



PROPIONIBACTERIUM PAL[®] WITH and WITHOUT RELIGIOUS CERTIFICATION RM (Argentine)

I/- PRESENTATION

Freeze dried Propionibacteria cultures to direct set milk intended for the production of cheese with propionic eyes formation.
Standard packaging : 100 g

II/ - SPECIFICATIONS

PROPIONIBACTERIUM PAL[®] are blends of strains of *Propionibacterium freudenreichii subsp. shermanii*.

The highly concentrated lyophilized culture (3.10E10 cfu/g +/-0.3 log) is very active and easy to use in direct set of the milk used.

On the other hand, these cultures are not formulated for intermediate or bulk starter production. If you have specific applications, please feel free to contact our Technical dept.

III/ - APPLICATIONS

PROPIONIBACTERIUM PAL[®] can be used for all cheeses with limited or strong openings, where the typical propionic acid aroma is required as in the cooked (Emmental, Gruyere, Swiss cheese) and partly cooked (Jarlsberg, Maasdammer) cheeses, as well as for some soft cheeses (Pont L'évêque, Livarot).

Raw milk can naturally contain propionibacteria which can be removed by the bactofugation process of the cheese milk carried out to reduce the number of butyric spores.

It is advisable to set the milk with selected propionibacteria to ensure the proper eye formation and to get the typical propionic flavor.

IV/ - DIRECTIONS FOR USE

A 100 g PROPIONIBACTERIUM PAL[®] flask is sufficient to direct set 5,000 to 100,000 l milk according to the treatment, technology and size of the cheese.

For Emmental production, use 1 flask for 30,000 to 70,000 l milk according to the season ; this set corresponds to 40/60 million propionibacteria/1,000 l milk or 4.10E4 to 1.10E5 cfu/ml.

Use higher concentrations if 100 % of the cheese milk is bactofugated, separated or micro-filtered : 1 flask for 10,000 to 15,000 l milk is then recommended.

For small size cheeses, the quantities are increased :
- 1 flask for 10,000 to 15,000 l milk for 5 to 10 kg cheese,
- 1 flask for 3,000 to 5,000 l milk for 1 to 2 kg cheese.

The PROPIONIBACTERIUM PAL[®] cultures are added to the milk during maturation or at the time of renneting. Dilute the culture with milk or preferably with 20/25°C water in order to get good distribution in the vat.

VI/ - PURPOSE OF THE PROPIONIBACTERIA

The propionibacteria ferment the lactates and produce carbon dioxide, propionic acid and acetic acid.

The propionibacteria are in competition with other micro-organisms, especially with the butyric acid bacteria, and their efficiency will be more obvious as the butyric contamination is low.

The propionic fermentation is very rapid at higher temperature (optimal temperature of growth : 30°C).

As an example, used by producing Emmental type cheese at 25°C, 2/3 rd to 3/4th of the CO2 could be produced within 3 days.

VII/ - PRESERVATION AND STORAGE

The PROPIONIBACTERIUM PAL[®] cultures can be kept for 6 months without loss of activity if stored at +4/8°C and for 2 years at -18°C.

The cultures can be shipped at room temperature for several days without affecting their quality.

VIII/ - SPECIFIC BLENDS

The PROPIONIBACTERIUM PAL[®] cultures have demonstrated their ability to produce carbon dioxide for eye formation, both in laboratory trials and full-scale production.

In order to meet specific needs, blends of various strains are available :

- **PROPIONIBACTERIUM PAL[®] STANDARD** and RM : a balanced mixture of strains conferring high robustness to the culture.

- **PROPIONIBACTERIUM PAL[®] 7916** and RM : mix of high CO₂ producers and propionic acid strains.

- **PROPIONIBACTERIUM PAL[®] 4034** and RM, Rapid culture, with an aspartase activity; providing typical aromatic spicy (cheesy, sweat odours, ...).

- **PROPIONIBACTERIUM PAL[®] P14** : Rapid culture, moderate producer of propionic acid and strong producer of CO₂ under standard conditions, slightly sensitive to cold storage before ripening and highly sensitive to an increase in the salt/humidity ratio; strong producer of aroma factors (esterase activity) with little effect on PAB/LAB (propionic acid bacteria/lactic acid bacteria) interactions.

VIII - SPECIFICATIONS

Enumeration on lactate medium	30 x 10 ^E 9/ ufc/g +/-0.3 log
Staphylococcus coagulase +	≤10/ ufc/g
Yeasts/moulds	≤10/ ufc/g
<i>Salmonella</i>	abs/25 g
<i>Listeria monocytogenes</i>	abs/25 g
Enterobacteria	≤10/ ufc/g

The guaranteed values are ensured by the HACCP system and hygiene in the plant and staff

IX - CONTROL AND COUNTING

Each shipment of PROPIONIBACTERIUM PAL[®] and PAL[®] RM can be accompanied by a certificate of analysis.

For the enumeration of the propionibacteria, we propose the following methods and culture media :





- 1°) on MRS AGAR DIFCO,
 2°) on PAL PROPIOBAC without selective additive.
 3°) on AGAR medium with sodium lactate.

- Composition :

Sodium lactate (60% USP)	1,67 ml
glucose ref. 24379 363 Prolabo	1,0 g
Casein pancreatic peptone (BIOKAR)	2,0 g
Yeast autolytic extract	1,0 g
Bacteriologic meat extract (BIOKAR)	0,1 g
Bacteriologic Agar, type E (BIOKAR)	1,2 g
De-ionized water	100 ml

Boil in order to liquefy the AGAR, adjust to 100 ml with water and at pH 6,8 distribute into proper containers, sterilize in an autoclave at 121°C for 15 minutes.

RECONSTITUTION AND DILUTION OF THE LYOPHILIZED CULTURE.

- Put 10 g sample powder into a 250 cc flask containing 90 ml of 0.1 % sterile peptone solution.
- Stir to dissolve the powder completely.
- Agitate 50 times backwards-forwards on a 30 cm distance for 30 seconds for distributing the cells of the 10 E-1 dilution uniformly.

Take off 1 ml of the 10E-2 dilution, then put it into a 250 cc flask containing 99 ml sterile peptone solution. agitate, 50 times backwards-forwards in order to reach the 10E-3 dilution.

Repeat until 10E-9 dilution is reached.

Set 3 Petri dishes with 1 ml of the 10E-9 dilution in every dish, which gives you the 10E-9 dilution.

Add 15 ml Agar to the melted and cooled (45°C) lactate.

Mix 25 times clockwise and 25 times counter-clockwise. Allow to solidify.

Incubate at 30°C in a Gas pack anaerobic jar for 5 days without any desiccant and without opening the jar.

Count the colonies and multiply by 10E9 in order to get the total number (CFU) of bacteria per gram of powder.

X- ALLERGENS DECLARATION

Allergens as defined by regulation 1169/2011/EC and under the directives 2003/89/EC – 2006/142 /EC - 2007/68 / EC :

Yes	No	Allergens
	X	Cereals containing gluten
	X	Crustaceans
	X	Eggs
	X	Fish
	X	Peanuts
	X	Soybeans and soya bean-based products
*	X	Milk (including lactose)
	X	Groundnuts and groundnuts-based products
	X	Lupins
	X	Molluscs
	X	Celery
	X	Mustard
	X	Sesame seeds
	X	Sulphur dioxide and sulfits (> 10 mg/kg)

*Presence of Lactose in references : A08008

XI / - GMO STATUS

PROPIONIBACTERIUM PAL® and PAL® RM do not consist of, nor contain, nor are produced from genetically modified organisms according to the definitions of Regulation (EC) 1829/2003 and Regulation (EC) 1830/2003 of the European Parliament and of the Council of 22 September 2003.

XII/ - ESB STATEMENT

PROPIONIBACTERIUM PAL® and PAL® RM do not contain any ESB suspected constituents of bovine origin.

XIII/ - ALIMENTARITY

PROPIONIBACTERIUM PAL® and PAL® RM are manufacturing auxiliaries complying with food application.

XIV / - IONIZATION

PROPIONIBACTERIUM PAL® and PAL® RM are not submitted to ionization.

XV – CODE ARTICLE

1) PROPIONIBACTERIUM PAL® without religious certification

A01001	PROPIONIBACTERIUM PAL® STANDARD 100 G
A01004	PROPIONIBACTERIUM PAL® 7916 100 G
A08008	PROPIONIBACTERIUM PAL® P14 100 G
A09037	PROPIONIBACTERIUM PAL® 4034 100 G

2) PROPIONIBACTERIUM PAL® RM with religious certification
 Kasher et Halal

A01020	PROPIONIBACTERIUM PAL® STANDARD RM 100 G
A01032	PROPIONIBACTERIUM PAL® 7916 RM 100 G
A09008	PROPIONIBACTERIUM PAL® 4034 RM 100 G

XVI / HALAL and KOSHER STATUS

PROPIONIBACTERIUM PAL® RM correspond to the range of certified Kasher and Halal cultures.

These cultures contain no ingredient of animal origin and our laboratories do not use alcohol during their production.

XVII / -LEGISLATION / LABELING

The user must ensure that this product complies with his expectations and with the relevant labeling requirements.

We advise you to refer to EU Regulation No 1169/2011 and its amendments

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Technical Reference:

GB SFT PROPIONIBACTERIUM PAL STANDARD ET RM A01-A09 20151123 A Argentine

