

## Kit Gram-Hücker R, fast action

REF. 361520-0000

Differential staining of bacteria



IFU044A-RAL

For professional use only.

Please read all information carefully before using this device.

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### Intended Use

Kit Gram-Hücker R, fast action is intended to be used for differential staining of bacteria prior microscopic examination.

If applicable, RAL Diagnostics recommends using the associated RAL Diagnostics products and cannot guarantee that the expected results will be achieved if used in combination with products of other brands.

### Principle

Gram-Hücker staining is a differential staining based on the permeability of the bacterial wall. In this technique, the bacterial wall is not stained but its structure permits classification of Gram-positive or Gram-negative bacteria.

Lugol solution allows the formation of an intracellular complex with Crystal violet oxalate. A more important permeability of Gram-negative bacteria wall allows alcohol to eliminate this complex. Gram-negative bacteria can fix Safranin and then appear stained orangey-pink. Gram-positive bacteria, characterized by a less important permeability of wall, are not discolored by Alcohol and remain stained violet.

## Kit description

### Crystal violet oxalate

Clear dark purple solution  
REF. 3614901B240 1 X 240 mL

### Lugol, PVP-stabilized solution

Clear brown solution  
REF. 3674002B240 1 X 240 mL

### Fast differentiator (alcohol / acetone)

Clear colorless solution  
REF. 361510-0240 1 X 240 mL

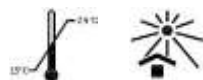
### Safranin

Clear red solution  
REF. 3615004B240 1 X 240 mL

For a specific batch, refer to the analysis certificate of the batch available at [my.ral-diagnostics.fr](http://my.ral-diagnostics.fr).

## Storage

Storage temperature: 15-25°C away from light.  
Bottle shelf life before and after opening: refer to expiry date on label.



## Hazard classification and safety information

### Crystal violet oxalate

Warning: H226 - Flammable liquid and vapour. H319 - Causes serious eye irritation. H351 - Suspected of causing cancer. H412 - Harmful to aquatic life with long lasting effects.



P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P280 - Wear protective gloves, protective clothing, eye protection, face protection. P308+P313 - IF exposed or concerned: Get medical advice/attention. P337+P313 - If eye irritation persists: Get medical advice/attention.

<b>CONT</b>	Crystal violet
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### Lugol, PVP-stabilized solution

No labelling applicable

### Fast differentiator (alcohol / acetone)

Danger: H225 - Highly flammable liquid and vapour. H319 - Causes serious eye irritation. H336 - May cause drowsiness or dizziness. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P261 - Avoid breathing dust/fume/gas/mist/vapours/spray. P280 - Wear protective gloves, protective clothing, eye protection. P312 - Call a POISON CENTRE or doctor if you feel unwell. P337+P313 - If eye irritation persists: Get medical advice/attention.



<b>CONT</b>	CH3COCH3; butan-2-one; isopropyl alcohol
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### Safranin

Warning: H226 - Flammable liquid and vapour. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.



## Personnel qualification

All samples and products must be handled by qualified and authorized personnel, using individual or collective protection, in accordance with the national directives in force in the laboratories. Personnel must also be aware of the classification of hazardous materials indicated on the label and the safety data sheet (available at [my.ral-diagnostics.fr](http://my.ral-diagnostics.fr)).

The specimen must be treated in accordance with procedures available in the laboratory and required by national authorities.

The diagnosis must be conducted by qualified and authorized personnel, in accordance with the procedures in force within the laboratory.

## Specific equipment and reagents required but not provided

Microscope slides, mild heat source (Bunsen burner or hot plate), chemical fixative (methanol, ethanol, acetic acid, or formalin etc.) and these following RAL Diagnostics devices:

SUREFIX REF: 336000-0050

This equipment may vary depending on the protocol. Please refer to the relevant protocol (see the section operating procedure) to ensure that you have the necessary equipment to carry out tests.

## Operating procedure

The equipment used for sample processing must comply with the supplier's instructions for use.

## Sample preparation

Pre-treatment of sample from liquid culture media: Take around 300 to 400 µL of liquid culture medium (including a few beads if possible) and pour it into a microtube. Centrifuge for 1 min at 10 000 rpm and discard supernatant. Then add 2 to 3 drops of physiological saline to the microtube and vortex or stir with a loop. The sample is now ready to be smeared.

Manual bacterial smear: made a thin film of bacteria sample and leave the slide to dry at room temperature. Then bacterial smear can be fixed with mild heat source (Bunsen burner or hot plate) or chemically fixed with chemical fixative (methanol, ethanol, acetic acid, or formalin...)

***NB: Never pass through the flame a smear that is not entirely dry, this could cause cracklings and dissemination of bacteria (creation of aerosols).***

If necessary, the two fixations can be combined.

Manual bacterial smear from liquid or solid culture: Apply a drop of SUREFIX on a slide and with a loop place on top of the SUREFIX drop, the preparation from a liquid culture (as described above) or a colony from a solid culture. Mix SUREFIX drop and the sample and made a uniform smear layer. Eventually Leave the smear to air dry before placing the slide on a hot plate for 30 min at a temperature of 80 °C.

## Reagents and instruments preparation

No preparation needed. The solutions are ready to use.

## Protocols

The staining steps of the protocols indicated below consist of a successive covering of the slides with the different staining reagents.

For the staining steps, place slide on a stand with fixed smear on top.

### ***Protocol for bacterial smear staining - Manual covering method - Manual microscopic analysis***

Processing time: 02 min 32 s

Steps	Reagent	Time [mm: ss]	Indications
Stain	Crystal violet oxalate	01:00	No
Rinse	Water	No	Get rid of reagent and remove the excess
Rinse	Lugol, PVP-stabilized solution	No	A jet of Lugol to remove rinsing water
Stain	Lugol, PVP-stabilized solution	00:30	Can be extended to 1 min
Rinse	Water	No	Thoroughly rinse
Discolor	Fast Differentiator	00:02	Can be extend to 5 sec
Rinse	Water	No	Quickly
Stain	Safranin	01:00	No
Rinse	Water	No	Quickly
Dry	No	≥03:00	No

According to the thickness of the smear, it may be necessary to increase the discoloring in the differentiator time.

## Expected results

### Bacterial smear

**Gram-positive Bacteria:** violet

**Gram-negative Bacteria:** orangey – pink

If observed results vary from those expected, please contact RAL Diagnostics technical service through your usual supplier for assistance.

## Performance

This medical device is state of the art. Its analytical performance, scientific validity and medical relevance are assessed in the CE marking review.

To ensure product performance, use clean and dry laboratory equipment.

The laboratory is responsible for notifying the manufacturer and state competent authority of any serious incident relating to the use of the medical device.

## User quality Control

The following example is for bacterial samples.

RAL Diagnostics recommend using a Gram positive and a Gram negative sample for reagents quality control at reagents renewal, for each staining set or at least for the first staining cycle if a stain is performed multiple times daily.

These slides can be prepared in advance and heat-fixed appropriately for storage.

This control could be done using Gram positive and Gram negative samples from identified patient samples or using a known Gram positive and Gram negative strains (such as *Staphylococcus aureus* ATCC 25923 and *Escherichia coli* ATCC 25922). The strains used must be identified, avoid Gram variable species.

Staining results for each cell type must also be compliant with this manual expected results.

These quality controls depend on the authorization by qualified personnel.

Users remain responsible for determining the appropriate quality control procedures for their laboratory and for complying with applicable laboratory regulations.

## Other products

For more information contact your usual supplier.

## Recommendations, notes, and troubleshooting

### Products appearance

If the appearance of the products differs from the description above, do not use it and contact RAL Diagnostics technical service through your usual supplier for assistance.

### Procedures notes

To prevent products degradation, please comply with the storage and handling recommendations specified in this manual.

According to the thickness of the smear, it may be necessary to increase the discoloring in the differentiator time.

Adding of Polyvinylpyrrolidone (PVP) to Lugol, PVP-stabilized solution helps to avoid Iodine migration and then provides a satisfactory stability of the ready-to-use plastic bottle packaged solutions.

One can improve the sharpness of the observation with a green light-microscope (a green filter or a yellow one superposed on the blue filter). The contrast depends on the way one carries out the differentiation.

The genus *Campylobacter* is badly colored by R4 Safranin, while the genus *Legionella* remains colorless.

The rinsing liquid for staining can be distilled, demineralized, or tap water.

### Products stability

Every RAL Diagnostics product can be used until the expiry date indicated on, in its original packaging if it is still hermetically sealed.

### Staining stability

Staining quality and reproducibility depend on the correct use of the products. Staining conducted according to these recommendations will remain stable for several days.

**Instructions for cleaning and waste disposal**

All biological samples, effluents and used consumables should be considered potentially hazardous.



To avoid any risk, apply the following instructions: dispose of samples, effluents and consumables in accordance with laboratory standards and applicable national and local standards and regulations.

Chemical and biological waste must be collected and processed by specialized, registered companies.

## Table of symbols and abbreviations

Depending on the product, you may find the following symbols on the device or the packaging material.

GHS PICTOGRAMS	INTERPRETATION	SYMBOL	INTERPRETATION
	Explosive		Batch code
	Flammable		Serial number
	Oxidizer		Catalogue reference
	Compressed gas		Date of manufacture
	Corrosive		Use up to
	Toxic		Unique device identifier
	Harmful		Manufacturer
	Health Hazard		Importer
	Environmental Hazard		Entity distributing the medical advice in the region concerned
	No labelling applicable		CE marking device
			In vitro diagnostic medical device
			Authorised Representative in the European Community
			Authorised Representative in Switzerland
			Complies with UK guidelines
			Do not use if packaging is damaged
			Keep away from light
			Temperature limit: 15-25°C
			Temperature limit: 15-30°C
			Keep dry
			Box: handling upwards
			Fragile
			Sterilised by irradiation
			Single sterile barrier system with outer protective packaging
			Sterile and radiation-sterilised barrier suit
			Do not reuse
			Do not resterilize
			Contents sufficient for n tests
			Hazardous material contained
			Consult instructions for use
			Use
			After opening, use within XX months
			The product must not be used in conjunction with an automatic colouring machine
			Indicates a medical device that contains potentially carcinogenic, mutagenic or reprotoxic (CMR) substances, or substances classified as endocrine disruptors

## Bibliography

**CLARK G.**, *Staining procedures, Williams & Wilkins, 4th éd.*, 1981, p. 377-379.

**GENEVA WORLD HEALTH ORGANIZATION**, *Manual of basic techniques for a health laboratory*, n°39, 1982, p. 231-234.

**VASTEL C.L.**, *Coloration Gram-Hücker, Le Tech. Biol.*, n°5, 1978, p. 243-245.

## Change tracking

Date	Version	Changes
05/2022	IFU044A-RAL	IVDR (EU) 2017/746 compliance

