficient
	[°C]	[g/cm ³]	[kg/m ³]	[sl/ft ³]	[lb _m /ft ³]	[lb _m /gal(US liq)]	[kN/m ³]	
35	0.9940326	994.03	1.9287	62.0554	8.2956	9.7481	62.055	3.45
40	0.9922152	992.22	1.9252	61.9420	8.2804	9.7303	61.942	3.84

Lampiran 3. 3 Daftar Berat Jenis Air

DAFTAR BERAT JENIS AIR

Temperatur (t°C)	Berat Jenis	Temperatur (t°C)	Berat Jenis
20	0,9982	30	0,9957
21	0,9980	31	0,9954
22	0,9978	32	0,9951
23	0,9976	33	0,9947
24	0,9973	34	0,9944
25	0,9971	35	0,9941
26	0,9968	36	0,9937
27	0,9965	37	0,9934
27,5	0,9964	38	0,9930
28	0,9963	39	0,9926
29	0,9960	40	0,9922

**Lampiran 4. Gambar Distilasi Air
Laut Tenaga Surya Tipe Kolektor
Plat Datar yang Dibuat**



Lampiran 4. 1 Tampak Depan Dari Alat Distilasi yang Dibuat Pada Saat Pengujian



Lampiran 4. 2 Tampak Samping Dari Alat Distilasi Yang Dibuat Pada Saat Pengujian



Lampiran 4. 3 Tampak Belakang Dari Alat Distilasi Yang Dibuat Pada Saat Pengujian



Lampiran 4. 4 Distilasi Air Laut Tenaga Surya Tipe Kolektor Plat Datar Full Absorber

**Lampiran 5. Desain dari Distilasi
Tenaga Surya Tipe Kolektor Plat
Datar yang Dibuat**







