Pengabdian Kepada Masyarakat

API® System 20-E

"Pelatihan Identifikasi Enterobacteriaceae secara Biokimia menggunakan *Analitical Profile Index (API) 20-E* kepada Guru dan Siswa Teknologi Laboratorium Medik SMK Negeri 9 Kota Tangerang"

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SMK Negeri 9 Kota Tangerang
10 Januari 2023

Outline

- API Systems Principle
- API 20E Components
- API 20E Workflow
- Result Interpretation

Apa Perbedaan Kedua Kultur Bakteri di Bawah ?

Kultur 1

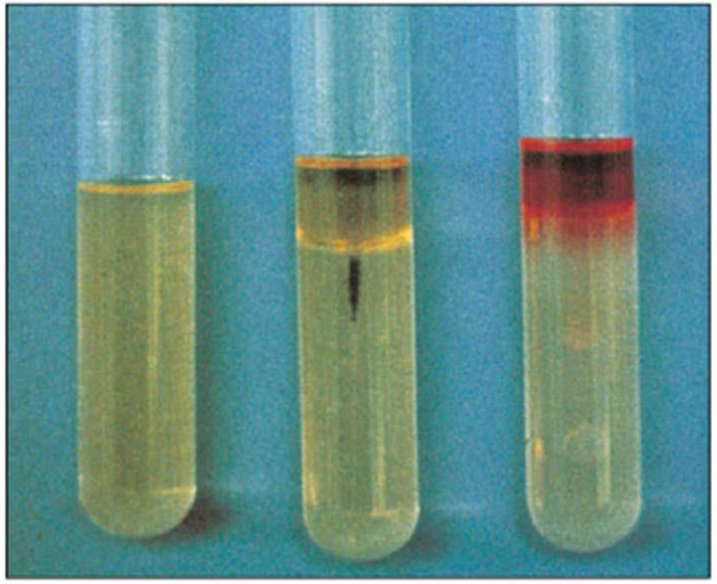
Kultur 2

Apa Nama Bakteri pada Kultur Tersebut ?

Section 1

API System Principle

Conventional biochemical test



Colorimetry principle: color change after biochemical reaction happened

API 20E test

API® (Analytical Profile Index) 20 E is a **qualitative**, **standardized** system for the identification of ***Enterobacteriaceae*** and other non-fastidious **Gram-negative rods**. It contains 20 tubes with different dehydrated substrates.

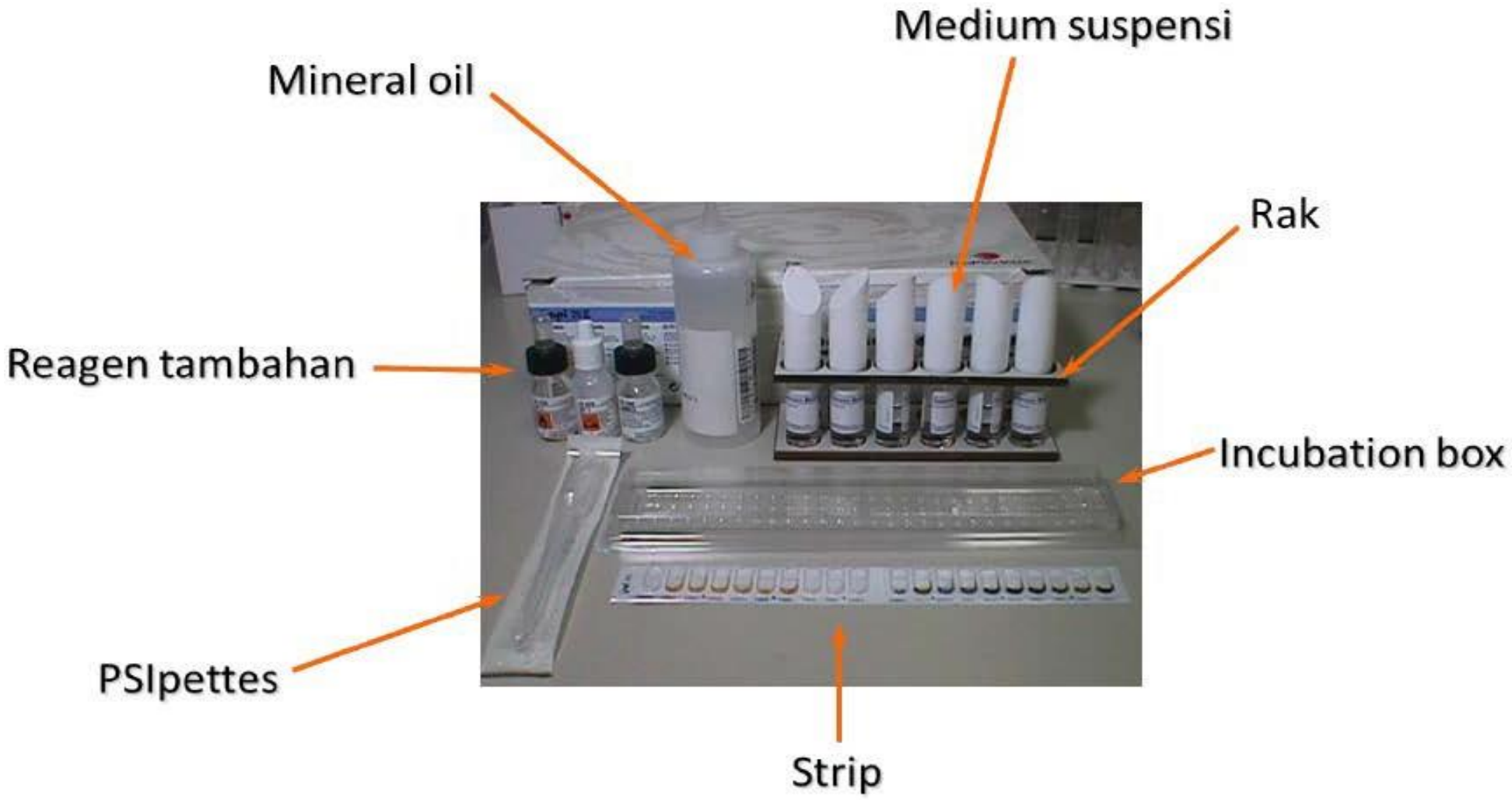
ACTIVE INGREDIENTS OF API 20E

TESTS	ACTIVE INGREDIENTS	QTY (mg/ cupule)	REACTIONS/ENZYMES	RESULTS	
				NEGATIVE	POSITIVE
ONPG	2-Nitrophenyl-βD-galactopyranoside	0.223	β-Galactosidase (Ortho nitrophenyl-βD-galactopyranosidase)	Colorless	Yellow [1]
ADH	L-Arginine	1.9	Arginine dihydrolase	Yellow	Orangey-red [2]
LDC	L-Lysine	1.9	Lysine decarboxylase	Yellow	Orangey-red [2]
ODC	L-Ornithine	1.9	Ornithine decarboxylase	Yellow	Orangey-red [2]
[CIT]	Trisodium citrate	0.756	Citrate utilization	Pale green / Yellow	Blue-green / Blue [3]
H2S	Sodium thiosulfate	0.075	H_2S production	Colorless / Greyish	Black deposit / Thin line
URE	Urea	0.76	Urease	Yellow	Orangey-red [2]
				TDA immediate	
TDA	L-Tryptophan	0.38	Tryptophan deaminase	Yellow	Reddish brown
				JAMES immediate	
IND	L-Tryptophan	0.19	Indole production	Colorless / Pale green-yellow	Pink
				VP 1 + VP 2 / 10 min	
[VP]	Sodium pyruvate	1.9	Acetoin production (Voges Proskauer)	Colorless / Pale pink	Pink / Red [5]
[GEL]	Gelatin (bovine origin)	0.6	Gelatinase	No diffusion	Diffusion of black pigment
GLU	D-Glucose	1.9	Fermentation - oxidation (glucose) [4]	Blue / Blue-green	Yellow / Greyish yellow
MAN	D-Mannitol	1.9	Fermentation - oxidation (mannitol) [4]	Blue / Blue-green	Yellow
INO	Inositol	1.9	Fermentation - oxidation (inositol) [4]	Blue / Blue-green	Yellow
SOR	D-Sorbitol	1.9	Fermentation - oxidation (sorbitol) [4]	Blue / Blue-green	Yellow
RHA	L-Rhamnose	1.9	Fermentation - oxidation (rhamnose) [4]	Blue / Blue-green	Yellow
SAC	D-Saccharose	1.9	Fermentation - oxidation (saccharose) [4]	Blue / Blue-green	Yellow
MEL	D-Melibiose	1.9	Fermentation - oxidation (melibiose) [4]	Blue / Blue-green	Yellow
AMY	Amygdalin	0.57	Fermentation - oxidation (amygdalin) [4]	Blue / Blue-green	Yellow
ARA	L-Arabiose	1.9	Fermentation - oxidation (arabiose) [4]	Blue / Blue-green	Yellow
OX	See the oxidase test package insert		Cytochrome oxidase	See the oxidase test package insert	

Section 2

API 20E Components

API 20E Components



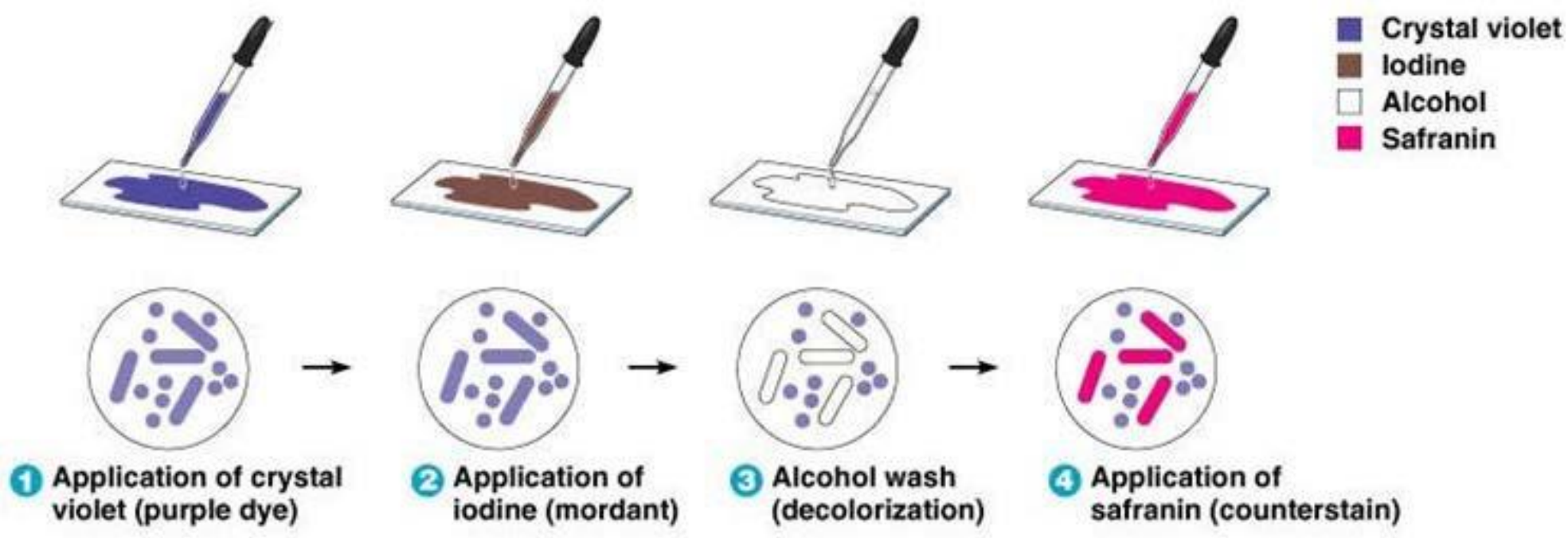
Section 3

API 20E Workflow

API 20E Workflow

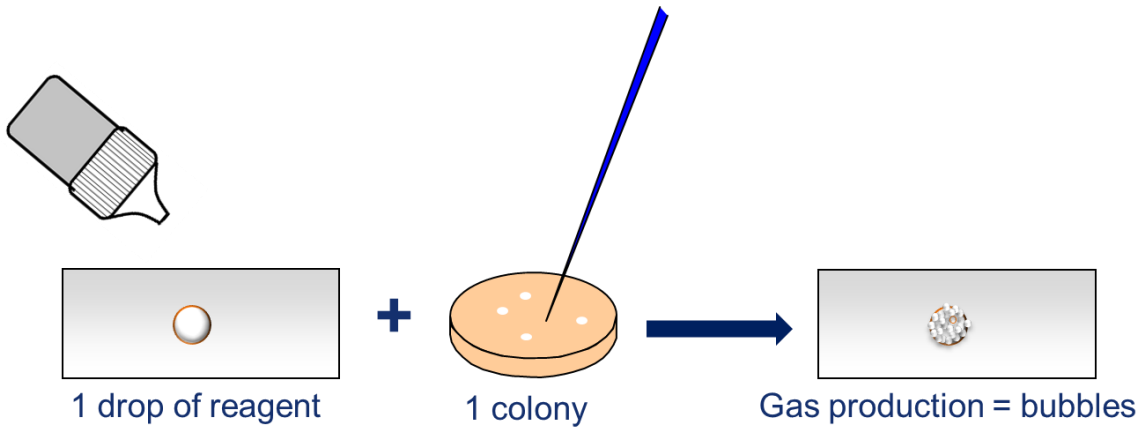
1. Orientation test	Gram staining, oxidase, catalase
2. Culture incubation	Culture is incubated accordingly
3. Suspension and strip inoculation	Colony being suspensed in suspension medium, homogenized, and inoculated into the strip's tubes
4. Reading and interpretation	Result examination manually, inputting the biochemical test to APIWeb, and interpreting the results

Microscopic Examination – Gram Staining

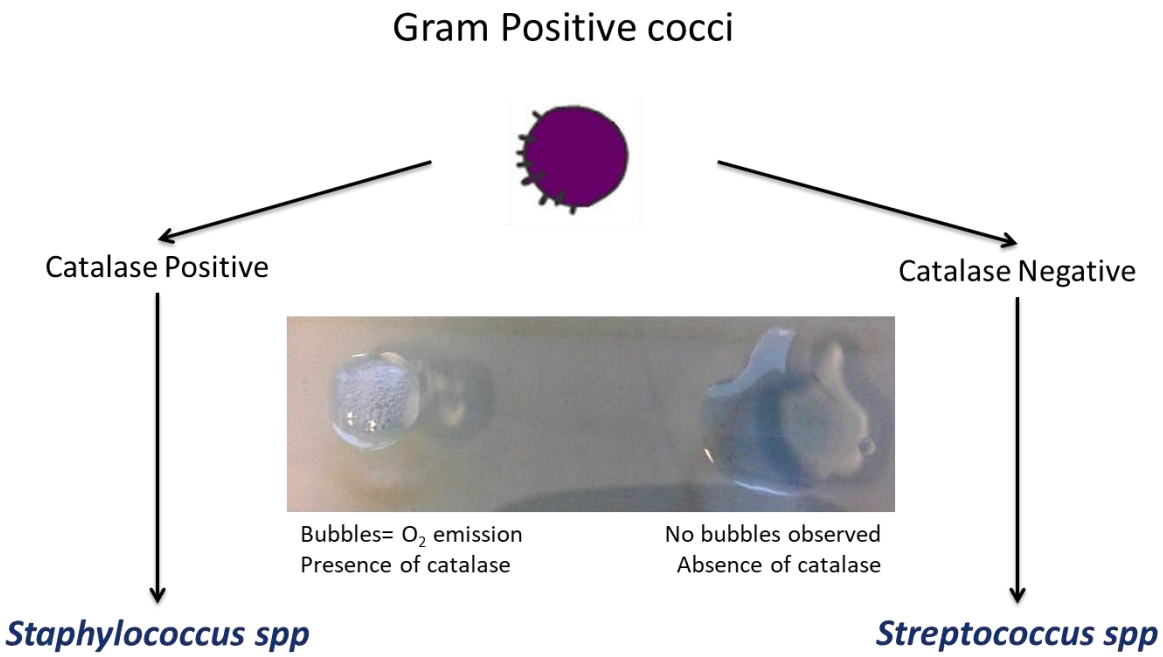


Observation at magnificence x1000, immersion oil

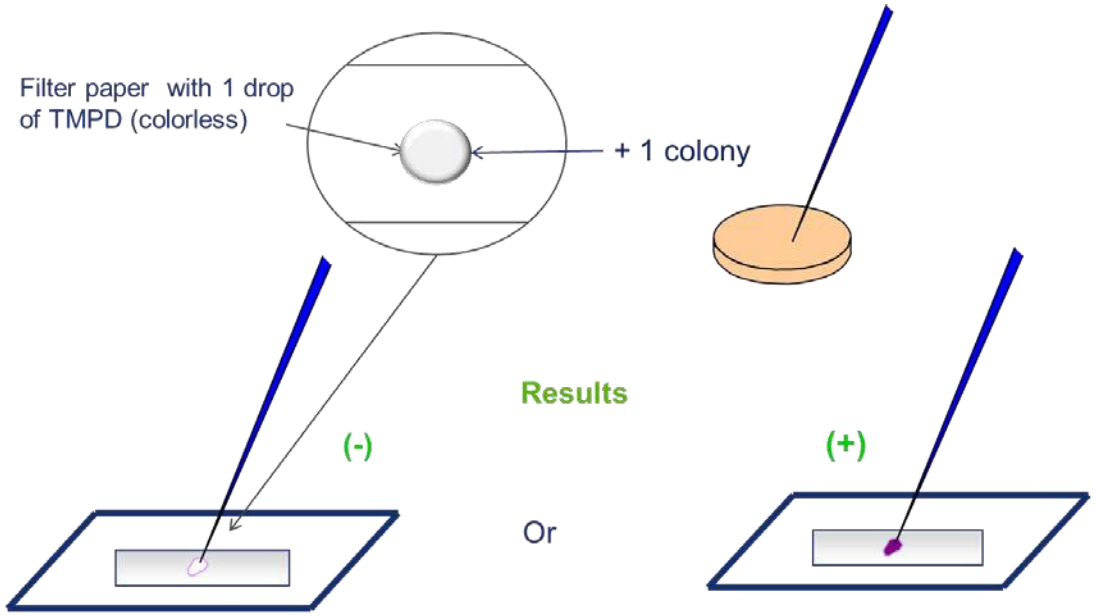
Orientation Test: Catalase



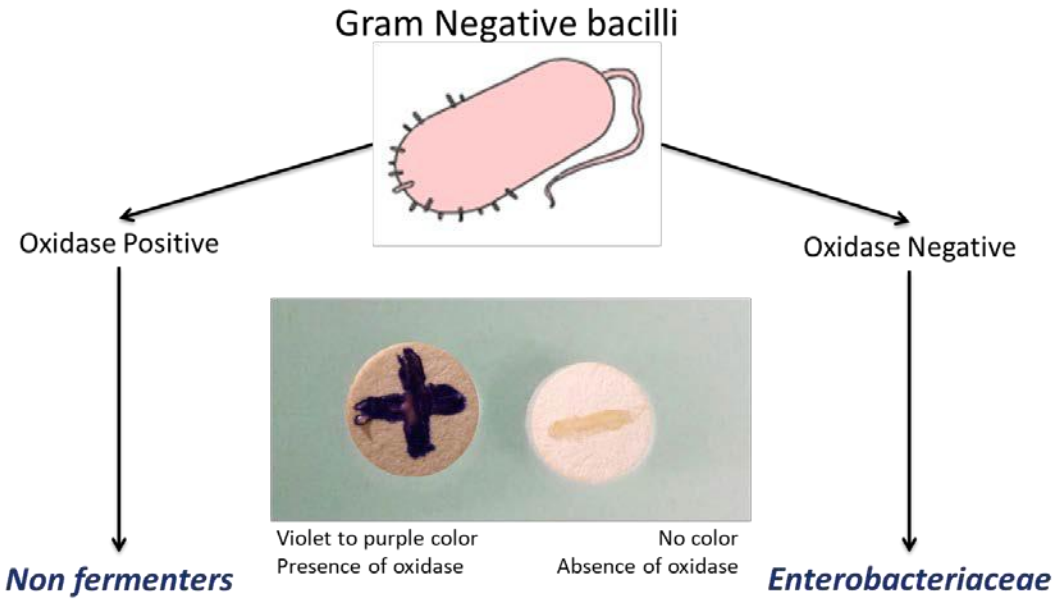
$$2\,H_2O_2 \xrightarrow{catalase} 2\,H_2O + O_2$$



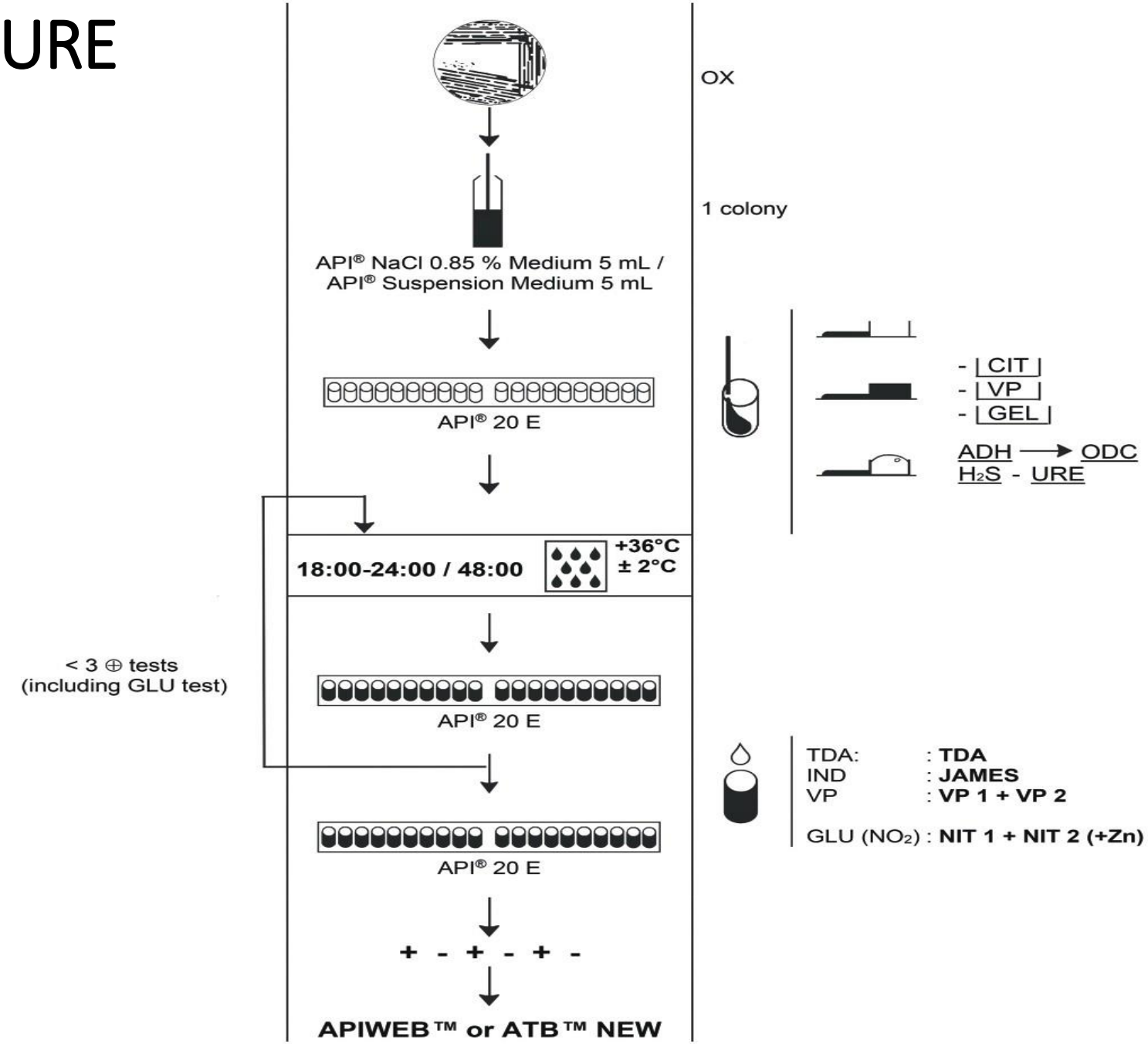
Orientation Test: Oxidase



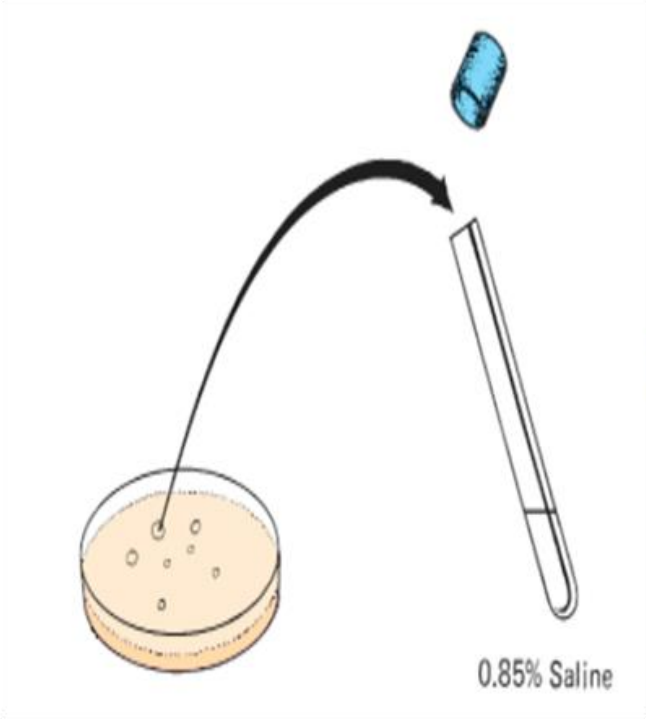
➔*If the oxidase enzyme is present, it oxidizes the TMPD reagent to a dark purple colored compound*



API 20E PROCEDURE

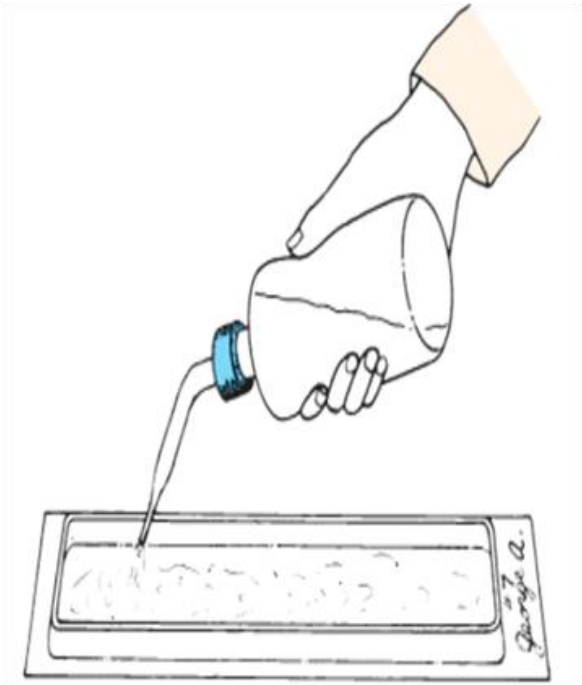


API 20E® workflow

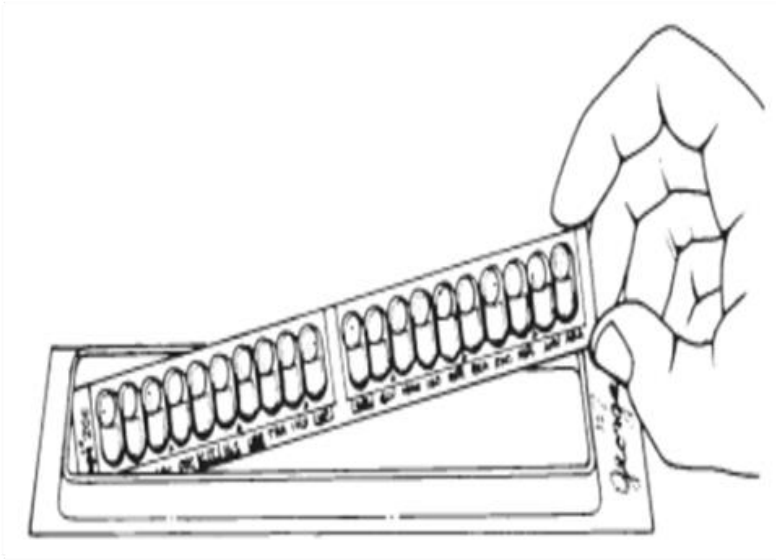


Choose a single, pure colony and inoculate it into a 5 mL saline water to make a culture suspension

Culture age: 18-24 hours

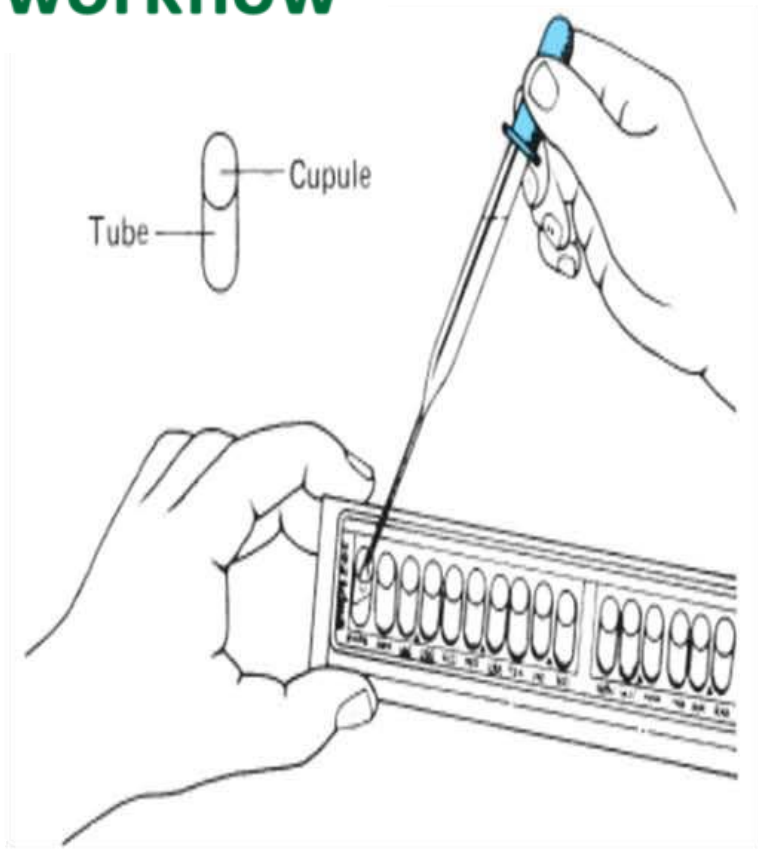


Fill the bottom tray with distilled water to keep the system hydrated in course of incubation



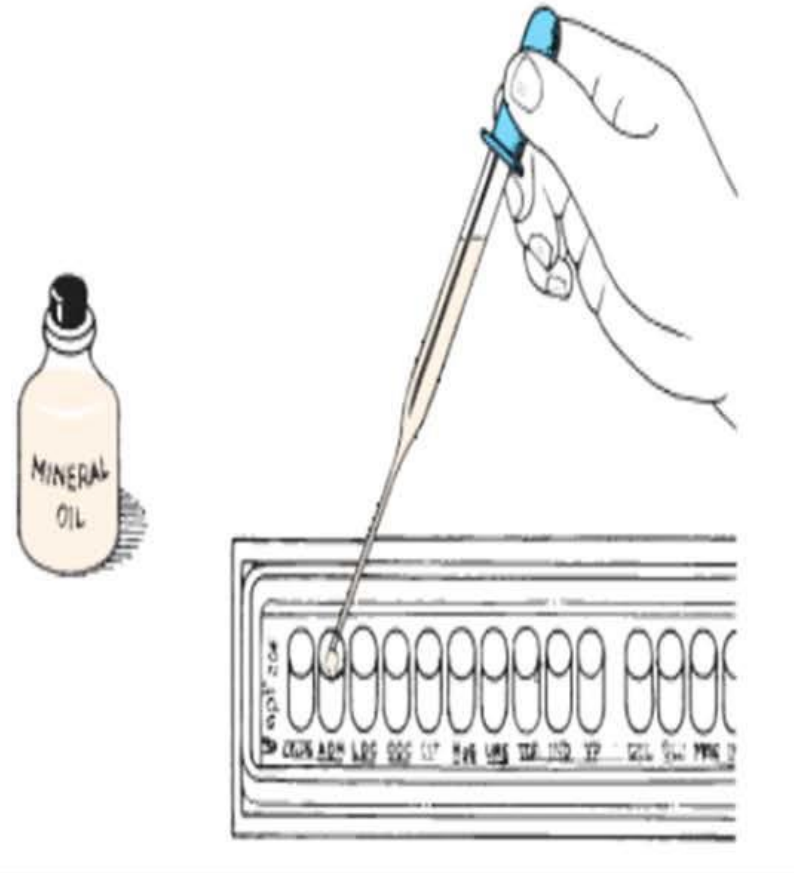
Place API strip on top of the watered bottom tray

API 20E® workflow



Fill all the strip tubes with the culture suspension.

For the underlined tubes code like ADH, fill **only** until the tube is full. For the bracketed tubes code like VP, fill until the cupule is full.



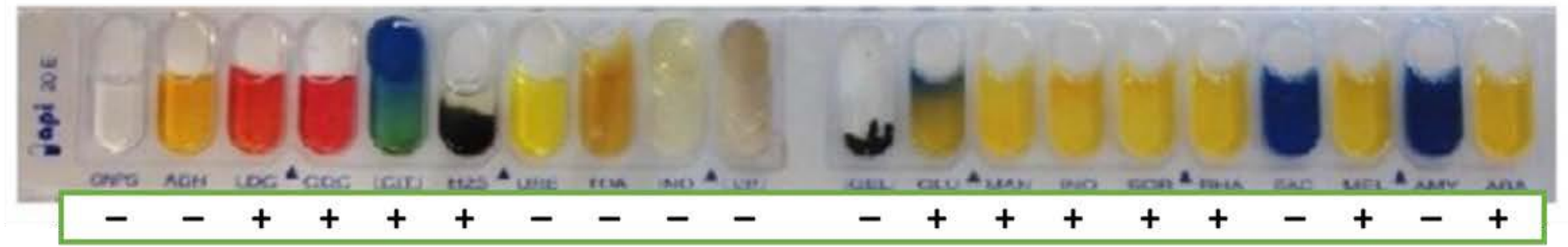
For anaerobic condition, fill the cupules with mineral oil on top of the suspension

Section 4

Result Interpretation

Result interpretation

Positive

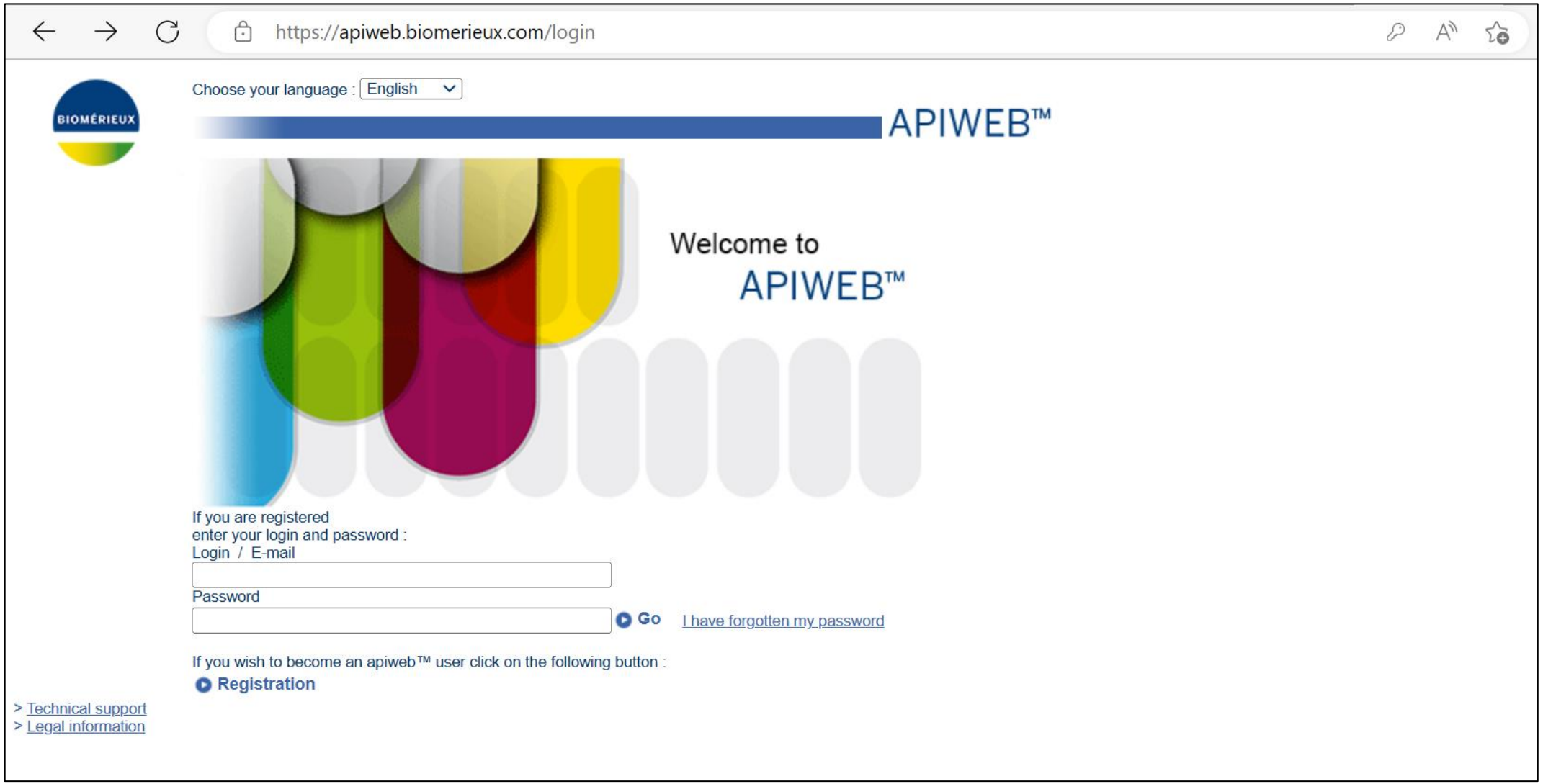


Sample to be determined

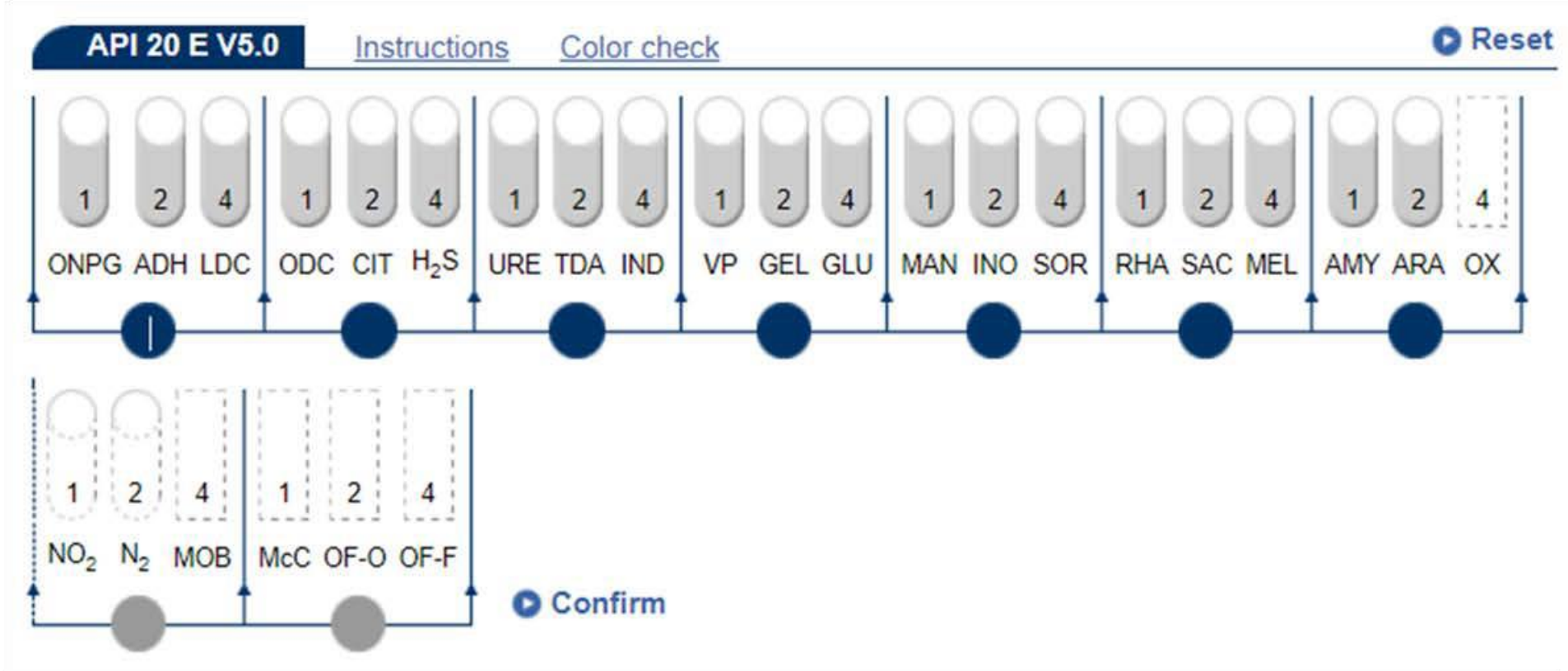
Negative

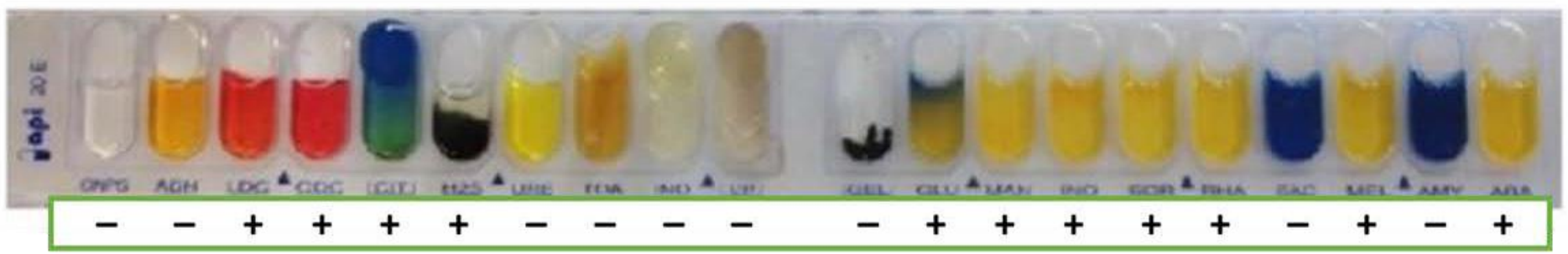
RESULT INTERPRETATION

Go to APIWeb https://apiweb.biomerieux.com/



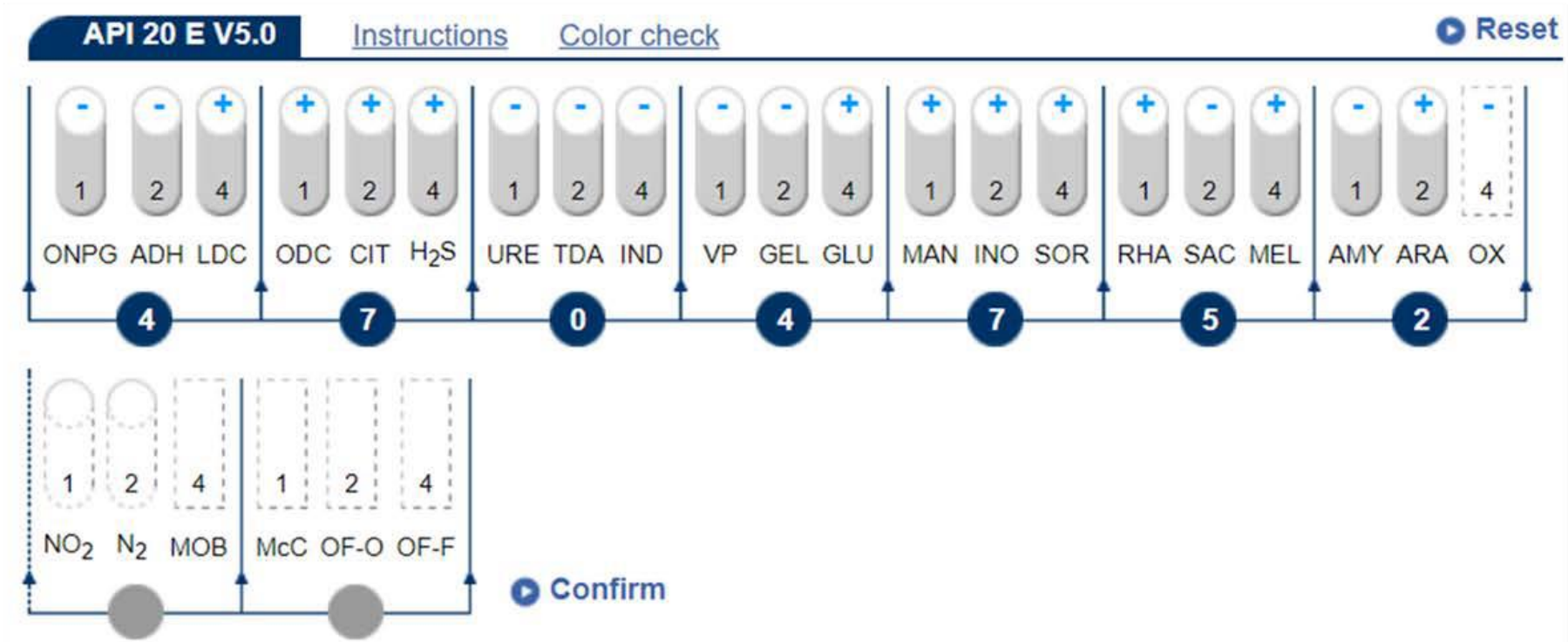
Result interpretation (and an example too)

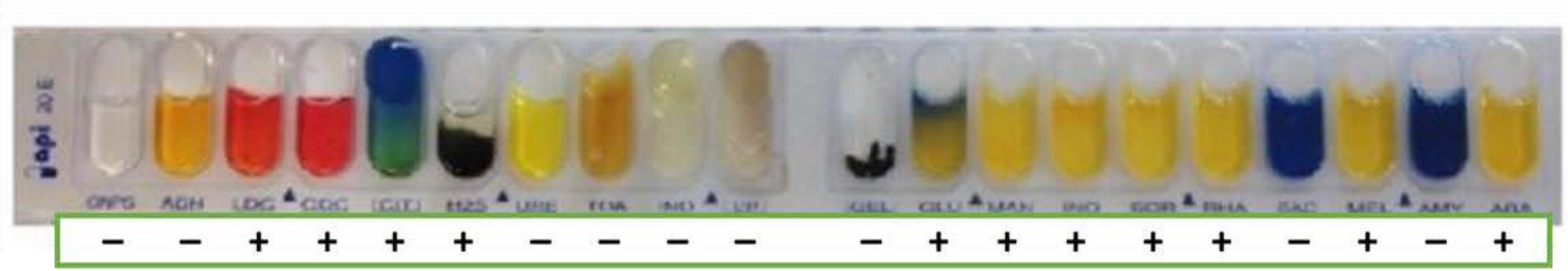




Sample to be determined

Result interpretation





Sample to be determined

Result interpretation

EXCELLENT IDENTIFICATION	
Strip	API 20 E V5.0
Profile	4 7 0 4 7 5 2
Note	CONFIRM BY SEROLOGICAL TESTS

Significant taxa	% ID	T	Tests against			
Salmonella spp	99.9	0.95				

Next taxon	% ID	T	Tests against			
Salmonella enterica ssp arizonae	0.1	0.34	ONPG 98%	ADH 75%	INO 1%	

Sample to be determined

Confidence Levels

EXCELLENT IDENTIFICATION	%id >= 99.9 et T >= 0.75
VERY GOOD IDENTIFICATION	%id >= 99.0 et T >= 0.50
GOOD IDENTIFICATION	%id >= 90.0 et T >= 0.25
ACCEPTABLE IDENTIFICATION	%id >= 80.0 et T >= 0

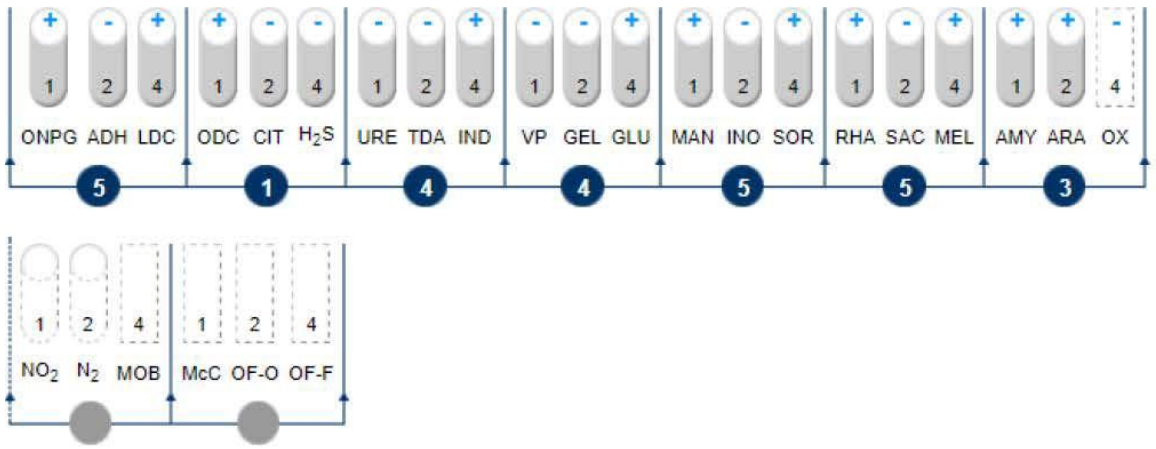
Do not accept the results in the following cases :	**"Doubtful profile"** : at least one totally against test. Atypical profile **"Non reliable identification"** : profile located in a mix-up zone, close to the limit of 5 taxa or more **"Unacceptable profile"** : profile not corresponding to any taxa in the database	**In these cases: check operating mode, purity of isolate and do another strip**

Other examples

PT. Enseval Medika Prima - Jakarta

APIWEB™

API 20 E V5.0



REFERENCE

DATE
2/19/22

COMMENT

LOW DISCRIMINATION

Strip	API 20 E V5.0
Profile	5 1 4 4 5 5 3
Note	

Significant taxa	% ID	T	Tests against			
Escherichia coli 1	66.7	0.75	AMY 3%			
Kluyvera spp	32.8	0.67	LDC 25%	SOR 25%	SAC 89%	

Next taxon	% ID	T	Tests against			
Citrobacter koseri/farmeri	0.1	0.22	LDC 0%	SAC 99%		

Complementary test(s)	dCELLOBIO.	ASCORBATE	MDG	ESC (HYD.)
Escherichia coli	2%	NT	0%	20%
Kluyvera ascorbata	100%	+	98%	98%
Kluyvera cryocrescens	100%	-	94%	100%

Close

Print


thank you
danke
謝謝
рахмат
ngiyabonga
شكراً جزيلاً
teşekkür ederim
Баярлалаа
спасибо
mersi
kia ora
barka
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dank je
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감사합니다
xièxie
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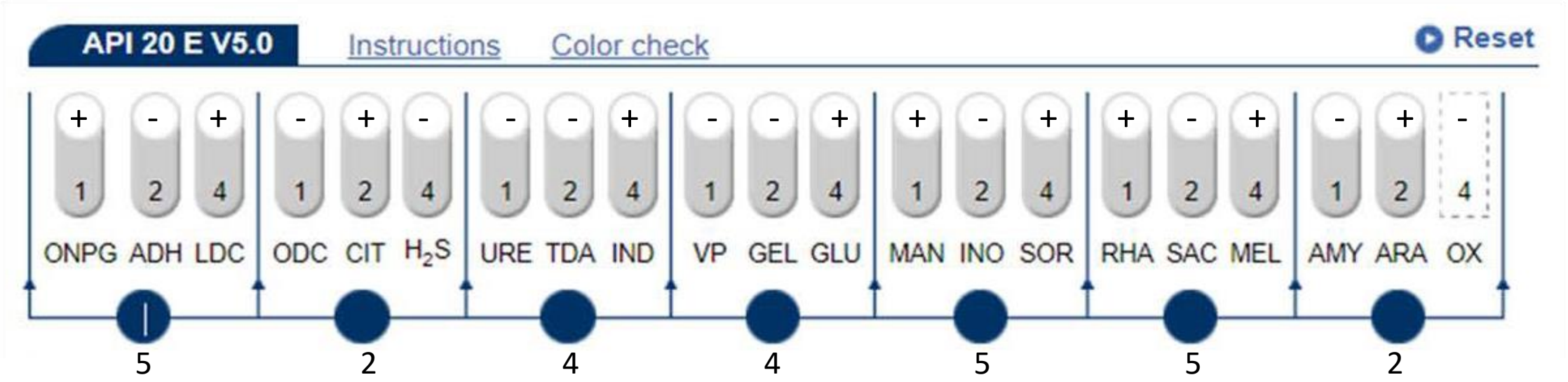
HASIL INKUBASI 24 JAM



INTERPRETASI HASIL (POSITIF / NEGATIF)

Positive

Negative