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LAMPIRAN

Lampiran 1. Perhitungan Kepadatan Populasi Koloni Bakteri Pelarut Fosfat

Kode Isolat	Pengenceran	Pengulangan 1	Pengulangan 2	Jumlah Koloni Rata-Rata	Nilai TPC (cfu/ml)
DB 1.3	10^{-4}	4	17	10,5	6,5 ×10^7cfu/ml
	10^{-5}	11	23	17	
	10^{-6}	38	92	65	
DB 2.3	10^{-4}	14	17	15,5	1,5 ×10^5* cfu/ml
	10^{-5}	5	2	3,5	
	10^{-6}	2	1	1,5	
DB 3.3	10^{-4}	123	32	77,5	7,8 × 10^5 cfu/ml
	10^{-5}	8	2	5	
	10^{-6}	1	2	1,5	
DB 4.3	10^{-4}	31	53	42	1 ×10^7 cfu/ml
	10^{-5}	27	-	13,5	
	10^{-6}	12	46	29	
MS 1.3	10^{-4}	91	23	57	1,8×10^7cfu/ml
	10^{-5}	35	76	55,5	
	10^{-6}	42	54	48	
TB 2.3	10^{-4}	spreader	27	14	4,3 ×10^5 cfu/ml
	10^{-5}	spreader	12	6,5	
	10^{-6}	spreader	-	0,5	
GJ 3.3	10^{-4}	27	1	14	1,4 ×10^5 cfu/ml
	10^{-5}	1	4	2,5	
	10^{-6}	2	-	1	

Keterangan: CFU: Colony Forming Unit

Perhitungan Jumlah Populasi Koloni Bakteri Pelarut Fosfat pada Ekosistem Mangrove Berdasarkan SNI 2897:2008

1. Sampel DB 1.3

   Nilai TPC = $65 \times \frac{1}{10^{-6}} = 65 \times 10^6$

   $= 65.000.000$

   $= 6{,}5 \times 10^7$

2. Sampel DB 2.3

   Nilai TPC = $15{,}5 \times 10^4$

   $= 155.000$*

   $= 1{,}5 \times 10^5$*

3. Sampel DB 3.3

   Nilai TPC = $77{,}5 \times \frac{1}{10^{-4}}$

   7,5000

   ,8 × 10^5

   .3

   $\frac{42\times10^{-4})+(13{,}5\times10^{-5})+(29\times10^{-6})}{3}$

$$= \frac{(420000) + (1350000) + (29000000)}{3}$$

$= 10.256.666,7$

$= 1 \times 10^7$

5. Sampel MS 1.3

Nilai TPC $= \frac{(57 \times 10^{-4}) + (55{,}5 \times 10^{-5}) + (48 \times 10^{-6})}{3}$

$$= \frac{(570000) + (5550000) + (48000000)}{3}$$

$= 18.040.000$

$= 1{,}8 \times 10^7$

6. Sampel TB 2.3

Nilai TPC $= \frac{(14 \times 10^{-4}) + (6{,}5 \times 10^{-5}) + (0{,}5 \times 10^{-6})}{3}$

$$= \frac{(140000) + (650000) + (500000)}{3}$$

$= 430.000$

$= 4{,}3 \times 10^5$

7. Sampel GJ 3.3

Nilai TPC $= 14 \times \frac{1}{10^{-4}} = 14 \times 10^4$

$= 140000$

$= 1{,}4 \times 10^5$

Lampiran 2. Tabel Perhitungan Indeks Kelarutan Fosfat (IKF)

No	Genus	DZB (mm)	DK (mm)	IKF (mm)	Kategori*)
1	Micrococcus	12	22	1,54	Rendah
2	Bacillus	12,5	27	1,46	Rendah
3	Pseudomonas	11,5	30	1,38	Rendah
4	Micrococcus	12,5	32	1,39	Rendah
5	Escherichia	10,5	20	1,52	Rendah
6	Bacillus	18	16	2,1	Rendah
7	Enterobacter	9	12	1,75	Rendah
8	Enterococcus	18	10	2,8	Sedang
9	Enterococcus	8,5	16	1,53	Rendah
10	Micrococcus	11	9	2,2	Rendah
11	Clostridium	7,5	7	2,07	Sedang
12	Enterococcus	6,2	4	2,5	Sedang
13	Spirillum	5,2	11	1,47	Rendah
14	Pseudomonas	24,5	25	1,98	Rendah
15	Pseudomonas	18	34	1,52	Rendah
16	Pseudomonas	4	18	1,22	Rendah
17	Escherichia	19,5	13	2,5	Sedang
18	Pseudomonas	17	21	1,8	Rendah
19	Escherichia	17,5	15	2,16	Sedang
20	Serratia	21,5	18	2,19	Sedang
21	Spirillum	19	16	2,18	Sedang
22	Pseudomonas	21	17	2,23	Sedang
23	Clostridium	15,5	20	1,77	Rendah
24	Enterococcus	22	23	1,95	Rendah
25	Pseudomonas	16	9	2,7	Sedang
26	Pseudomonas	14	21	1,66	Rendah
27	Pseudomonas	30	16	2,8	Sedang
28	Spirillum	2,3	18	2,66	Sedang
29	Enterococcus	6	5	2,2	Rendah
30	Acinetobacter	5,4	4	2,3	Rendah
	ım	2,2	3	1,73	Rendah
	ccus	6,5	23	1,28	Rendah
	ım	3,2	7	1,45	Rendah
	ıonas	10,5	6	2,75	Sedang

Lampiran 3. Jumlah Isolat Bakteri Pelarut Fosfat di Kawasan Hutan Mangrove IKN

No	Kode Sampel	Jumlah Koloni Morfotipe	Kode Isolat
1	Delta Mahakam 1	5	DB 1.1 DB 1.2 DB 1.3 DB 1.4 DB 1.5
2	Delta Mahakam 2	4	DB 2.1 DB 2.2 DB 2.3 DB 2.4
3	Delta Mahakam 3	4	DB 3.1 DB 3.2 DB 3.3 DB 3.4
4	Delta Mahakam 4	5	DB 4.1 DB 4.2 DB 4.3 DB 4.4 DB 4.5
5	Muara Sepaku	5	MS 1.1 MS 1.2 MS 1.3 MS 1.4 MS 1.5
6	Gresik Jenebora	4	GJ 1.1 GJ 1.2 GJ 1.3 GJ 1.4
7	Teluk Balikpapan	7	TB 1.1 TB 1.2 TB 1.3 TB 1.4 TB 1.5 TB 1.6 TB 1.7

Keterangan: DB: Delta Mahakam, MS: Muara Sepaku, GJ: Gresik Jenebora, TB: Teluk Balikpapan.

Lampiran 4. Diameter Zona Bening Bakteri Pelarut Fosfat

No	Kode Isolat	DZB (mm)
1	DB 1.1	12
2	DB 1.2	12,5
3	DB 1.3	11,5
4	DB 1.4	12,5
5	DB 1.5	10,5
6	DB 2.1	18
7	DB 2.2	9
8	DB 2.3	18
9	DB 2.4	8,5
10	DB 3.1	11
11	DB 3.2	7,5
12	DB 3.3	6,2
13	DB 3.4	5,2
14	DB 4.1	24,5
15	DB 4.2	18
16	DB 4.3	4
17	DB 4.4	19,5
18	DB 4.5	17
19	MS 1.1	17,5
20	MS 1.2	21,5
21	MS 1.3	19
22	MS 1.4	21
23	MS 1.5	15,5
24	GJ 1.1	22
25	GJ 1.2	16
26	GJ 1.3	14
27	GJ 1.4	30
28	TB 1.1	2,3
29	TB 1.2	6
30	TB 1.3	5,4
31	TB 1.4	2,2
32	TB 1.5	6,5
33	TB 1.6	3,2
34	TB 1.7	10,5

Keterangan: DZB: Diameter Zona Bening

Lampiran 5. Indeks Kelarutan Fosfat Isolat BPF di Kawasan Mangrove IKN

No	Kode Isolat	IKF	Kategori*)
1	DB 1.1	1,54	Rendah
2	DB 1.2	1,46	Rendah
3	DB 1.3	1,38	Rendah
4	DB 1.4	1,39	Rendah
5	DB 1.5	1,52	Rendah
6	DB 2.1	2,1	Rendah
7	DB 2.2	1,75	Rendah
8	DB 2.3	2,8	Sedang
9	DB 2.4	1,53	Rendah
10	DB 3.1	2,2	Rendah
11	DB 3.2	2,07	Sedang
12	DB 3.3	2,5	Sedang
13	DB 3.4	1,47	Rendah
14	DB 4.1	1,98	Rendah
15	DB 4.2	1,52	Rendah
16	DB 4.3	1,22	Rendah
17	DB 4.4	2,5	Sedang
18	DB 4.5	1,8	Rendah
19	MS 1.1	2,16	Sedang
20	MS 1.2	2,19	Sedang
21	MS 1.3	2,18	Sedang
22	MS 1.4	2,23	Sedang
23	MS 1.5	1,77	Rendah
24	GJ 1.1	1,95	Rendah
25	GJ 1.2	2,7	Sedang
26	GJ 1.3	1,66	Rendah
27	GJ 1.4	2,8	Sedang
28	TB 1.1	2,66	Sedang
29	TB 1.2	2,2	Rendah
30	TB 1.3	2,3	Rendah
31	TB 1.4	1,73	Rendah
32	TB 1.5	1,28	Rendah
33	TB 1.6	1,45	Rendah
34	TB 1.7	2,75	Sedang

Keterangan: *) Kategori Indeks Kelarutan Fosfat

Lampiran 6. Hasil Pengamatan Makroskopis Bakteri Pelarut Fosfat

No	Kode Isolat	Ukuran	Bentuk	Permukaan	Elevasi	Margins	Warna
1	DB 1.1	Large	Circular	Sedikit halus dan sedikit zona bening	Flat	Entire	Putih sedikit kekuningan
2	DB 1.2	Large	Irregular	Sedikit kasar	Flat	Undulate	Krem kekuningan
3	DB 1.3	Large	Irregular	Halus dan sedikit mengkilap	Flat	Entire	Putih sedikit krem
4	DB 1.4	Moderate	Circular	Halus	Flat	Entire	Putih susu
5	DB 1.5	Moderate	Irregular	Halus	Flat	Entire	Putih susu sedikit kekuningan
6	DB 2.1	Moderate	Irregular	Kasar	Flat	Undulate	Krem kekuningan
7	DB 2.2	Moderate	Circular	Halus dan sedikit mengkilap	Convex	Entire	Putih krem
8	DB 2.3	Moderate	Irregular	Halus	Flat	Entire	Putih krem
9	DB 2.4	Moderate	Circular	Halus	Flat	Entire	Putih kecoklatan
10	DB 3.1	Moderate	Circular	Sedikit halus	Flat	Entire	Putih susu kekuningan
11	DB 3.2	Moderate	Circular	Kasar	Flat	Lobate	Krem kekuningan
12	DB 3.3	Small	Circular	Halus	Convex	Entire	Putih krem
13	DB 3.4	Moderate	Irregular	Kasar	Convex	Undulate	Putih susu
14	DB 4.1	Large	Circular	Halus	Flat	Entire	Putih kecoklatan
15	DB 4.2	Moderate	Irregular	Sedikit halus	Flat	Entire	Putih susu sedikit coklat
16	DB 4.3	Moderate	Irregular	Halus	Flat	Entire	Putih susu
17	DB 4.4	Small	Circular	Halus dan sedikit mengkilap	Flat	Entire	Putih susu sedikit kekuningan
18	DB 4.5	Moderate	Irregular	Sedikit halus	Convex	Entire	Putih kekuningan
19	MS 1.1	Moderate	Circular	Halus	Flat	Entire	Putih susu kecoklatan
		ate	Circular	Halus dan mengkilap	Flat	Entire	Merah muda
		ate	Irregular	Halus	Flat	Lobate	Putih sedikit kekuningan
		ate	Irregular	Halus	Flat	Entire	Putih susu sedikit kecoklatan
		ate	Circular	Kasar	Flat	Lobate	Putih susu sedikit krem

No	Kode Isolat	Ukuran	Bentuk	Permukaan	Elevasi	Margins	Warna
24	TB 1.1	Large	Irregular	Sedikit kasar	Flat	Lobate	Putih susu
25	TB 1.2	Moderate	Irregular	Halus	Convex	Entire	Merah muda
26	TB 1.3	Large	Circular	Halus dan sedikit mengkilap	Flat	Entire	Putih susu kekuningan
27	TB 1.4	Moderate	Irregular	Halus	Flat	Entire	Putih susu kekuningan
28	TB 1.5	Moderate	Circular	Halus	Flat	Entire	Putih susu
29	TB 1.6	Moderate	Irregular	Halus	Flat	Lobate	Putih susu krem
30	TB 1.7	Small	Irregular	Halus	Flat	Entire	Putih susu
31	GJ 1.1	Moderate	Irregular	Halus dan sedikit berlendir	Flat	Entire	Krem kekuningan
32	GJ 1.2	Moderate	Irregular	Halus dan berlendir	Flat	Undulate	Krem kekuningan
33	GJ 1.3	Moderate	Irregular	Halus berlendir	Flat	Undulate	Krem kekuningan
34	GJ 1.4	Moderate	Irregular	Sedikit halus	Flat	Entire	Krem

Lampiran 7. Hasil uji SIM Bakteri Pelarut Fosfat

Uji SIM	Hasil	Kode Sampel
H_2S	Positif (+)	DB 1.5; DB 2.1; MS 1.1; MS 1.2; MS 1.3
	Negatif (-)	DB 1.1; DB 1.2; DB 1.3; DB 1.4; DB 2.2; DB 2.3; DB 2.4; DB 3.1; DB 3.2; DB 3.3; DB 3.4; DB 4.1; DB 4.2; DB 4.3; DB 4.4; DB 4.5; MS 1.4; MS 1.5; GJ 1.1; GJ 1.2; GJ 1.3; GJ 1.4; TB 1.1; TB 1.2; TB 1.3; TB 1.4; TB 1.5; TB 1.6; TB 1.7
Indol	Positif (+)	DB 1.1; DB 1.2; DB 1.3; DB 1.4; DB 1.5; DB 2.1; DB 2.2; DB 2.3; DB 2.4; DB 4.1; DB 4.2; DB 4.4; DB 4.5; MS 1.1; MS 1.2; MS 1.3; MS 1.4; GJ 1.2; GJ 1.3; GJ 1.4; TB 1.1; TB 1.2; TB 1.4; TB 1.6
	Negatif (-)	DB 3.1; DB 3.2; DB 3.3; DB 3.4; DB 4.3; MS 1.5; GJ 1.1; TB 1.3; TB 1.5; TB 1.7
Motil	Positif (+)	DB 1.1; DB 1.2; DB 1.3; DB 1.5; DB 2.1; DB 2.2; DB 2.3; DB 3.1; DB 3.2; DB 3.3; DB 3.4; DB 4.1; DB 4.2; DB 4.3; DB 4.4; MS 1.1; MS 1.2; MS 1.3; MS 1.4; MS 1.5; GJ 1.1; GJ 1.2; GJ 1.3; GJ 1.4; TB 1.1; TB 1.2; TB 1.4; TB 1.5; TB 1.6; TB 1.7
	Negatif (-)	DB 1.4; DB 2.4; DB 4.5; TB 1.3

Lampiran 8. Karakteristik Makroskopik Bakteri Pelarut Fosfat

1. Ukuran Bakteri:

Kategori	Gambar
Pinpoint/punctiform (titik)	
Small (kecil)	
Moderate (sedang)	
Large (besar)	

2. Warna Koloni (Pigmentasi)

Mikroorganisme kromogenik sering memproduksi pigmen intraseluler, beberapa jenis lain memproduksi pigmen ekstraseluler yang dapat terlarut dalam media**.**

3. Bentuk Bakteri:

Kategori	Gambar
Circular	
Irregular	
Spindle	
Filamentous	
Rhizoid	

4. Elevasi Bakteri:

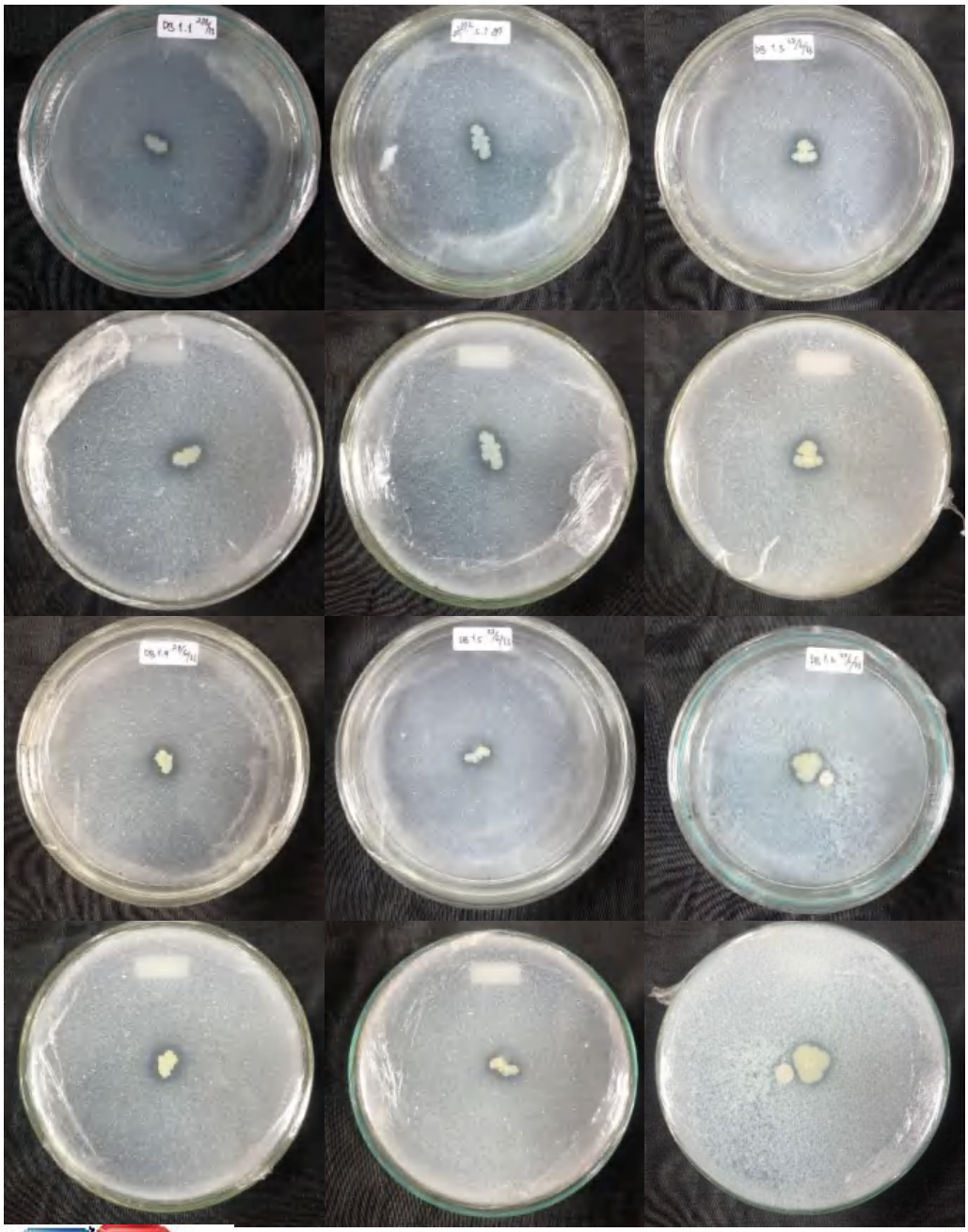
Kategori	Gambar
Flat	
Raised	
Convex	
Umbonate	

5. Permukaan:
   a. Halus mengkilap
   b. Kasar
   c. Berkerut
   d. Kering seperti bubuk

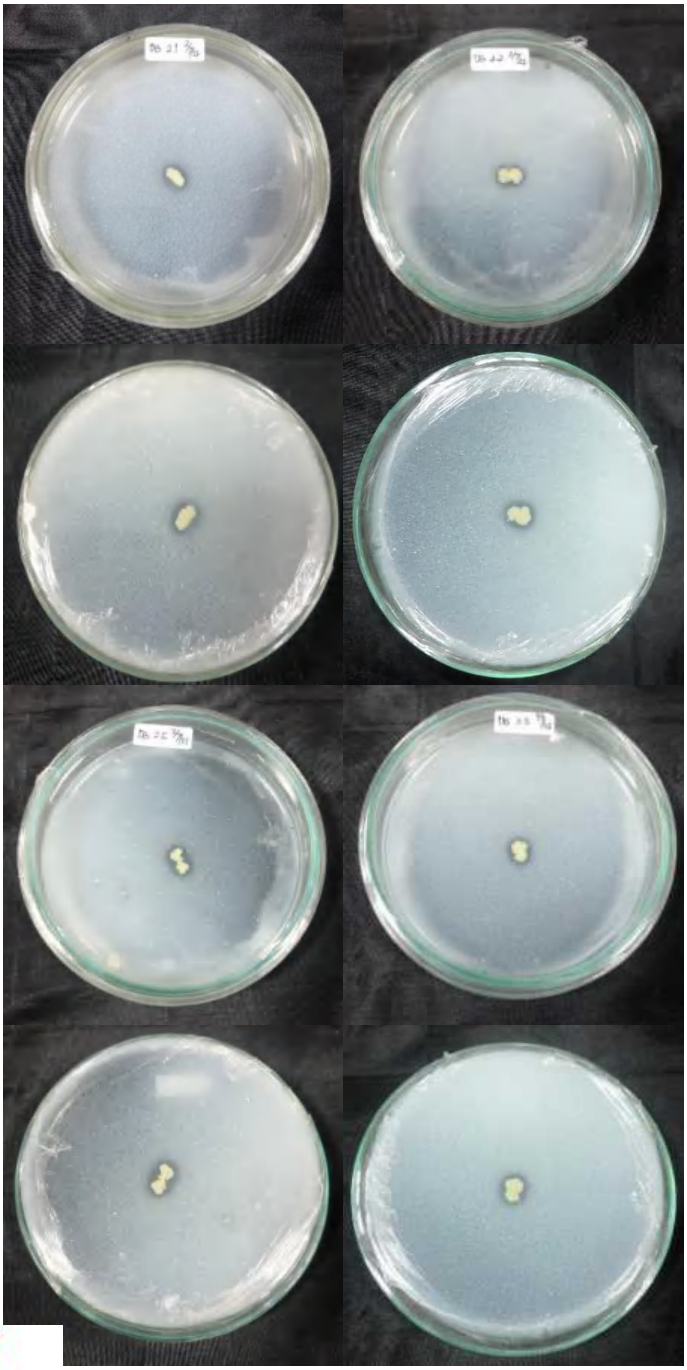
6. Margins Bakteri:

Kategori	Gambar
Entire	
Lobate	
Undulate	
Serrate	
Felamentous	
Curled	

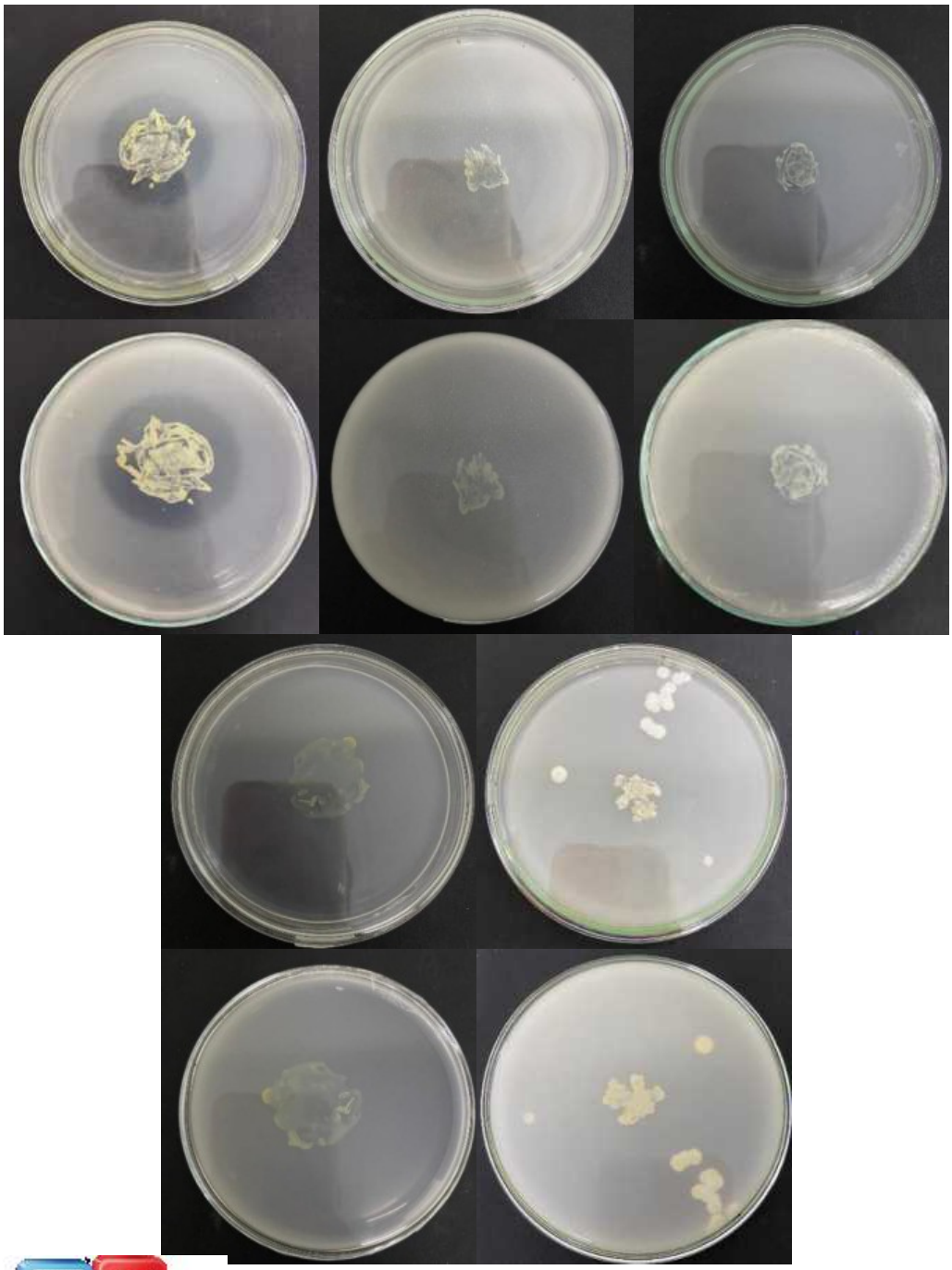
Lampiran *9*. Hasil Isolasi sampel Bakteri Pelarut fosfat



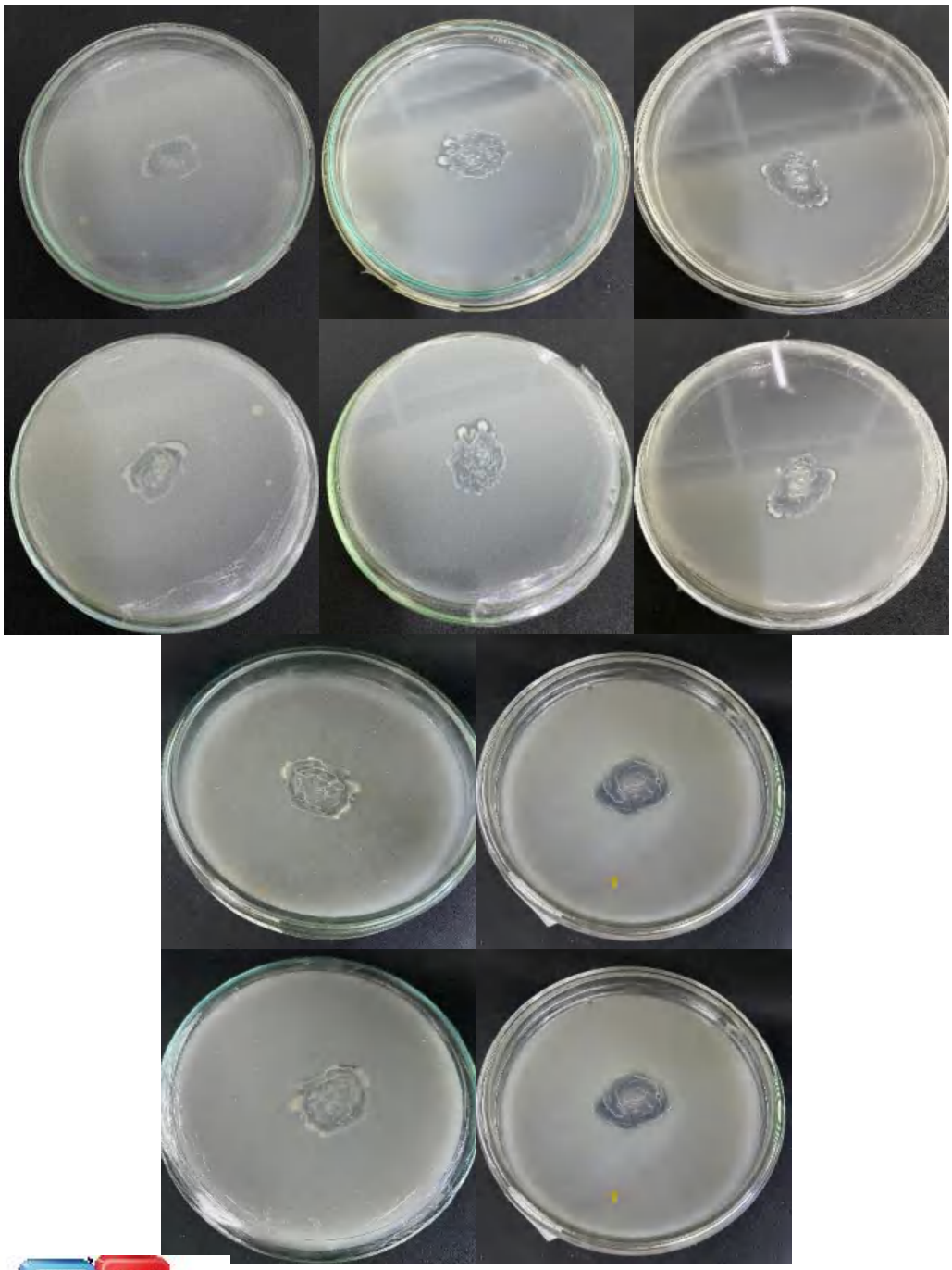
ian bakteri pelarut fosfat DB 1.3 (tampak depan dan belakang)



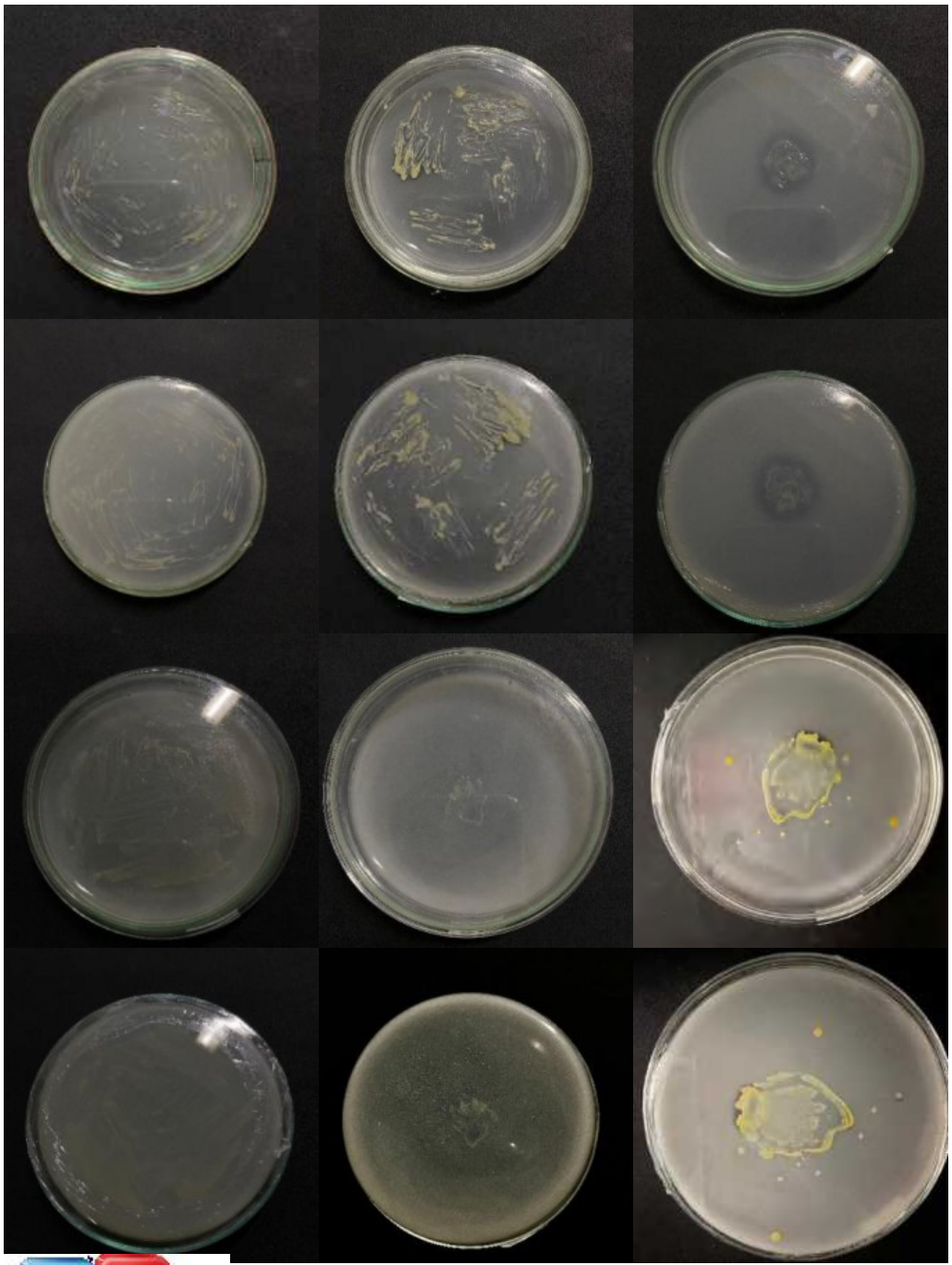
bakteri pelarut fosfat DB 2.3 (tampak depan dan belakang) pada

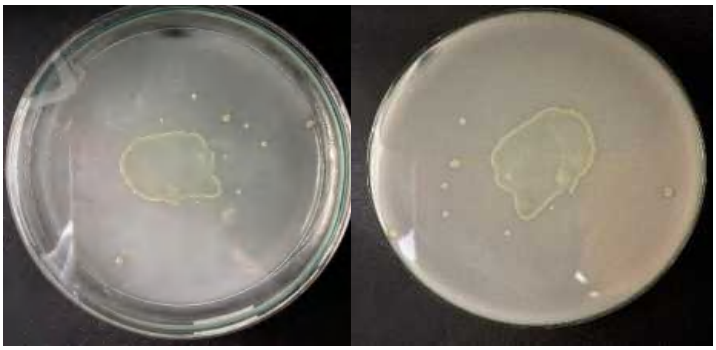


bakteri pelarut fosfat DB 4.3 (tampak depan dan belakang) pada

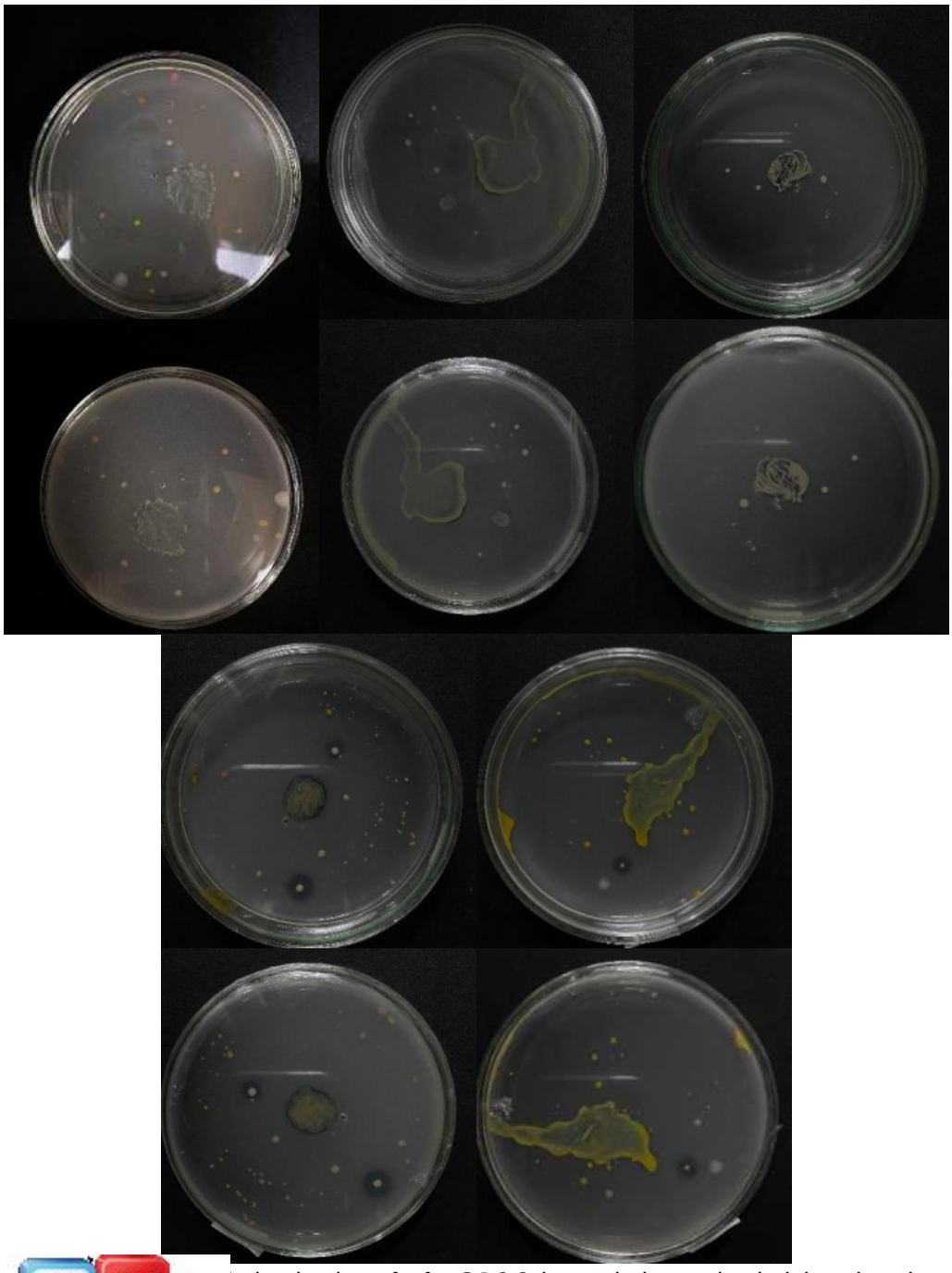


bakteri pelarut fosfat MS 1.1 (tampak depan dan belakang) pada



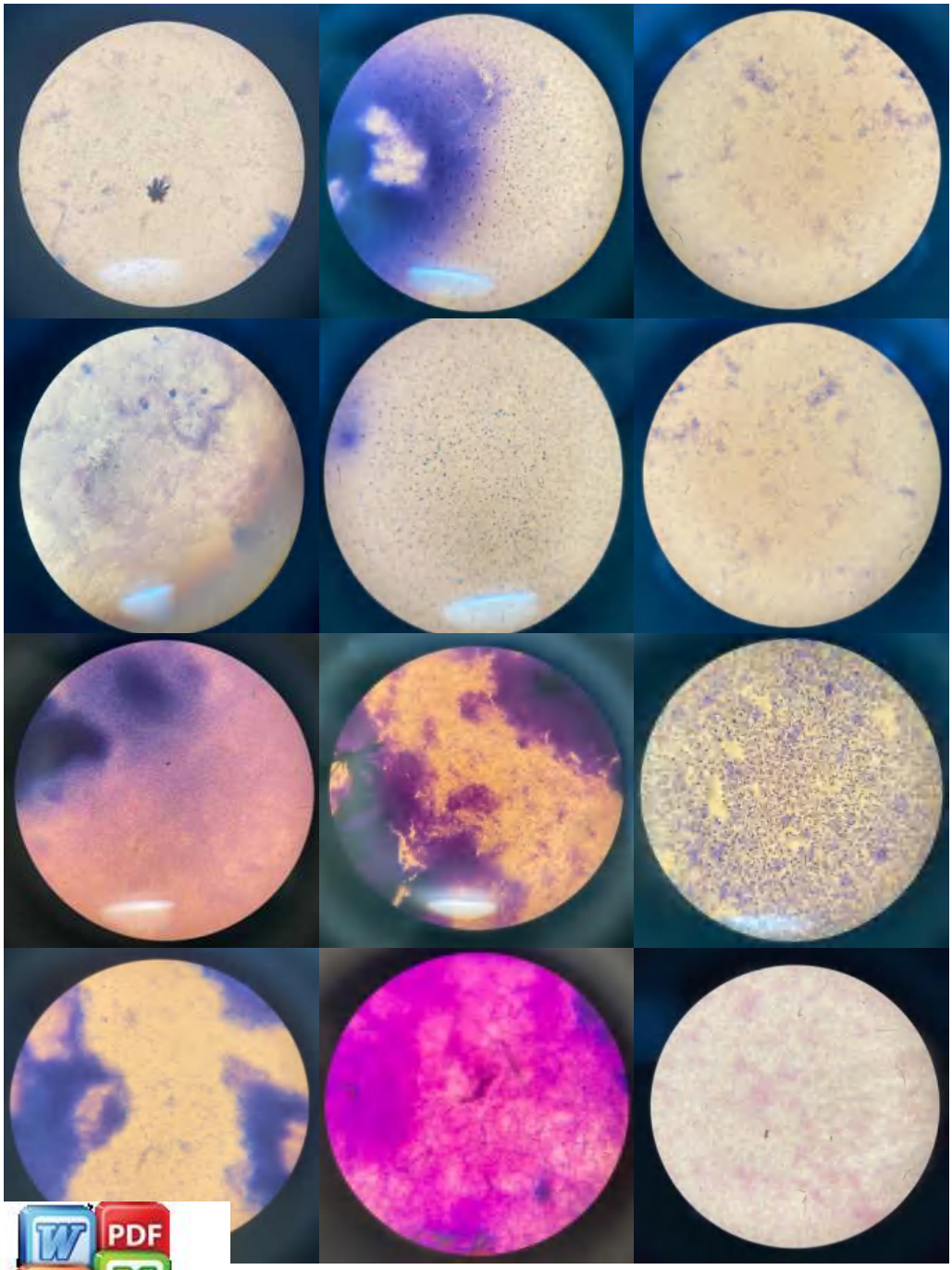


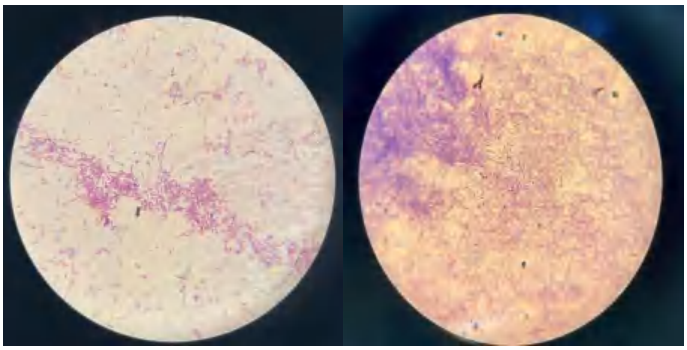
(e) Hasil pemurnian bakteri pelarut fosfat TB 2.3 (tampak depan dan belakang) pada inkubasi 7 hari



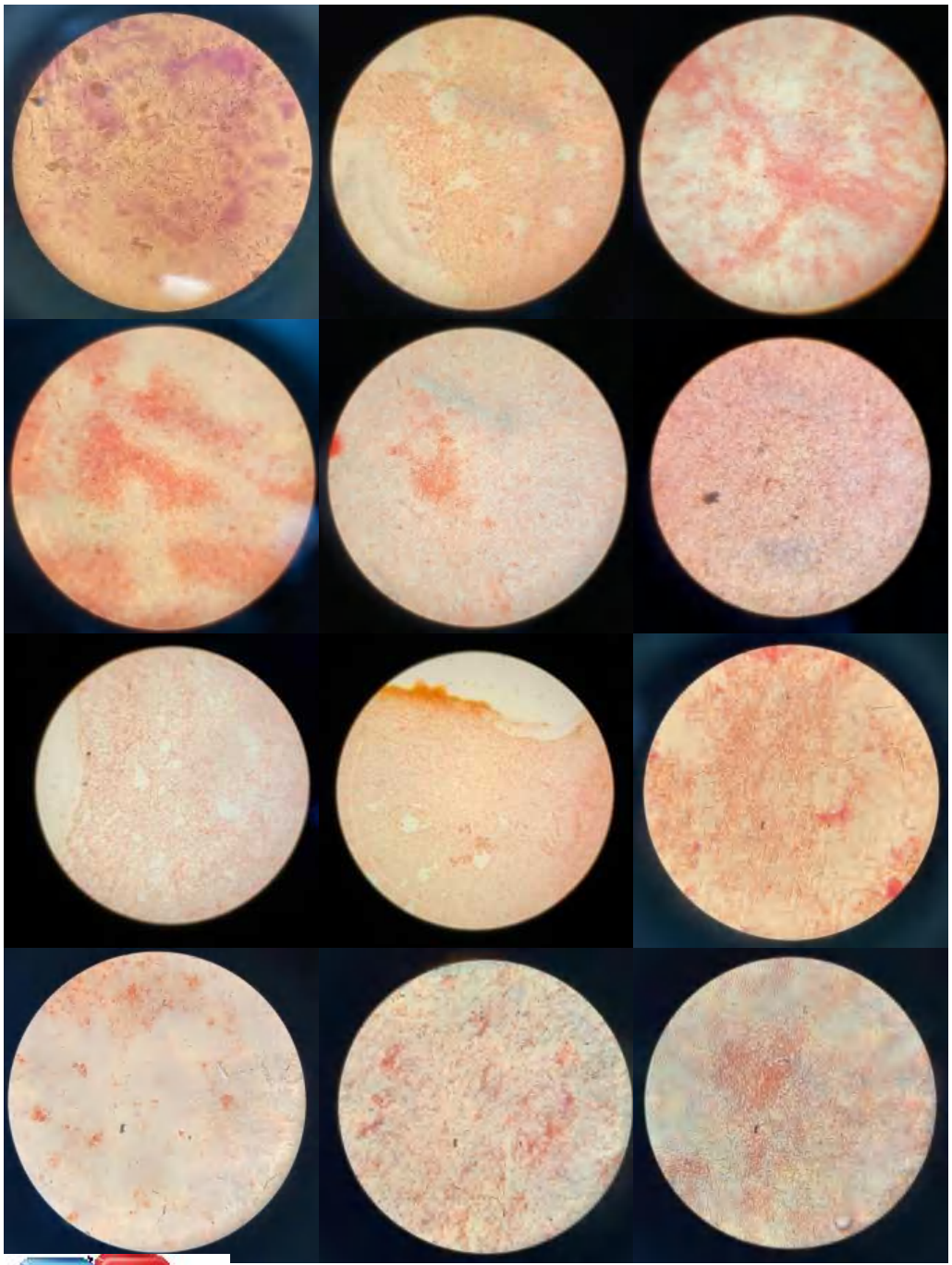
bakteri pelarut fosfat GJ 3.3 (tampak depan dan belakang) pada

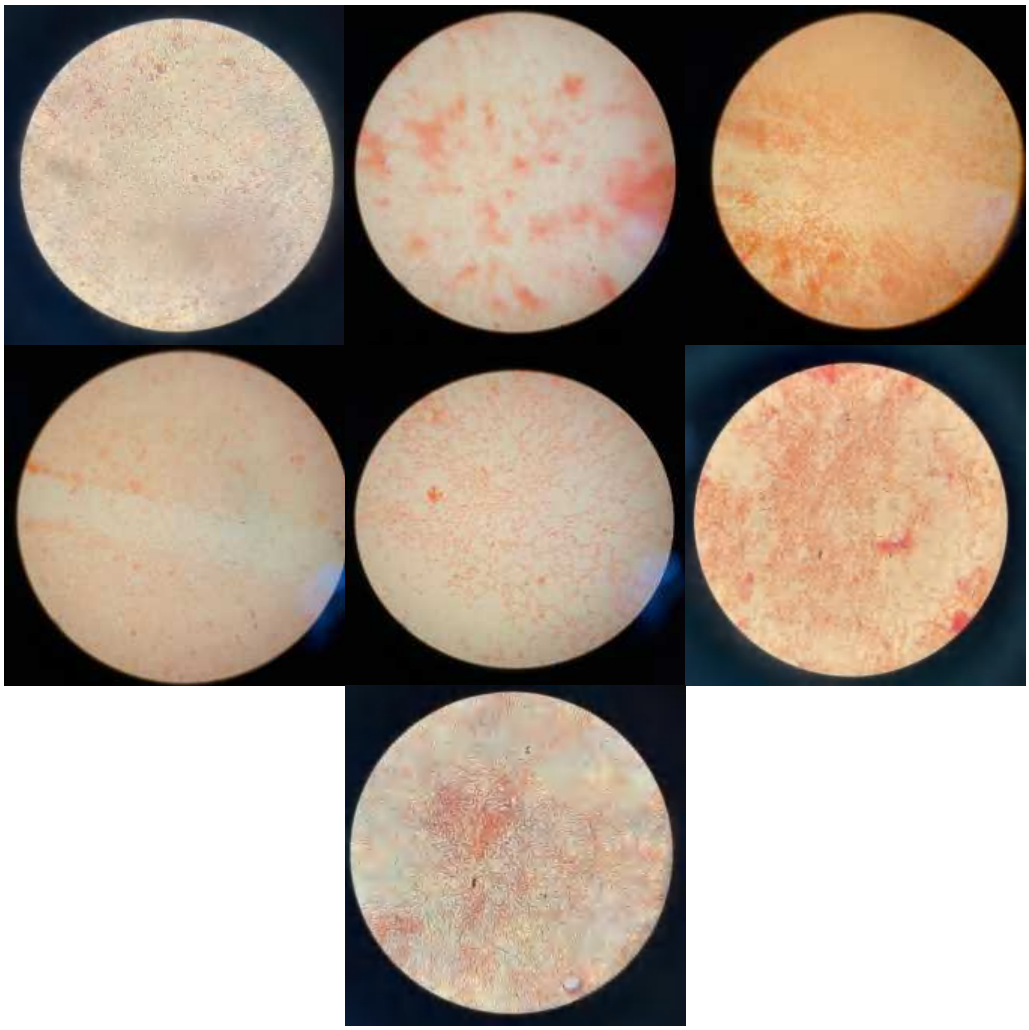
Lampiran 10. Karakterisasi Morfologis Uji Pewarnaan Gram Bakteri Pelarut Fosfat





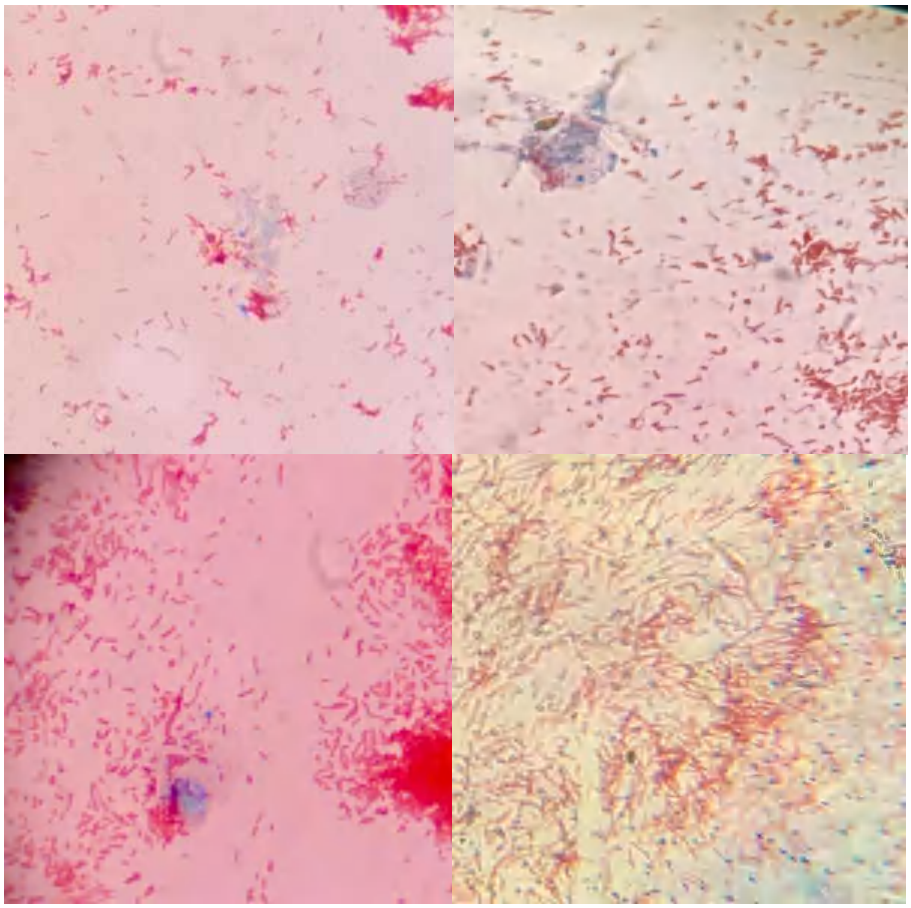
(a) Hasil Pengamatan isolat Sel Bakteri pelarut fosfat pada uji pewarnaan gram positif (+) Secara Mikroskopik Pada Media pikovskaya dengan perbesaran 1000x



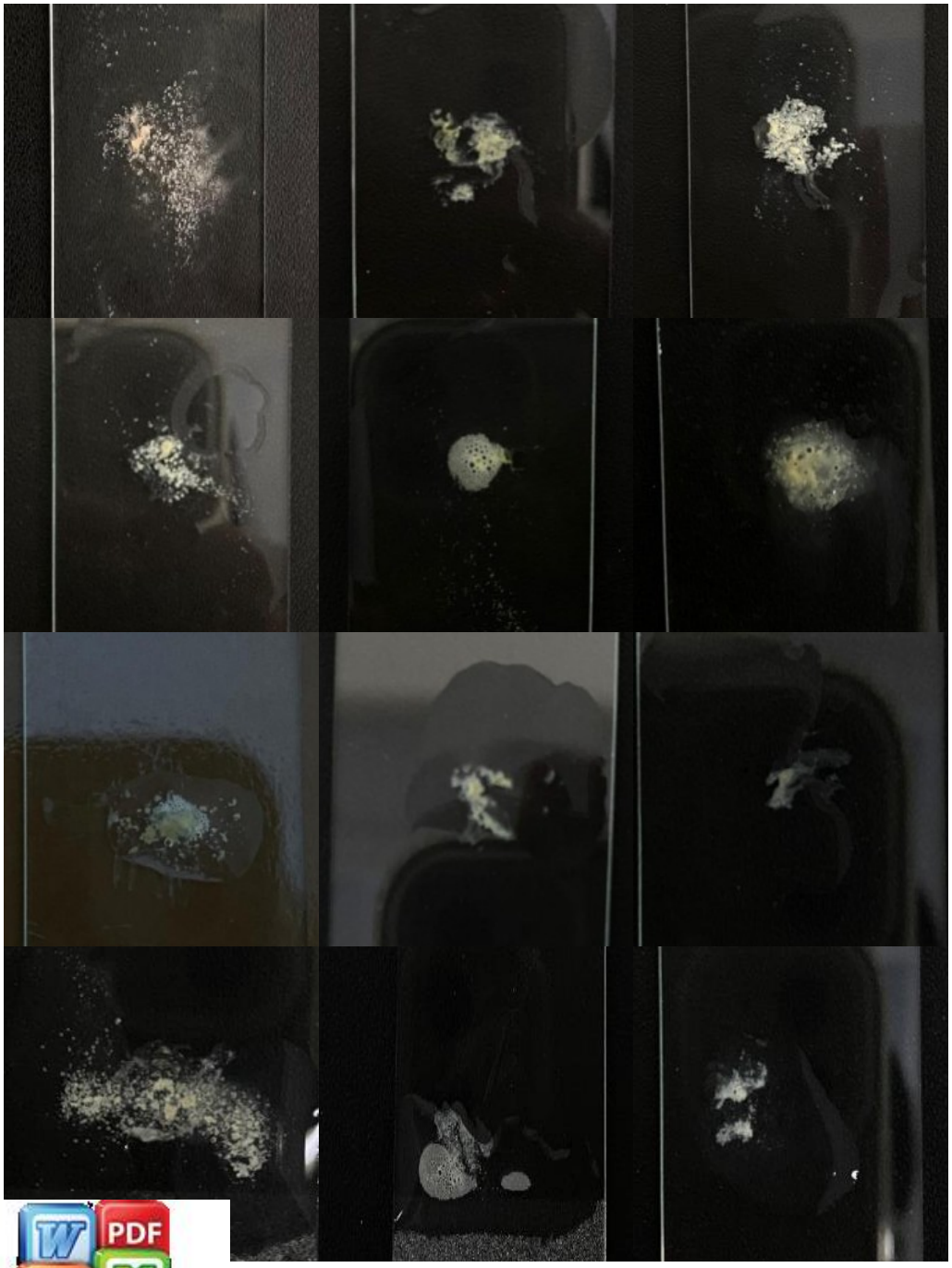


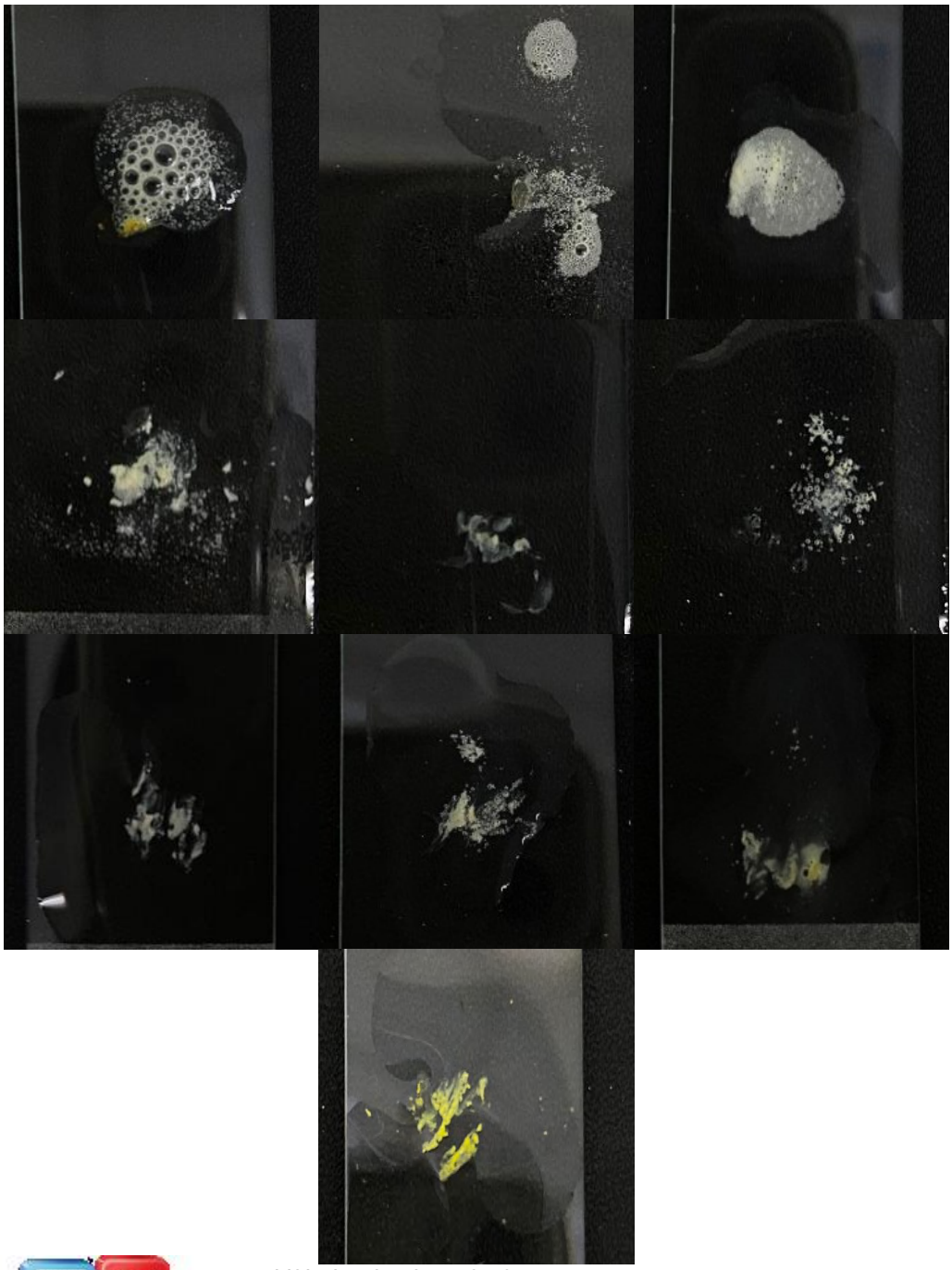
(b) Hasil Pengamatan isolat Sel Bakteri pelarut fosfat pada uji pewarnaan gram negatif (-) Secara Mikroskopik Pada Media pikovskaya dengan perbesaran 1000x

Lampiran 11. Karakterisasi Morfologis Uji Pewarnaan Endospora Bakteri Pelarut Fosfat



Lampiran 12. Karakterisasi Fisiologi Uji Katalase Bakteri Pelarut Fosfat

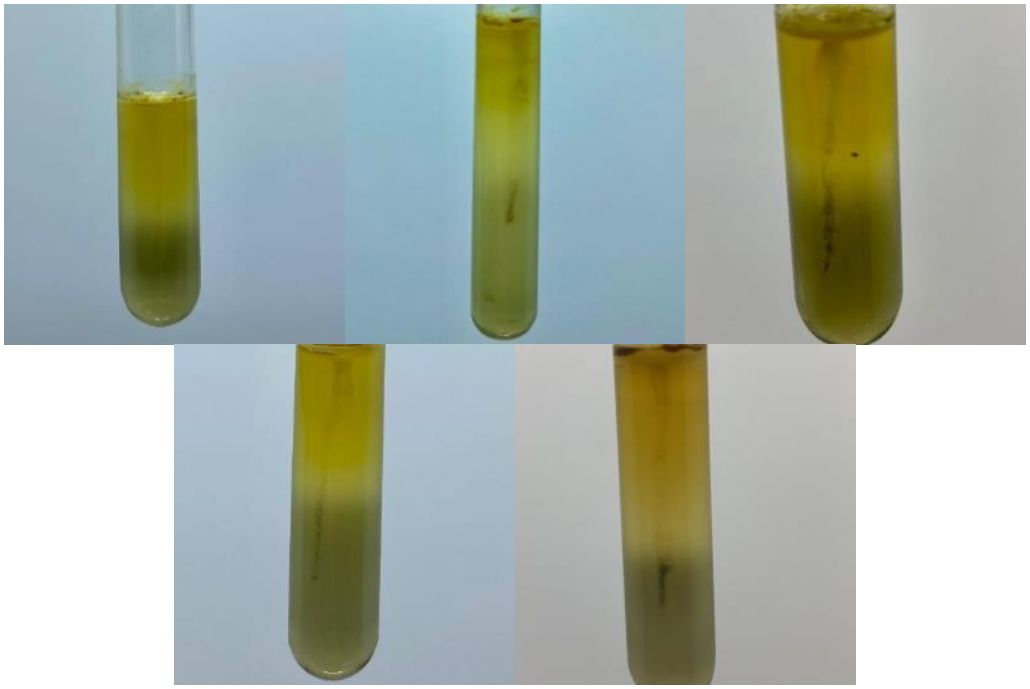




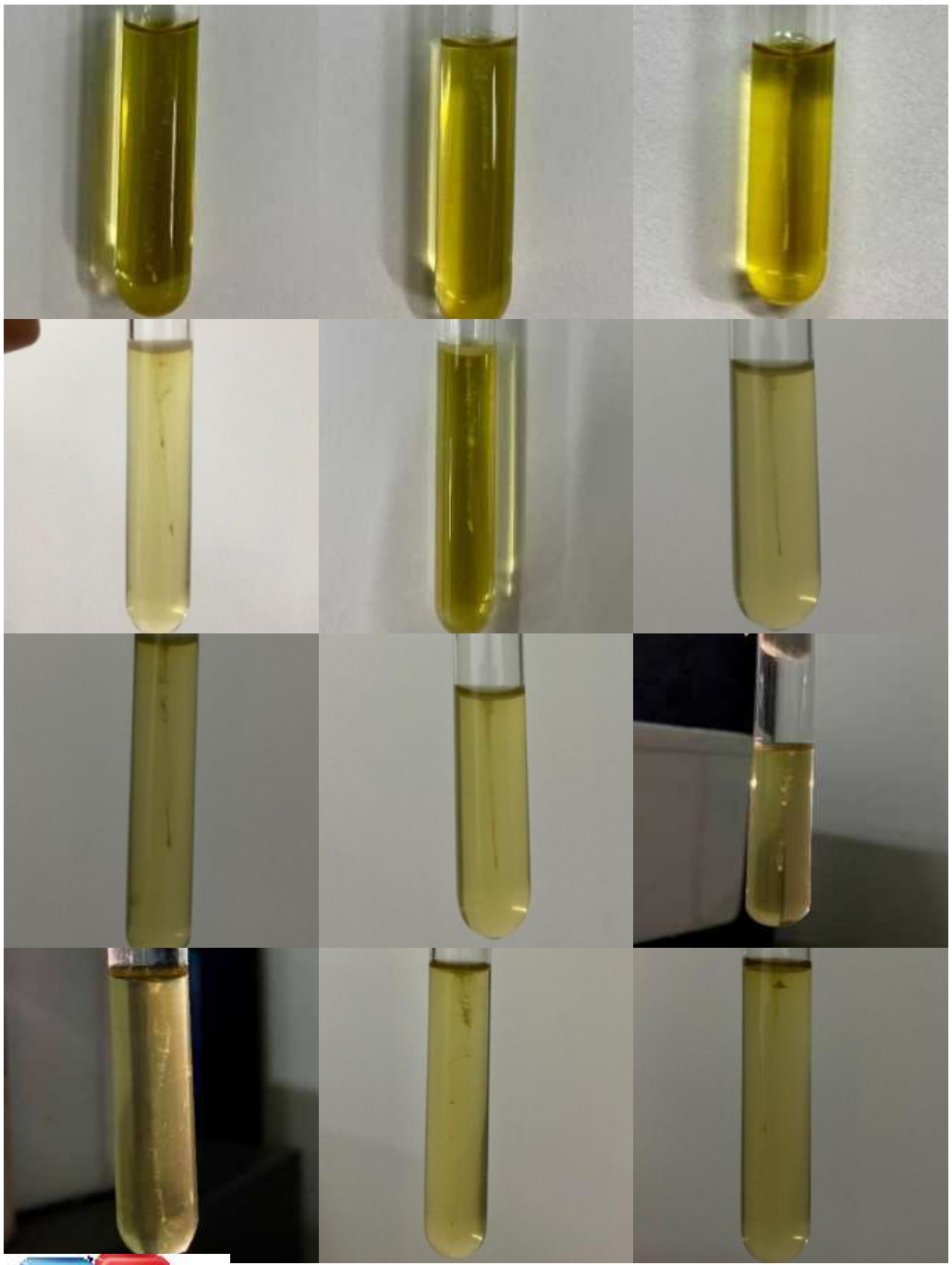
positif bakteri pelarut fosfat

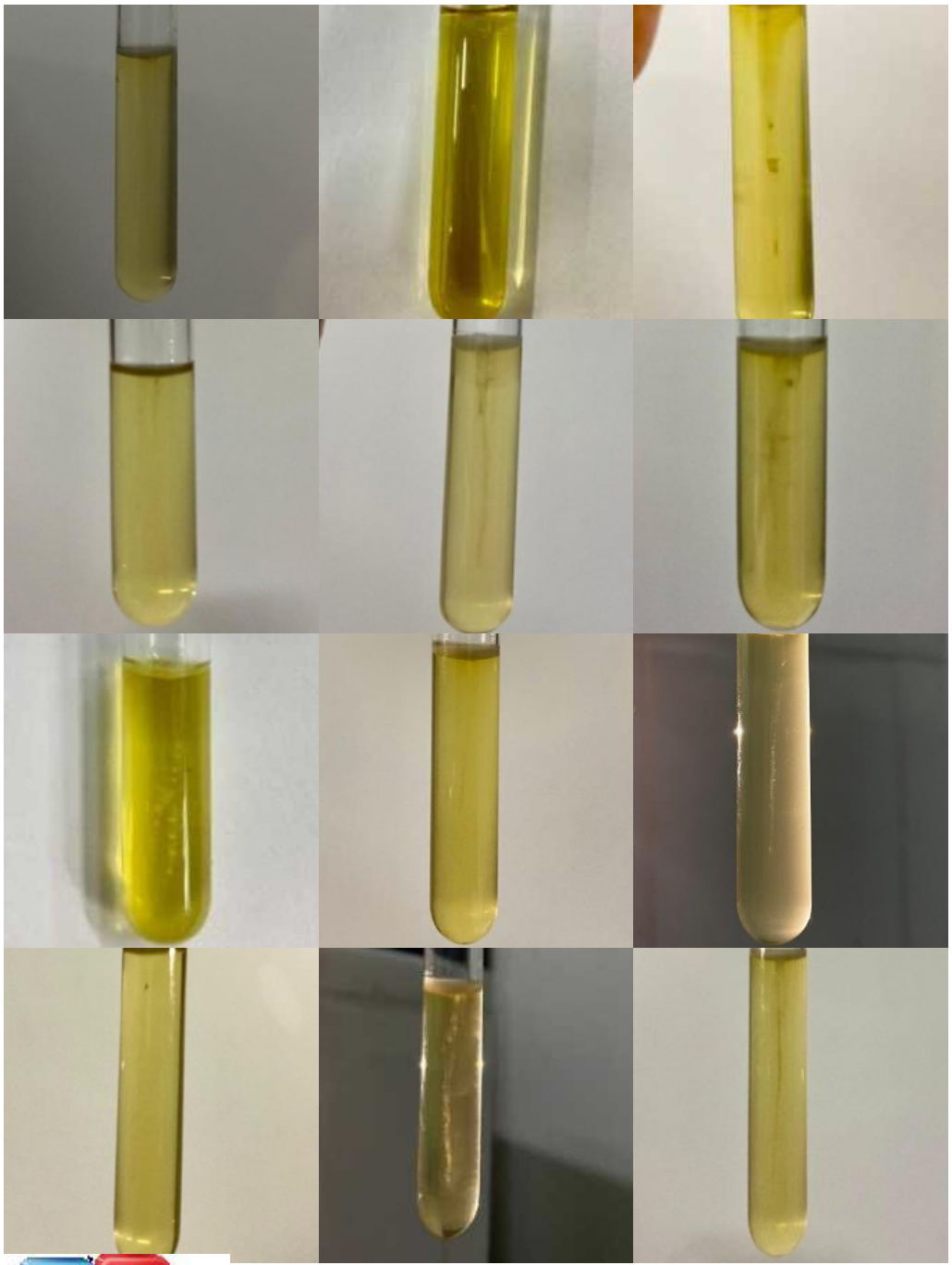
(b) Hasil uji katalase negatif bakteri pelarut fosfat

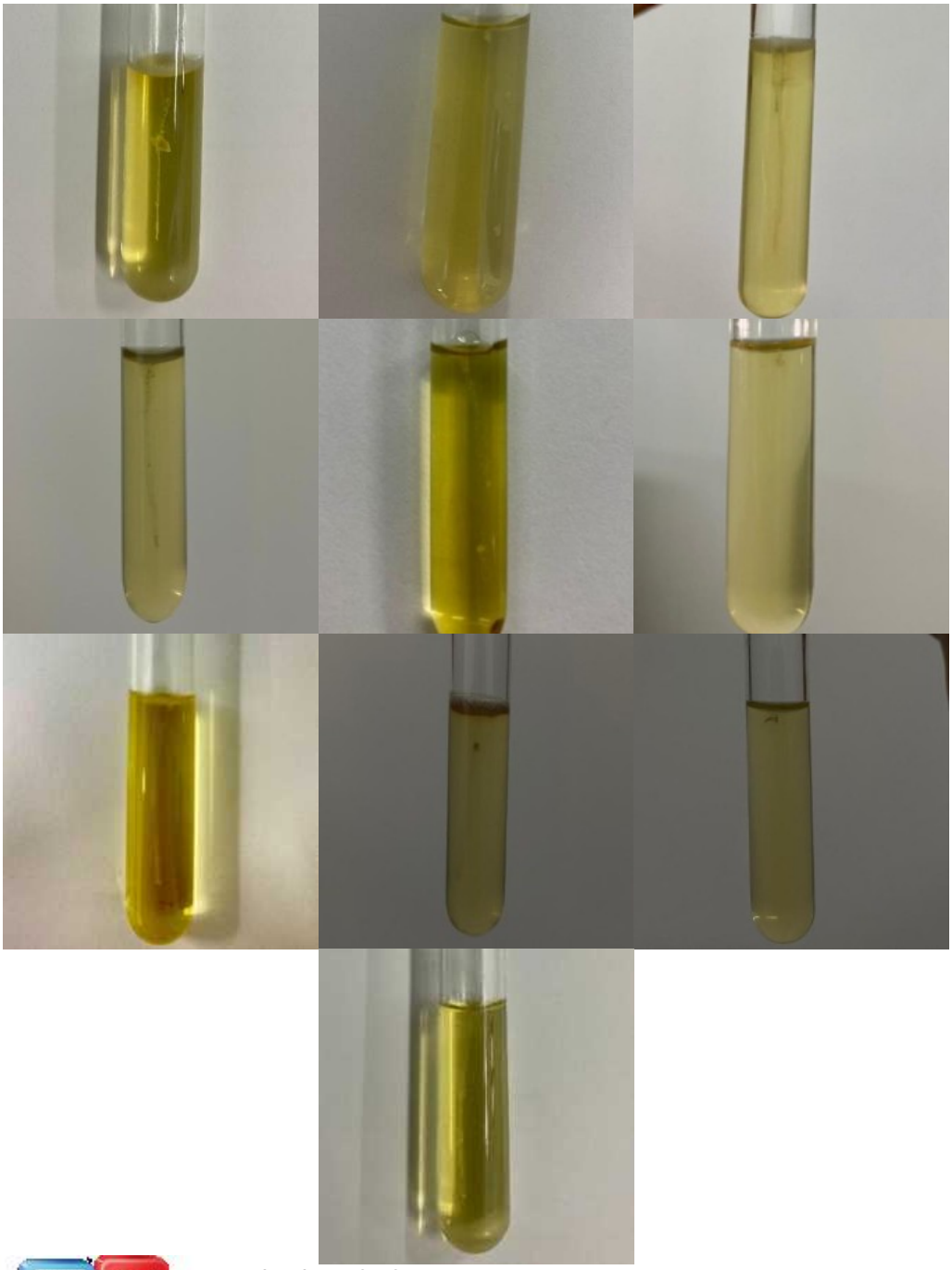
Lampiran 13. Hasil Karakterisasi Fisiologi Uji SIM (Sulifit Indole Motility)



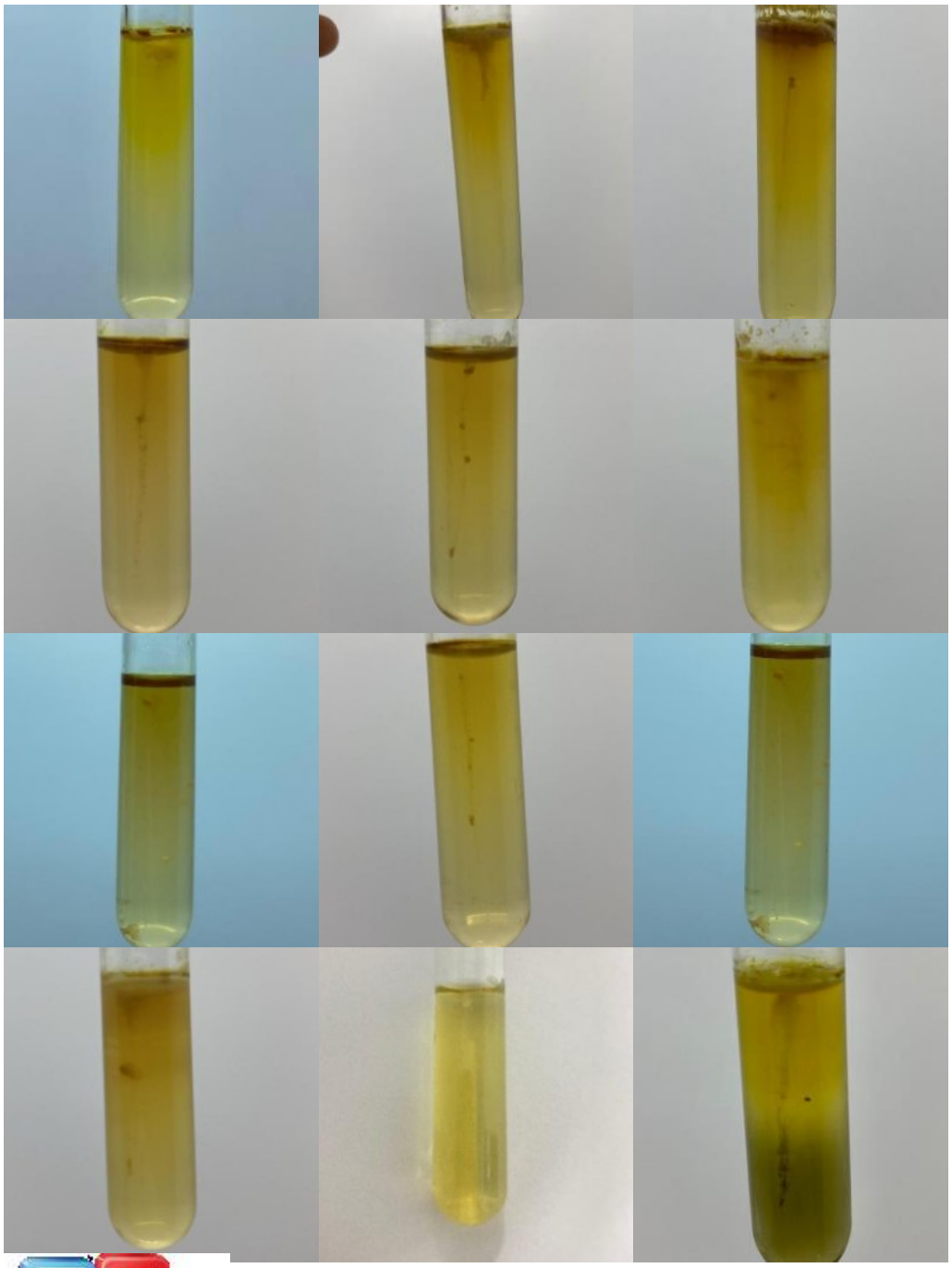
(a) Hasil uji H_2S pada Bakteri Pelarut Fosfat

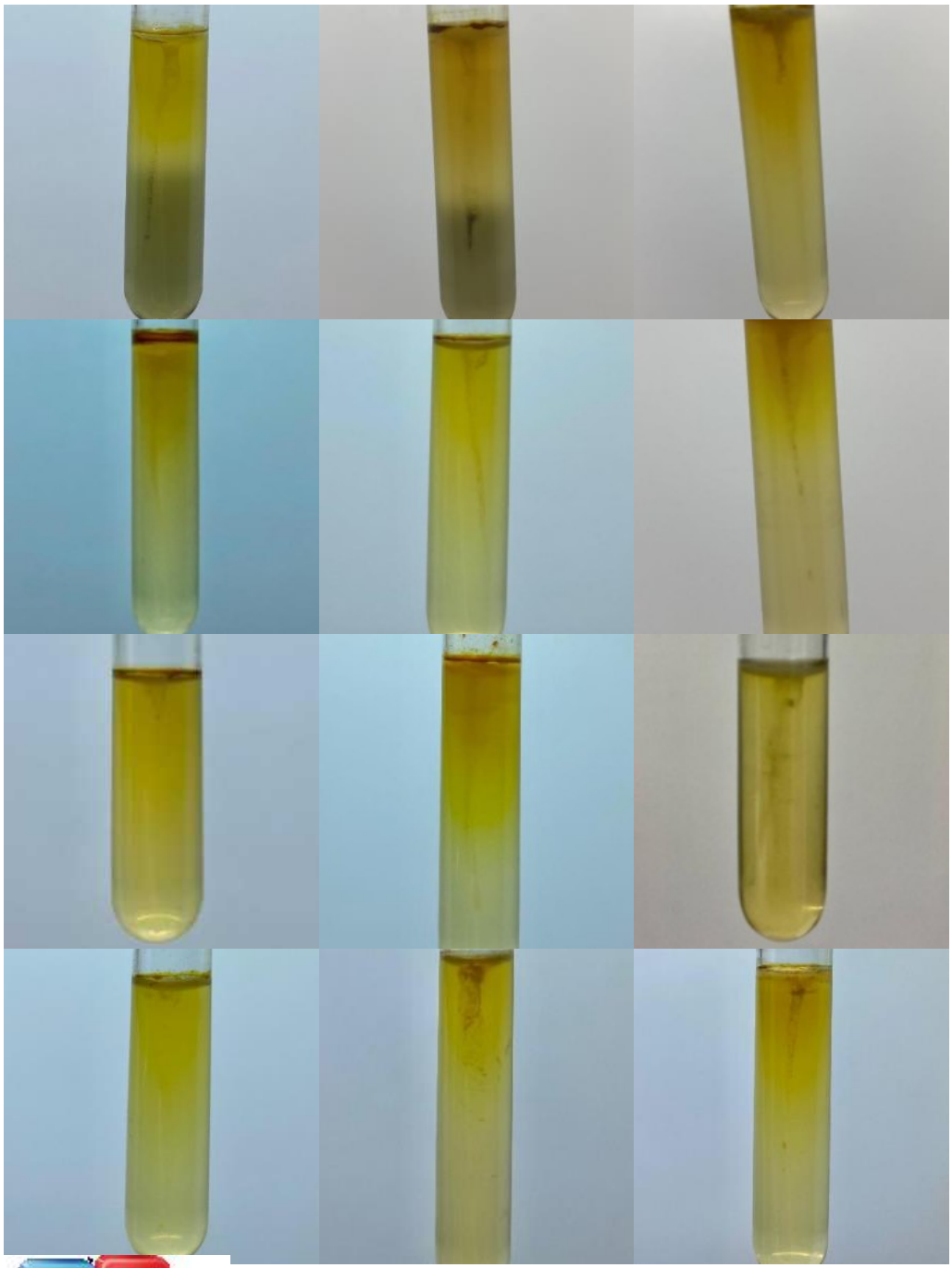


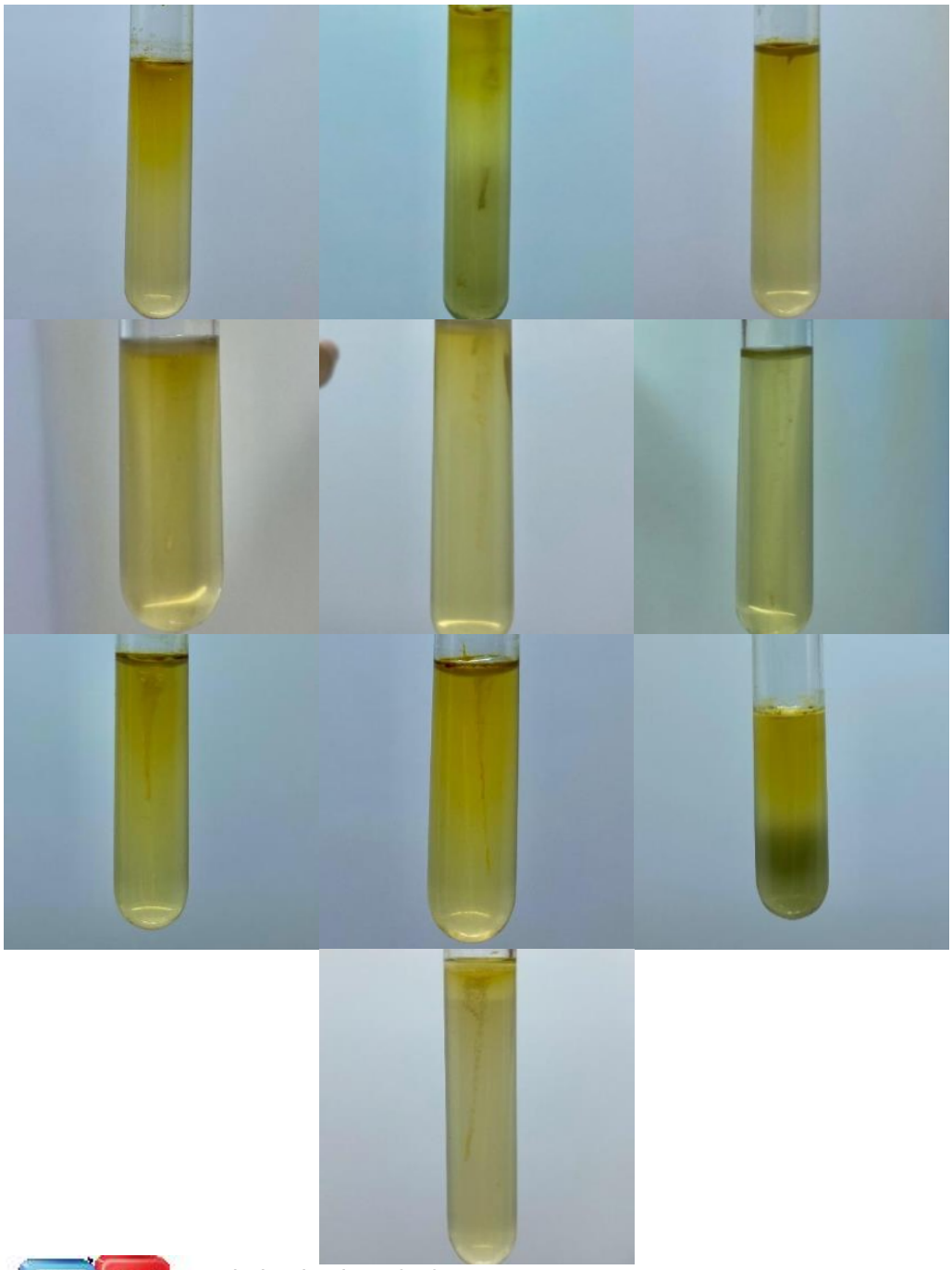




:teri pelarut fosfat



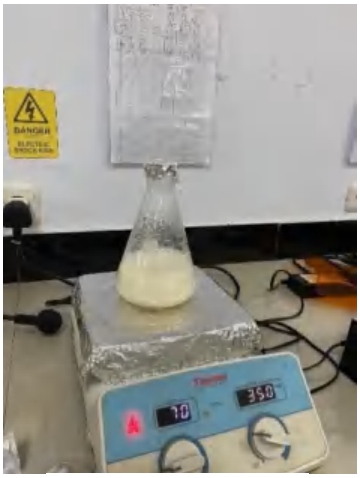




bakteri pelarut fosfat

Lampiran 14. Dokumentasi Proses pengerjaan Bakteri Pelarut Fosfat

Pembuatan Media Pikovskaya



Media Pikovskaya

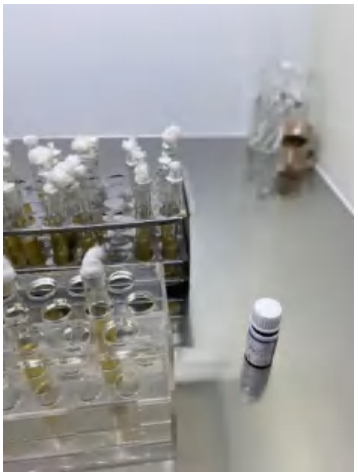
Menuang media pikovskaya ke dalam cawan petri

Menimbang bahan sebelum melakukan isolasi BPF

Persiapan alat bahan untuk pewarnaan gram BPF

Menghitung koloni menggunakan alat colony counter

Persiapan alat bahan untuk Pewarnaan endospora



Uji SIM Bakteri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