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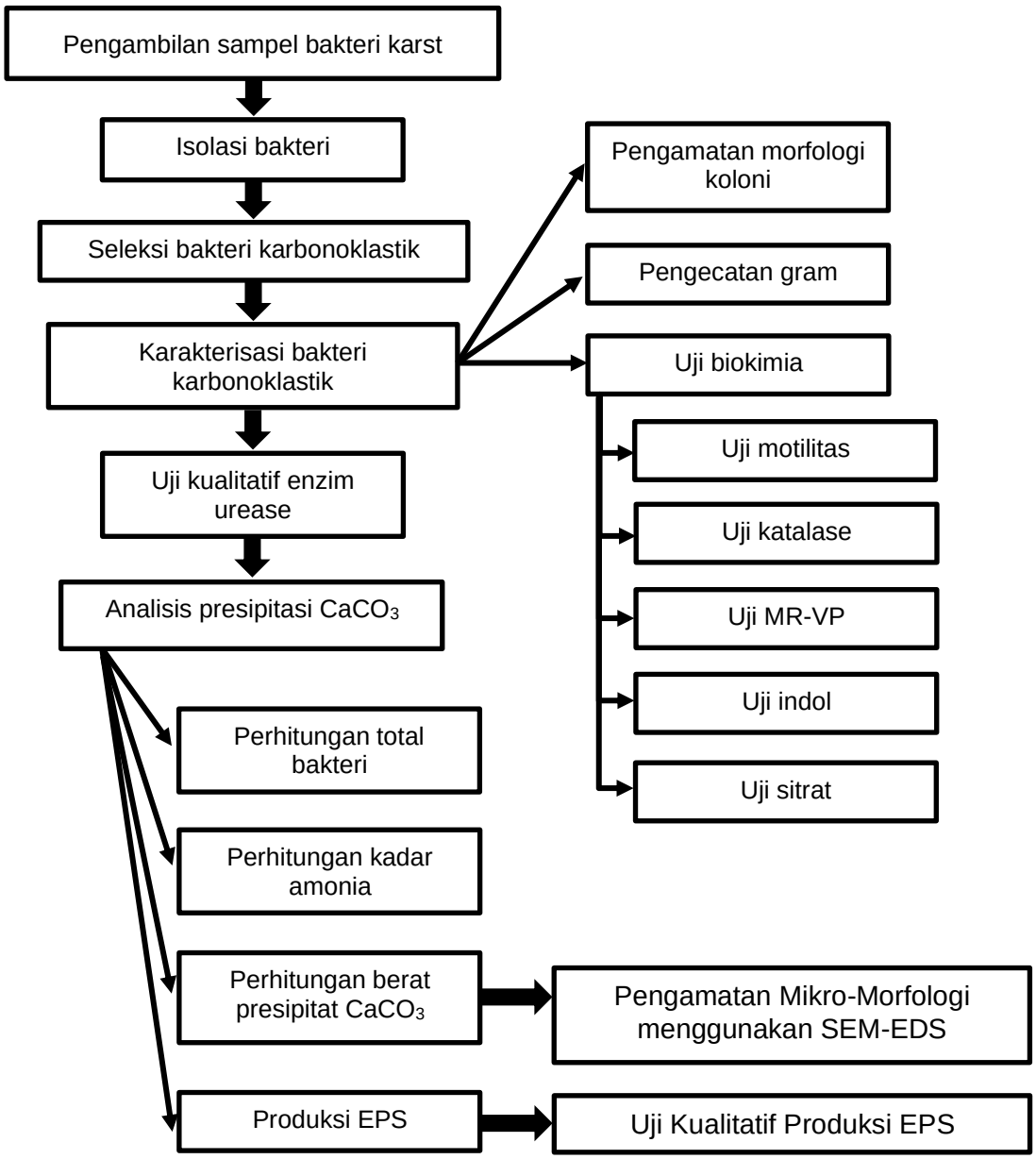
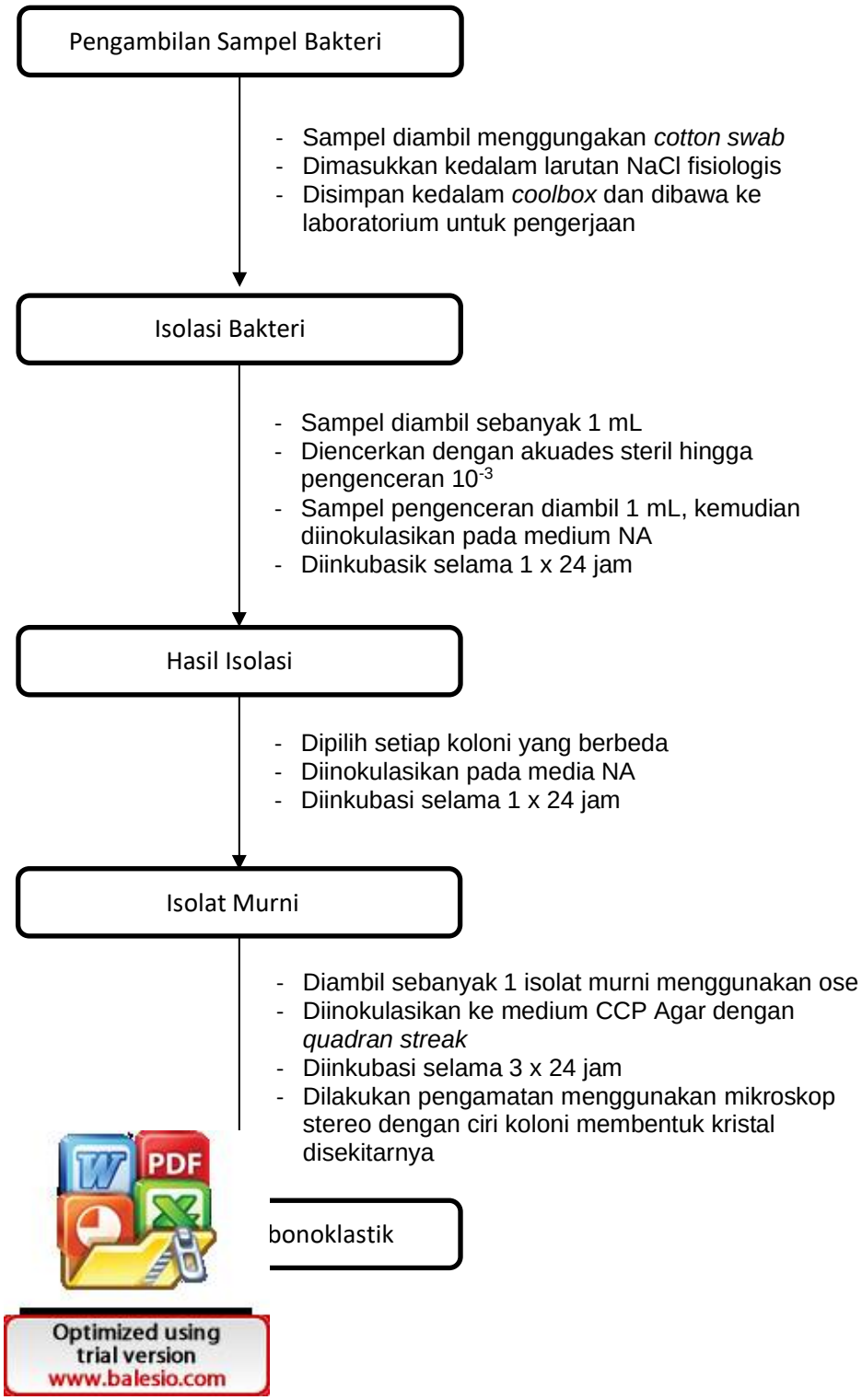
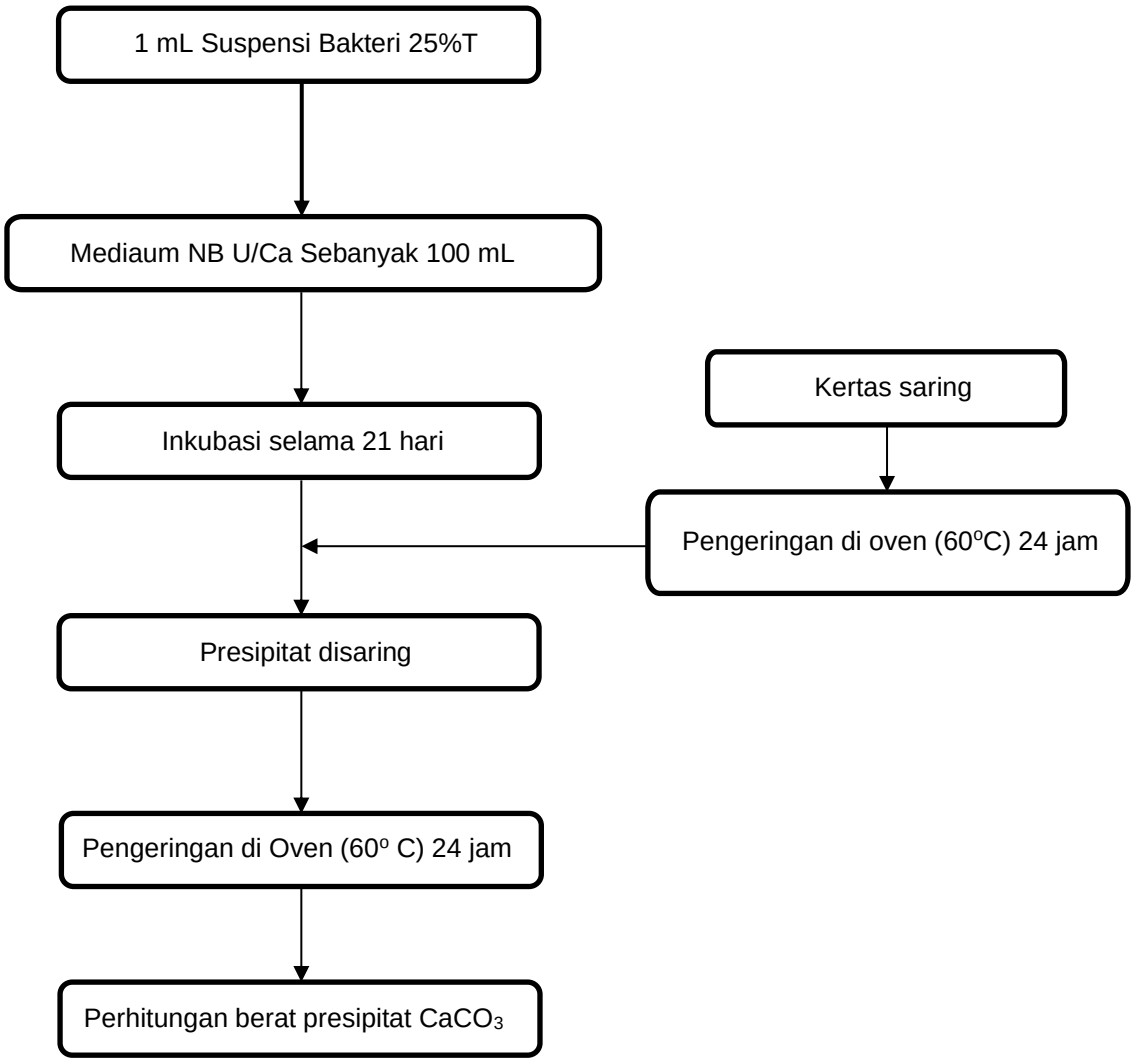
Lampiran 1. Skema Kerja Penelitian



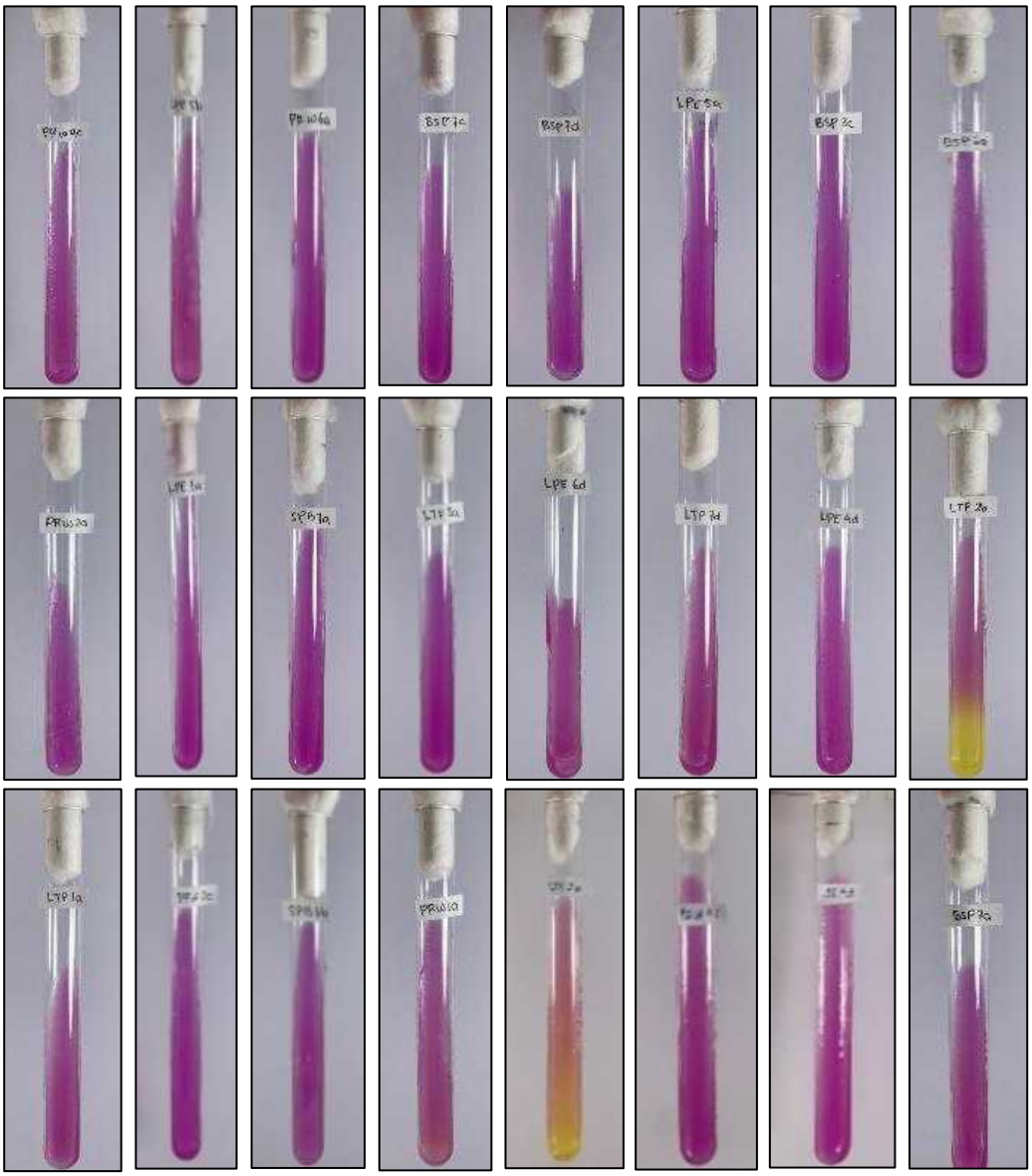
Lampiran 2. Skema Kerja Pengambilan Sampel, Isolasi dan Seleksi Bakteri Karbonoklastik



Lampiran 3. Skema Kerja Uji Presipitat $CaCO_3$ yang Dihasilkan Bakteri Karbonoklastik

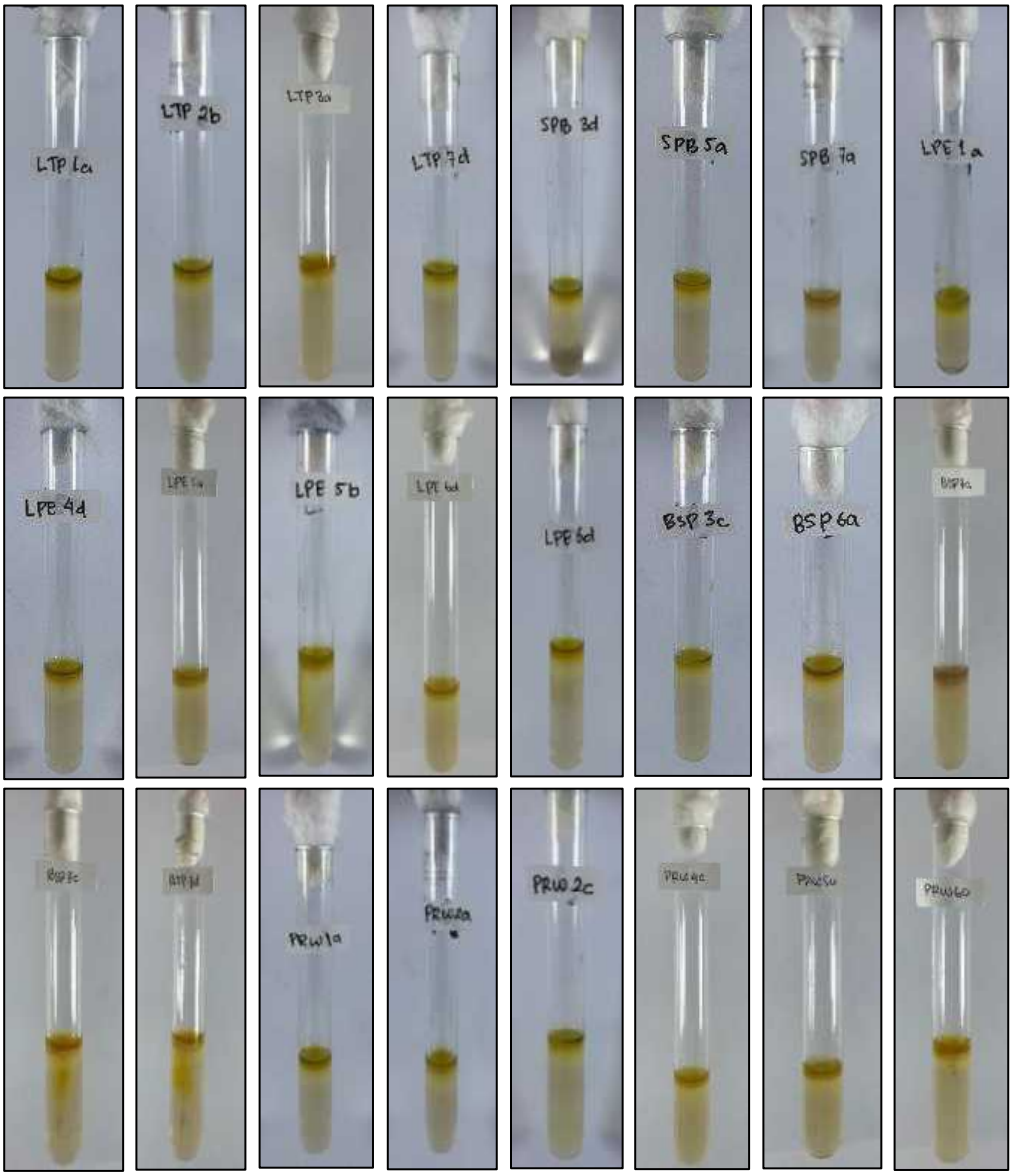


Lampiran 4. Hasil Uji Kualitatif Enzim Urease



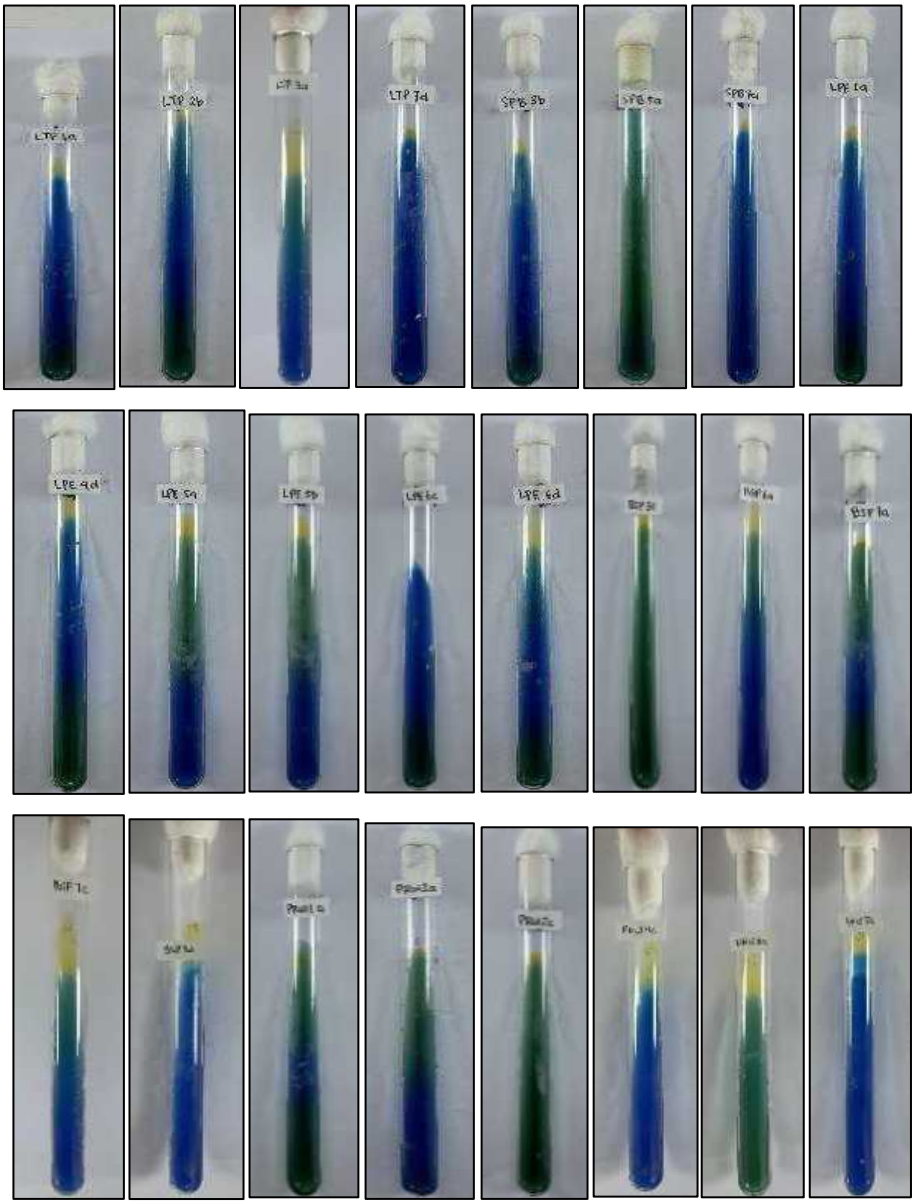
Gambar 18. Hasil Uji Kualitatif Enzim Urease Pada Media Christensen Urea Agar.

Lampiran 5. Hasil Uji SIM (Sulfid Indole Motiliy)



Gambar 19. Hasil Isolat Bakteri Karbonoklastik Pada Media SIM.

Lampiran 6. Hasil Uji Sitrat Isolat Bakteri Karbonoklastik

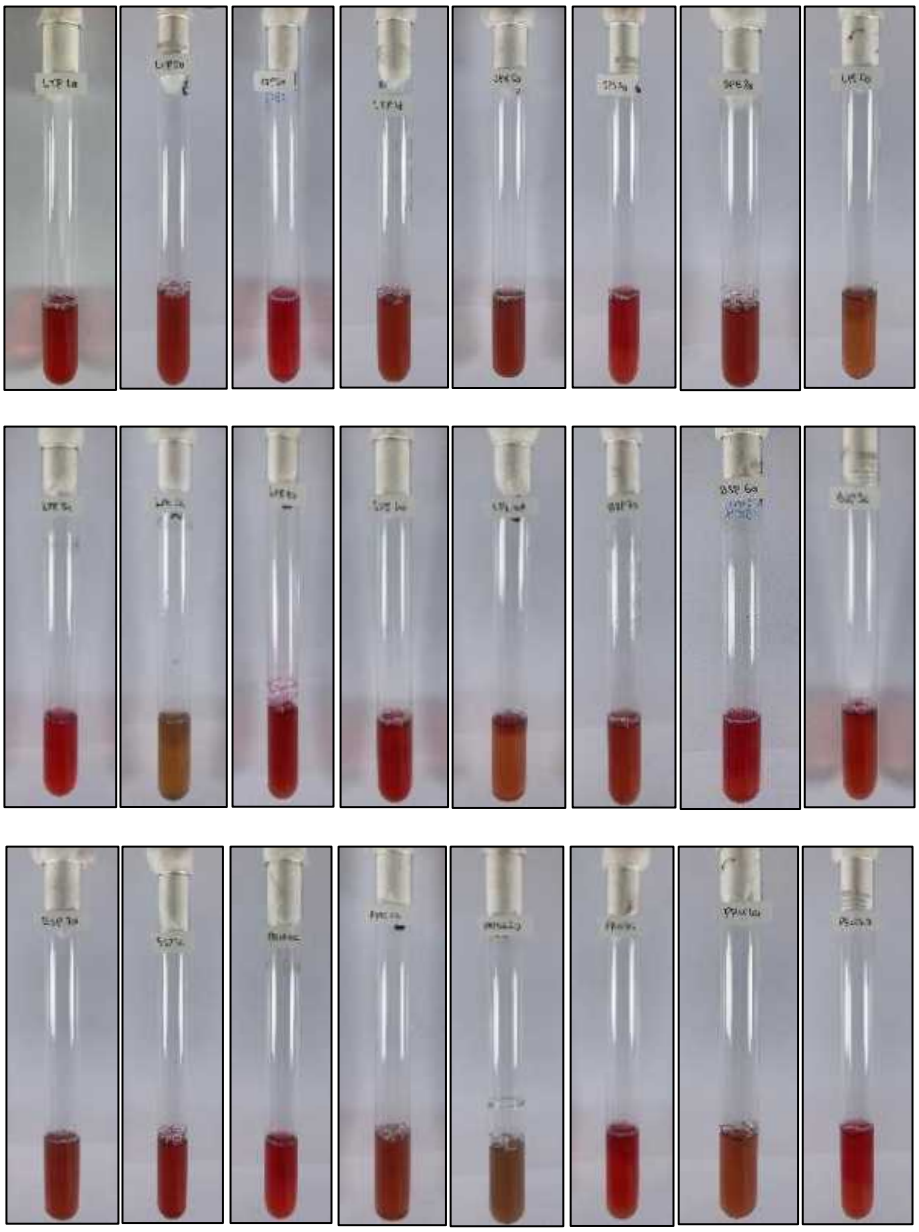


Gambar 20. Hasil Uji Sitrat Isolat Bakteri Karbonoklastik Pada Media *Simmon Citrate Agar.*

Lampiran 7. Hasil Uji Methyl Red Isolat Bakteri Karbonoklastik

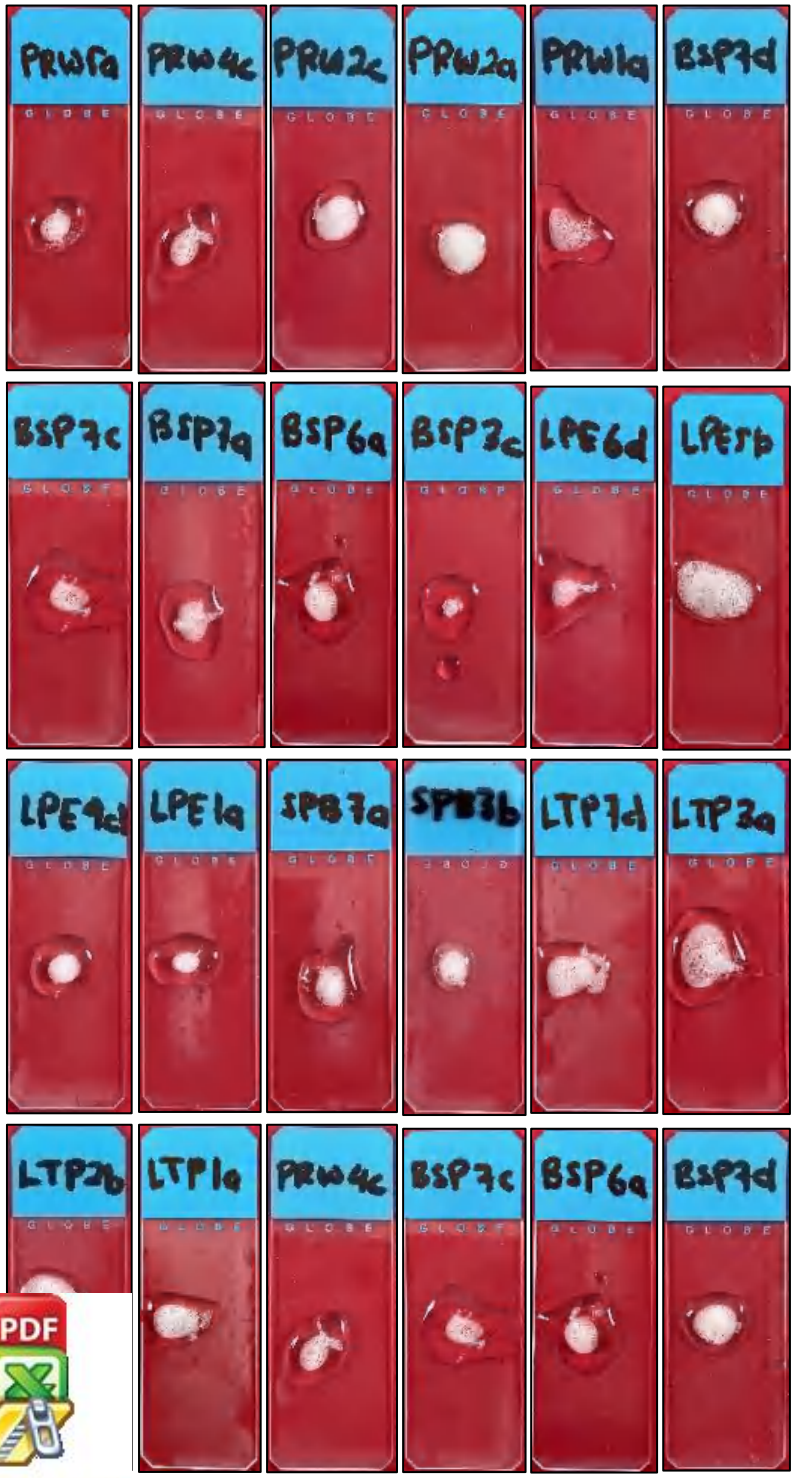
Gambar 21. Hasil Uji Methyl Red Isolat Bakteri Karbonoklastik Pada Media MR-VP.

Lampiran 8. Hasil Uji Voges Preskauer Isolat Bakteri Karbonoklastik



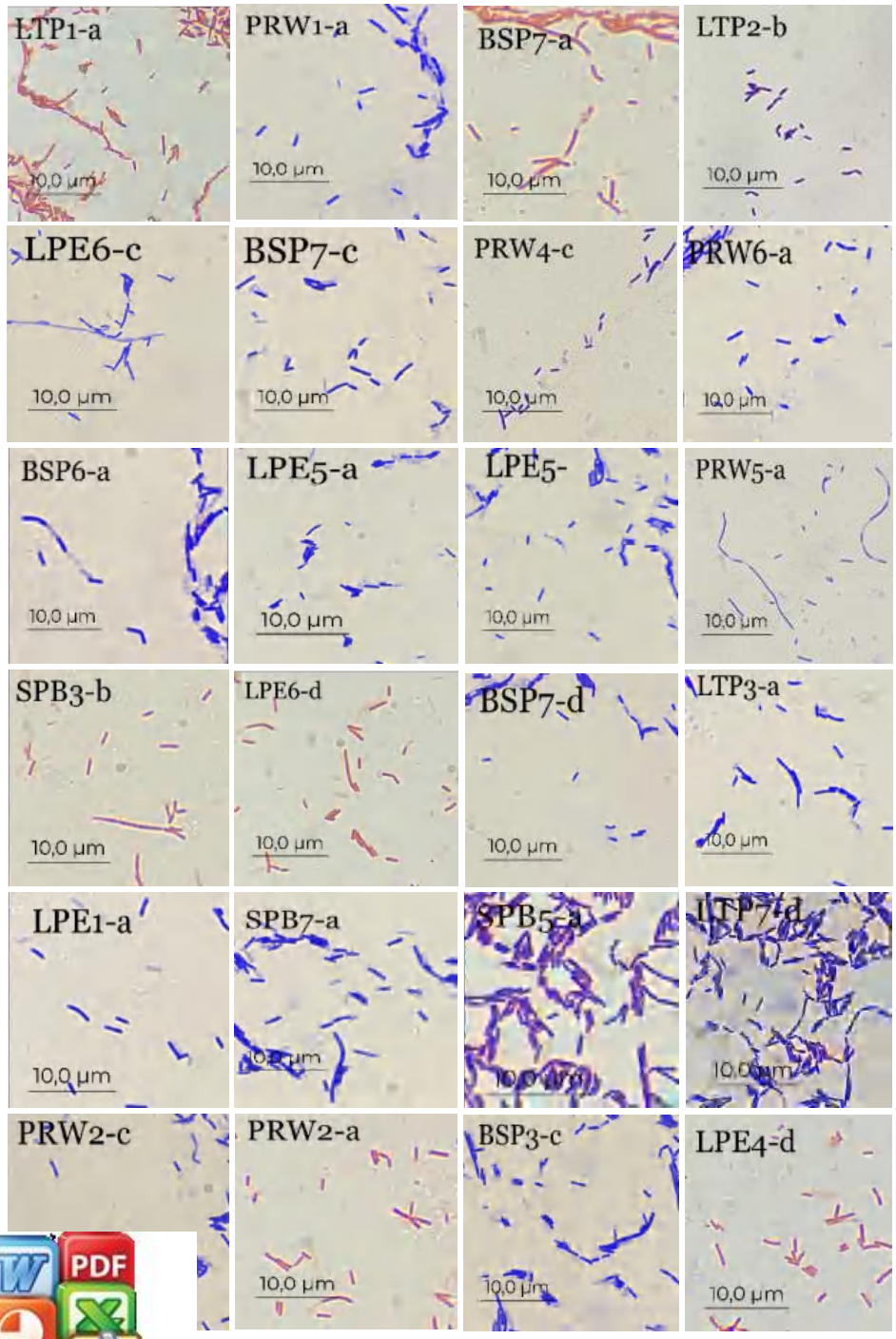
Gambar 22. Hasil Uji Voges Preskauer Isolat Bakteri Karbonoklastik Pada Media MR-VP.

Lampiran 9. Hasil Uji Katalase Isolat Bakteri Karbonoklastik



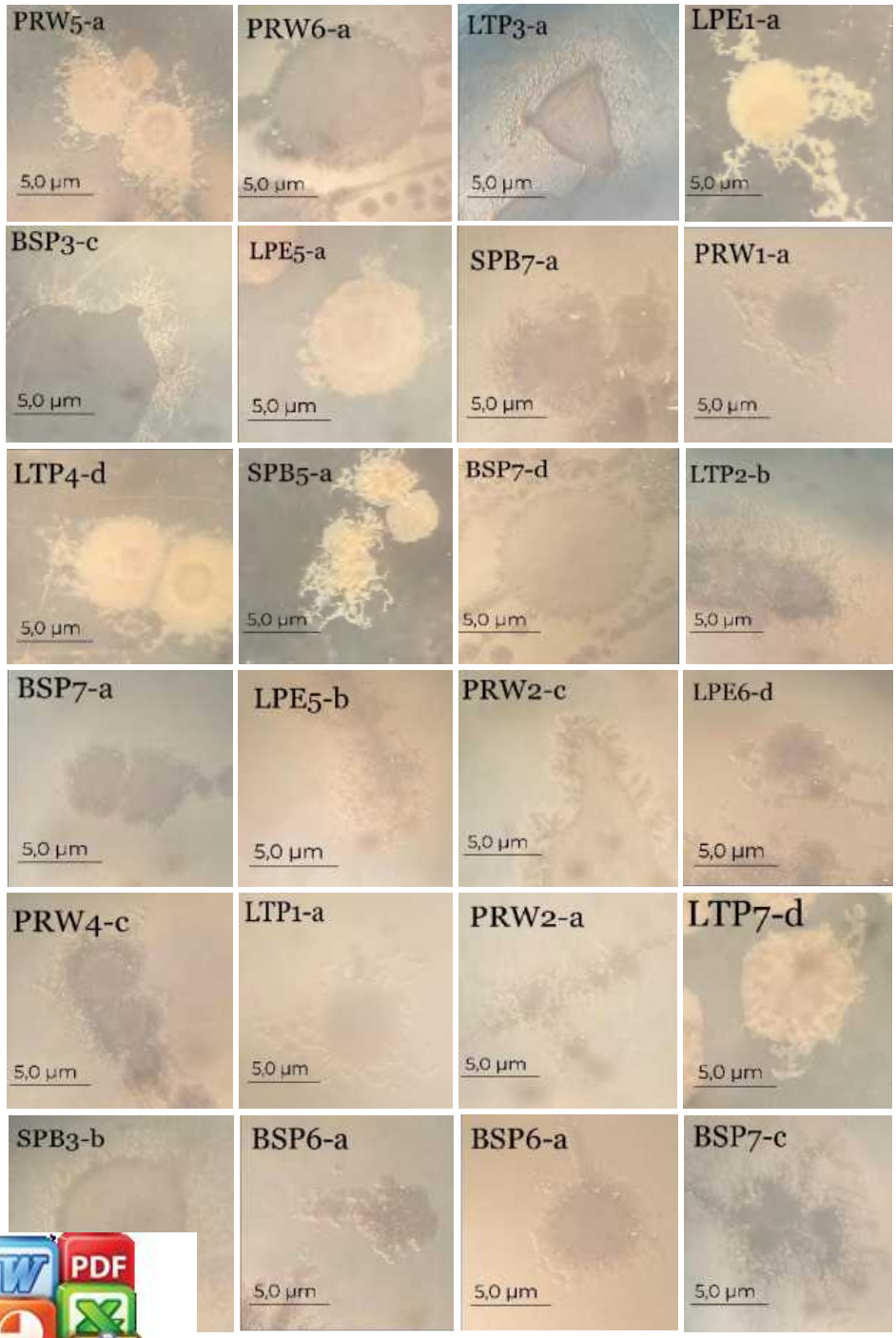
r 23. Hasil Uji Katalase Isolat Bakteri Karbonoklastik.

Lampiran 10. Hasil Karakterisasi Gram Staining Pada Bakteri Karbonoklastik



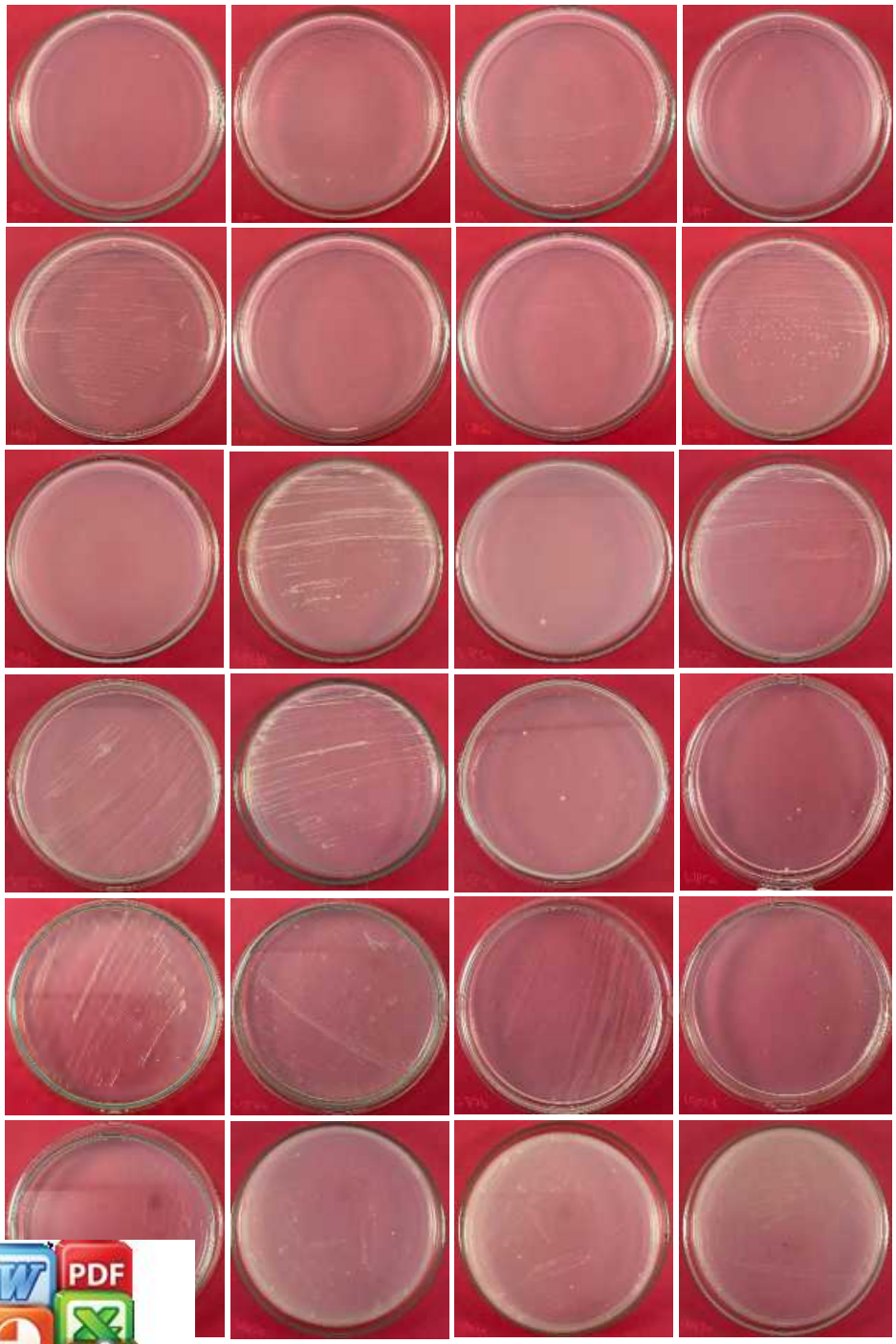
4. Hasil *Gram Staining* Pada Isolat Bakteri Karbonoklastik.

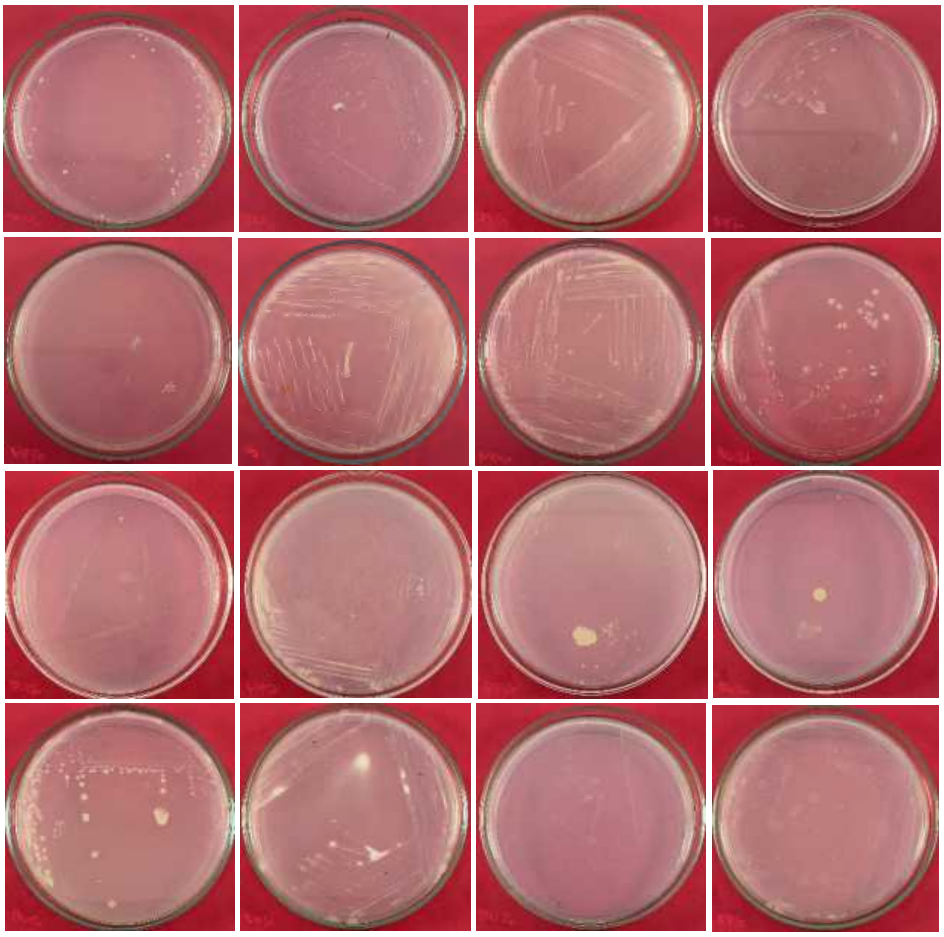
Lampiran 11. Hasil Seleksi Isolat Bakteri Karbonoklastik



Gambar 25. Hasil Seleksi Isolat Bakteri Karbonoklastik.

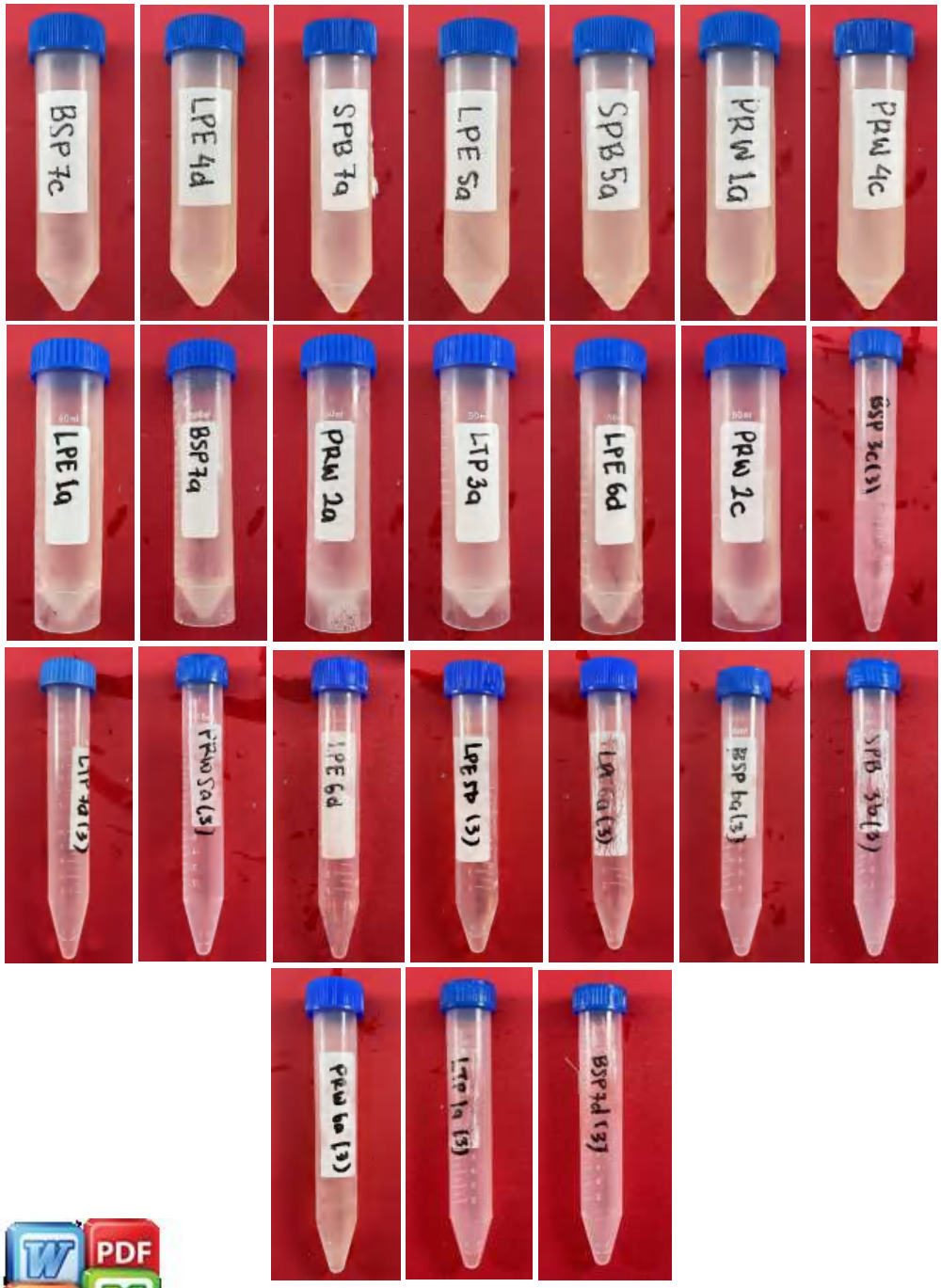
Lampiran 12. Hasil Isolasi Bakteri Karbonoklastik





Gambar 26. Hasil Isolasi Bakteri Asal Lukisan Prasejarah Karst Maros-Pangkep.

Lampiran 13. Sampel Eksopolisakarida Asal Bakteri Karbonoklastik

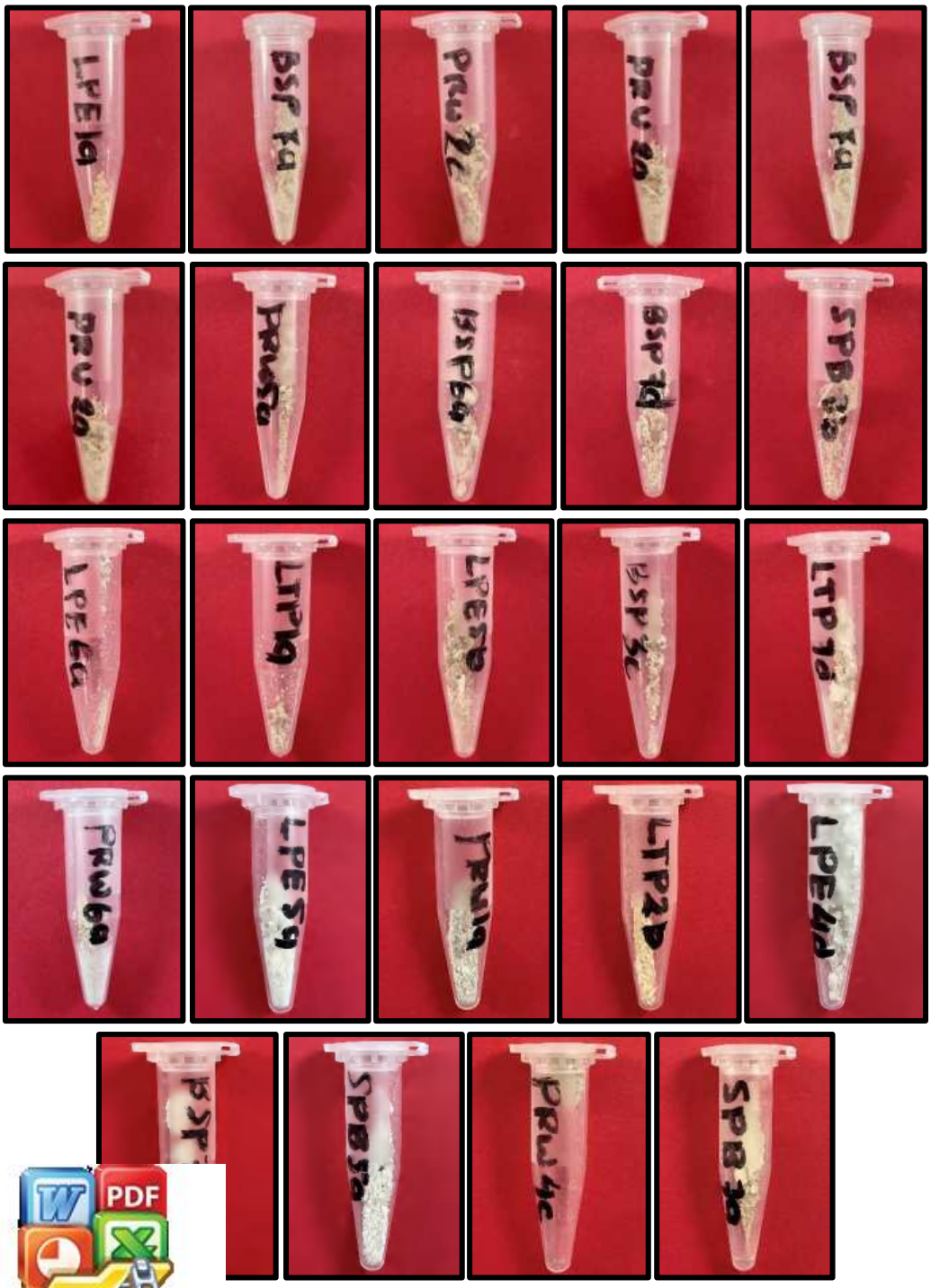


ambar 27. Sampel EPS Bakteri Karbonoklastik.

Lampiran 14. Uji Potensi Presipitat CaCO3 Oleh Bakteri Karbonoklastik Pada Media NB U/Ca

nkubasi Bakteri Karbonoklastik Pada Media NB U/Ca Setelah 21 Hari.

Lampiran 15. Hasil Presipitasi $CaCO_3$ Asal Bakteri Karbonoklastik



ar 29. Presipitat $CaCO_3$ Asal Bakteri Karbonoklastik.

Lampiran 16. Hasil Perhitungan Berat Presipitat $CaCO_3$ Asal Bakteri Karbonoklastik

Tabel 10. Hasil Perhitungan Berat Presipitat $CaCO_3$.

Isolat	Berat Presipitasi (mg)			Berat Presipitat (mg/mL)	Standar Deviasi
	Berat presipitat dan Berat Kertas Saring (Wfc)	Berat Kertas Saring (Wf)	Berat Presipitat (Wc)		
	1169.3	1087.7	81.60		
LTP1-a	1169.4	1087.7	81.70	8.15	0.26
	1168.9	1087.7	81.20		
	1172.7	1021.6	151.10		
LTP2-b	1172.3	1021.6	150.70	15.07	0.35
	1172	1021.6	150.40		
	911.5	808.3	103.20		
LTP3-a	911.4	808.3	103.10	10.30	0.26
	911	808.3	102.70		
	1173	1007	166.00		
LTP7-d	1173	1007	166.00	16.61	0.23
	1173.4	1007	166.40		
	1186.6	1087.4	99.20		
SBP3-b	1186.5	1087.4	99.10	9.92	0.10
	1186.7	1087.4	99.30		
	1002.3	790	212.30		
SPB5-a	1002.4	790	212.40	21.23	0.10
	1002.2	790	212.20		
	1197.5	960.8	236.70		
SPB7-a	1197.5	960.8	236.70	23.68	0.12
	1197.7	960.8	236.90		
	852	809.9	42.10		
LPE1-a	852.2	809.9	42.30	4.22	0.10
	852.1	809.9	42.20		
	1078.2	702	376.20		
	78.2	702	376.20	37.61	0.12
	)78	702	376.00		
	60.5	783.1	277.40		
	60.3	783.1	277.20	27.73	0.10
	60.4	783.1	277.30		
	54.5	977.9	176.60	17.63	0.25

Isolat	Berat Presipitasi (mg)			Berat Presipitat (mg/mL)	Standar Deviasi
	Berat presipitat dan Berat Kertas Saring (Wfc)	Berat Kertas Saring (Wf)	Berat Presipitat (Wc)		
	1154.2	977.9	176.30		
	1154	977.9	176.10		
	1159.1	1088.5	70.60		
LPE6-a	1159.6	1088.5	71.10	7.04	0.82
	1158	1088.5	69.50		
	925.1	810.8	114.30		
LPE6-d	925	810.8	114.20	11.44	0.32
	925.6	810.8	114.80		
	1145	1002.3	142.70		
BSP3-c	1145.3	1002.3	143.00	14.28	0.21
	1144.9	1002.3	142.60		
	1158.3	984.2	174.10		
BSP6-a	1158.9	984.2	174.70	17.43	0.35
	1158.3	984.2	174.10		
	860.9	765.5	95.40		
BSP7-a	860.8	765.5	95.30	9.52	0.32
	860.3	765.5	94.80		
	1116.4	1008.2	108.20		
BSP7-c	1116.4	1008.2	108.20	10.82	0.00
	1116,2	1008.2	108.20		
	1195	922.1	272.90		
BSP7-d	1195.3	922.1	273.20	27.31	0.15
	1195.2	922.1	273.10		
	1230.3	924.9	305.40		
PRW1-a	1230.3	924.9	305.40	30.53	0.17
	1230	924.9	305.10		
	888.4	765.5	122.90		
PRW2-a	888.2	765.5	122.70	12.29	0.25
	8.7	765.5	123.20		
	2.3	806.2	186.10		
	2.1	806.2	185.90	18.82	3.87
	8.9	806.2	192.70		
	0.1	508.7	291.40	29.17	0.38
	0.2	508.7	291.50		

Isolat	Berat Presipitasi (mg)			Berat Presipitat (mg/mL)	Standar Deviasi
	Berat presipitat dan Berat Kertas Saring (Wfc)	Berat Kertas Saring (Wf)	Berat Presipitat (Wc)		
	800.8	508.7	292.10		
	1088.6	965.9	122.70		
PRW5-a	1088.3	965.9	122.40	12.25	0.21
	1088.2	965.9	122.30		
	1101.9	935.1	166.80		
PRW6-a	1101.3	935.1	166.20	16.65	0.30
	1101.6	935.1	166.50		

Lampiran 17. Perhitungan Kadar EPS

Tabel 11. Perhitungan kadar EPS.

Kode sampel	Intercept	Slope	Absorbansi	EPS terukur	Standar Deviasi
LTP1-a	0.0399	0.0293	0.53 0.53 0.53	16.68	0.02
LTP2-b	0.0399	0.0293	0.61 0.61 0.61	19.55	0.02
LTP3-a	0.0399	0.0293	1.93 1.93 1.93	64.39	0.02
LTP4-d	0.0399	0.0293	0.14 0.14 0.13	3.23	0.02
LTP7-d	0.0399	0.0293	0.18 0.18 0.18	4.83	0.02
[illegible]3-b	0.0399	0.0293	0.15 0.16 0.16	3.92	0.02
[illegible]5-a	0.0399	0.0293	0.70 0.70 0.70	22.54	0.02
[illegible]7-a	0.0399	0.0293	1.50 1.52	50.29	0.39

Kode sampel	Intercept	Slope	Absorbansi	EPS terukur	Standar Deviasi
			1.52		
			0.56		
LPE1-a	0.0399	0.0293	0.55	17.64	0.02
			0.56		
			0.78		
LPE5-a	0.0399	0.0293	0.77	25.09	0.10
			0.78		
			0.22		
LPE5-b	0.0399	0.0293	0.22	6.16	0.02
			0.22		
			0.32		
LPE6-a	0.0399	0.0293	0.32	9.48	0.02
			0.32		
			0.20		
LPE6-d	0.0399	0.0293	0.20	5.3	0.07
			0.19		
			0.94		
BSP3-c	0.0399	0.0293	0.93	30.53	0.22
			0.94		
			0.98		
›6-a	0.0399	0.0293	0.98	32.16	0.02
			0.98		
			0.47		
›7-a	0.0399	0.0293	0.47	14.69	0.02
			0.47		
›7-c	0.0399	0.0293	0.13	2.9	0.03

Kode sampel	Intercept	Slope	Absorbansi	EPS terukur	Standar Deviasi
			0.13		
			0.13		
			1.30		
BSP7-d	0.0399	0.0293	1,29	41.45	0.02
			1.26		
			0.22		
PRW1-a	0.0399	0.0293	0.27	45.43	0.03
			0.53		
			1.30		
PRW2-a	0.0399	0.0293	1.31	15.63	0.09
			1.30		
			0.14		
PRW2-c	0.0399	0.0293	0.14	3.29	0.02
			0.16		
			1.28		
PRW4-c	0.0399	0.0293	1.20	40.13	0.02
			1.29		
			0.23		
PRW5-a	0.0399	0.0293	0.28	6.54	0.04
			0.22		
			0.36		
W6-a	0.0399	0.0293	0.39	12.06	0.02
			0.33		

Lampiran 18. Hasil Perhitungan Kadar Amonia.

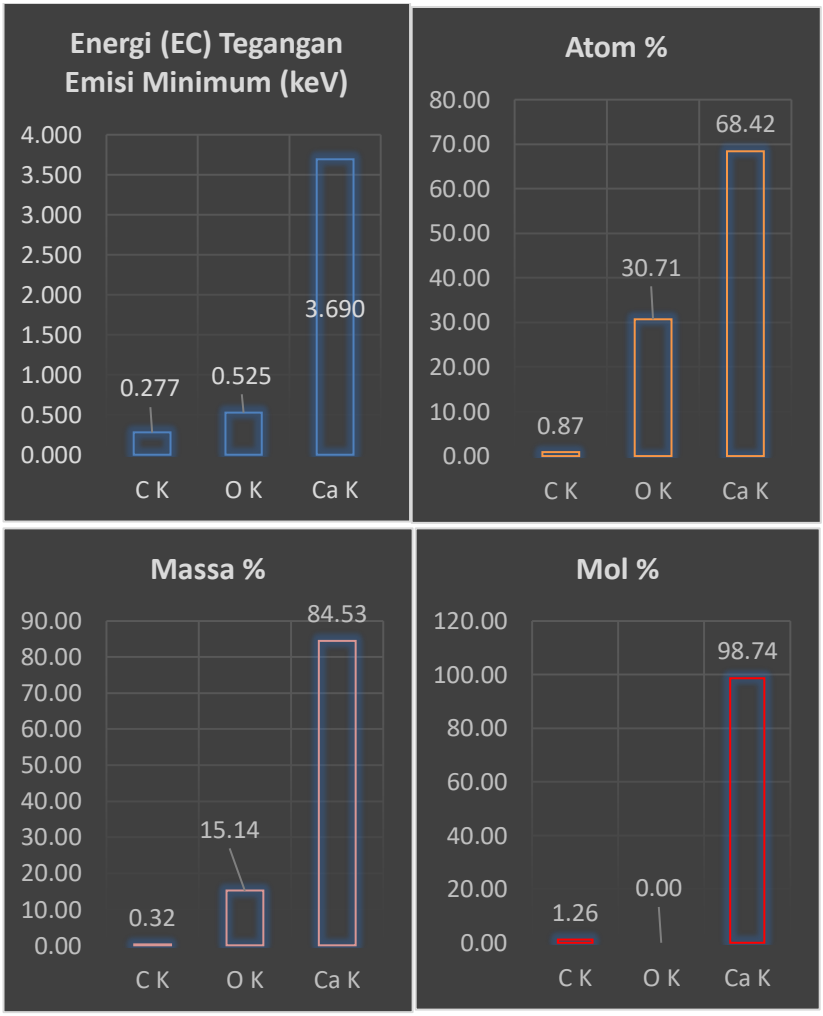
Tabel 12. Hasil Perhitungan Amonia.

Kode sampel	Pengenceran			Intercept	Slope	Absorbansi	Amonia terukur	Kadar NH-3	Standar Deviasi
	Sampel (mL)	H_20 (mL)	FP						
LTP1-a	1	49	50	0.0031	0.0241	5.61 5.61 5.52	5.61	278.91	0.05
LTP2-b	1	49	50	0.0031	0.0241	11.50 11.33 11.58	11.5	573.51	0.13
LTP3-a	1	49	50	0.0031	0.0241	7.14 6.93 7.14	7.14	353.60	0.12
LTP4-d	1	49	50	0.0031	0.0241	17.56 18.80 16.73	17.56	884.72	1.04
LTP7-d	1	49	50	0.0031	0.0241	8.39 8.43 8.30	8.39	418.60	0.06
SBP3-b	1	49	50	0.0031	0.0241	6.19 6.19 6.02	6.19	306.57	0.10
SPB5-a	1	49	50	0.0031	0.0241	6.52 6.44 6.73	6.52	328.01	0.15
a	1	49	50	0.0031	0.0241	5.15 5.15 5.32	5.15	260.24	0.10
a	1	49	50	0.0031	0.0241	3.49 3.53 3.66	3.49	177.94	0.09
a	1	49	50	0.0031	0.0241	7.14 6.93	7.14	352.90	0.11

Kode sampel	Pengenceran			Intercept	Slope	Absorbansi	Amonia terukur	Kadar NH-3	Standar Deviasi
	Sampel (mL)	H_20 (mL)	FP						
						7.10			
						5.19			
LPE5-b	1	49	50	0.0031	0.0241	5.44	5.19	265.08	0.13
						5.27			
						3.37			
LPE6-a	1	49	50	0.0031	0.0241	3.07	3.37	157.88	0.18
						3.03			
						5.27			
LPE6-d	1	49	50	0.0031	0.0241	5.32	5.27	266.46	0.06
						5.40			
						6.93			
BSP3-c	1	49	50	0.0031	0.0241	7.06	6.93	349.45	0.06
						6.98			
						5.52			
BSP6-a	1	49	50	0.0031	0.0241	5.56	5.52	276.14	0.04
						5.48			
						7.39			
BSP7-a	1	49	50	0.0031	0.0241	7.35	7.39	370.89	0.09
						7.51			
						8.55			
BSP7-c	1	49	50	0.0031	0.0241	8.59	8.55	426.90	0.06
						8.47			
						16.39			
d	1	49	50	0.0031	0.0241	16.48	16.39	821.09	0.05
						16.39			
						13.03			
-a	1	49	50	0.0031	0.0241	13.07	13.03	657.19	0.16
						13.32			
						4.20			
-a	1	49	50	0.0031	0.0241	3.99	4.2	204.22	0.10
						4.07			

Kode sampel	Pengenceran			Intercept	Slope	Absorbansi	Amonia terukur	Kadar NH-3	Standar Deviasi
	Sampel (mL)	H_20 (mL)	FP						
PRW2-c	1	49	50	0.0031	0.0241	6.02 6.27 6.02	6.02	305.19	0.14
PRW4-c	1	49	50	0.0031	0.0241	12.45 12.33 12.29	12.45	617.77	0.09
PRW5-a	1	49	50	0.0031	0.0241	3.90 3.95 4.03	3.9	197.99	0.06
PRW6-a	1	49	50	0.0031	0.0241	5.65 5.69 5.77	5.65	285.13	0.06

Lampiran 19. Analisis Energy Dispersive Spectroscopy



Gambar 30. Hasil analisis EDS Isolat LTP4-d.

Lampiran 20. Lokasi dan Foto Pengambilan Sampel

Gambar 31. Lokasi pengambilan sampel isolat bakteri karbonoklastik; (A) Leang Timpuseng; (B) Sumpang Bita; (C) Leang Pettar; D) Leang Parewe; (E) Bulu Sipong.

ɔar 32. Foto Pengambilan Sampel Isolat Bakteri Karbonoklastik

Daftar Riwayat Hidup

A. Data Pribadi

1. Nama : Nur Afifah Zhafirah
2. Tempat, Tgl Lahir : Watansoppeng, 01 Januari 2001
3. Alamat : Perumahan BTP, Kota Makassar
4. Kewarganegaraan : Warga Negara Indonesia

B. Riwayat Pendidikan

1. Tamat SD pada 2012 di SD Inpres Tamalanrea 1 Makassar
2. Tamat SMP pada 2015 di SMP Negeri 35 Makassar
3. Tamat SMA pada 2018 di SMA Negeri 21 Makassar
4. Sarjana (S1) tahun 2022 di Universitas Hasanuddin

C. Karya ilmiah yang telah dipublikasikan

1. Zhafirah NA., Haedar N., Santosa S. dan Gani F. 2024. Micromorphology characterization on crystal calcium carbonate and exxopolysaccharides quantification ccarbonatogenic bacterial LTP4-d isolated from historical painting of Maros-Pangkep karst area, Indonesia. Biodiversitas, 25(2):2139-2147.
   Doi: 10.13057/biodiv/d250532.