4PROTECTION

Special Protective Cultures

FOR MEAT

A COMPANY OF SACCO SYSTEM

SACCO

4PROTECTION
Special Protective Cultures

NATURAL CARE

INDEX

4PROTECTION, THE NATURAL GUARD FOR YOUR PRODUCT IDENTITY

INTRODUCTION

No additives, no preservatives, 100% natural are the most prevalent trends that also guide the choices of consumers; safety and durability and high quality standard level of foods is as important as ever.
Sacco has the right ingredients for the success of your products and the satisfaction of your customers.

4Protection Special Cultures help to enhance the quality and protect your brand image, allow the product to get to the end of shelf life ensuring a structural and sensorial stability, help to maintain freshness and do not change the taste, aroma and texture.
Your ally for a much more genuine product till the consumer table.

WHAT IS 4PROTECTION LINE AND WHY USE IT

Since 1998 Sacco has selected yeasts and bacteria for protection against spoiling unwanted microorganisms in dairy products such as yogurt, fermented milk, fresh cheese, semi-hard cheese, meat and fish. The cultures of 4Protection Lines help to control and preserve the final product from alterations, fighting in a completely natural way any possible unwished bacteria and thereby maintaining a "**clean label**" product.

Many of the selected strains used were chosen among probiotic microorganisms which has been studied and shown to be effective through specific studies, microbiological tests and sensorial analysis of the products.

NATURAL CARE

HOW 4PROTECTION LINE WORKS

Today it is known that microorganisms produce a diverse range of microbial defense molecules including exotoxins, lytic agents, metabolic by-products and bacteriocins (from EFFCA position PFC-2016).
The process is based on a competitive effect for space against microorganisms in general, including pathogens, on the production of anti-microbial metabolites such as organic acids and peptides with specific mode-of-action.

The selected 4Protection ferments do not acidify, nor alter the organoleptic characteristics of the product and are easily adapted even at refrigeration temperatures.

The different applications are studied as a function of the characteristics of the technological process and of the desired performance of the products. Sacco's technologists are committed to working alongside our customers to find the best solutions and production process, working together with clients offering a product and a customized service.
4Protection line is compatible and complementary to all the Sacco's starter cultures, they are used by direct inoculation or surface treatment.
Sacco is glad to help customers in finding the best solutions for their specific purpose, according with the characteristics of the products, the technological process and the activity needed from the use of our protective cultures.

4PROTECTION LINE FOR MEAT

Product	Applications
Lyocarni BXH-69	Fresh meat, cooked and sliced products with nitrite salt added after cooking and cooling
Lyocarni BMX-37	Fresh meat, cooked and sliced products with nitrite salt added and with anti-listerial properties after cooking and cooling
Lyocarni BOM-13	Fresh meat products without nitrite salt added or on cooked and sliced meat products after cooking and cooling
Lyocarni BOX-74	Fresh meat products without nitrite salt added or on cooked and sliced meat products after cooking and cooling, and with anti-listerial properties
Lyoflora FP-18 **Lyoflora FP-50**	Fresh meat, cooked and sliced products after cooking and cooling only with anti-listerial properties

Contamination of meat products with *Listeria monocytogenes* is an increasing problem. Therefore Sacco has developed a product range of protective cultures. Protection with Sacco cultures for meat application can be achieved by competitive exclusion, most efficient against spoilage bacteria, bacteriocin production efficiently killing *Listeria monocytogenes* and a combination of both principles.

Action	Product
Competitive exclusion with *Lactobacillus sakei*	Lyocarni BOM 13 Lyocarni BXH-12 Lyocarni BXH-69
Bacteriocin producing *Carnobacterium* culture	Lyoflora FP-18 Lyoflora FP-50
Combination of both principles	Lyocarni BOX-74 Lyocarni BMX-37

Articles and studies:

Available on request

- **Challenge test with Lyocarni BOX-74 used on cured, cold smoked filet (2015)**
- **Challenge test with Lyocarni BOX-74 used on emulsion sausage (2014)**
- **Challenge test with Lyocarni BOX-74 used on cooked ham (2014)**
- **Challenge test with Lyoflora FP-18 used on a meat emulsion sausage (2014)**
- **Application of bacteriocin producing lactobacilli for the control of *Listeria* in Italian salami – Andersen, Cislaghi, Coconcelli (2005)**

ABSTRACT MEAT

APPLICATION OF BACTERIOCIN PRODUCING LACTOBACILLI FOR THE CONTROL OF *LISTERIA* IN ITALIAN SALAMI

Lone Andersen[1]*, Simona Cislaghi[1], and Pier Sandro Cocconcelli[2,3]
[1]Sacco S.r.L., Cadorago, Italy. *Contact Email: l.andersen@saccosrl.it
[2]Istituto di Microbiologia, Università Cattolica del Sacro Cuore,
Piacenza, Italy. E-mail: pier.cocconcelli@unicatt.it
[3] Centro Ricerche Biotecnologiche, Università Cattolica del Sacro Cuore,
Cremona, Italy

Key Words: Fermented sausage, starter culture, acidification, staphylococci, LAB, bacteriocin, Listeria, PCR

Introduction

All over the world *Listeria* contamination is a potential hazard in fermented, dry sausages produced without heat treatment. As heat treatment alters the meat structure such a product is not perceived as a traditional fermented, dry sausage by consumers. Normally, if present, the level of *Listeria* in fermented, dry sausages is relatively low and should not cause health problems when fermented sausages are consumed. Nevertheless, regulation in food requirements, as safety criteria, calls for absence of *Listeria monocytogenes* in 25 g food, and consequently, efforts are accomplished to prevent *Listeria* being present in traditionally produced fermented sausages. Commercial bacteriocin producing lactic acid bacteria (LAB) have successfully been tested on applied *L. monocytogenes* in fermented sausages (Andersen, 1999) but few data on effect on indigenous *Listeria* with such LAB strains are available (Hugas et al, 2003).

Some of the characteristics of Italian salami are high final pH, moulded surface, and pronounced meaty flavour. It is well-known that staphylococci enhance the development of meaty flavour but also that they are inhibited by lowering in pH (Tjener, 2003). Therefore, an adequate anti-listerial LAB starter culture should not lower pH so much that it influences the development of required flavour compounds and the sensory assessment.

4PROTECTION,
THE NATURAL
GUARD FOR YOUR
PRODUCT IDENTITY

SACCO IS AN INTERNATIONAL COMPANY WITH FAMILY SPIRIT THAT OFFERS A LARGE RANGE OF INNOVATIVE PRODUCTS.

This includes starter cultures for food fermentation (in particular dairy) and nutritional supplements (probiotic cultures), as well as instruments for the improvement of food. **The sister company Caglificio Clerici has been an Italian leader** in rennet production since 1872. Sacco furthermore acquired the Italian culture producer CSL in 2013. The high quality of our products, the continuous innovation, the ability to work closely with our clients, and the focus on training and developing employees, are the pillars of Sacco. In recent years the company has further invested extensively in R&D, including brand new facilities in 2017, and has been a "pioneer" in areas such as protective cultures. **Sacco distributes its products in all key markets (110+ countries), and has ISO 22000 and FSSC 22000 accreditation and a GMP certified plant.**
Sacco is a company of Sacco System, the biotech network applied in food, nutraceutical and pharmaceutical industry.

SACCO system

Supporting food culture & life

4PROTECTION

Special Protective Cultures

TRADITION, PASSION INNOVATION

Sacco System
www.saccosystem.com