SPECIALIST IN PROBIOTIC HYGIENE AND INFECTION CONTROL
Chrisal

Est. 1989, Belgium

Cleaning, hygiene and personal care products

Pure, with respect to man and nature
Chrisal
Animal housing

Industry

Food industry

Healthcare

Automotive

Personal care

Homecare

Offices
Probiotics are good bacteria that provide health benefits to humans and animals.
Benefits of probiotics in cleaning and personal care products:

1. Microscopic deep cleaning
2. Prevention and elimination of odours
3. Healthy microflora in the environment
4. Reduced risk of infections
5. Lowers allergens
6. Promotes the environment (100% sustainable)
7. Cost saving
What about plants?
Plant growth/health – focus points:

1. Nutrition
   • Soil / Water / Sunlight / CO2

2. Environment
   • Root ecosystem / Climate

3. Plant health
   • Diseases / Physical damage

4. Handling
   • Equipment / Harvesting / Processing / Storage
Benefits of probiotics for plants

1. Growth promotion
   • Use probiotic bacteria to stimulate the growth of plants

2. Infection control
   • Use probiotic bacteria to lower infection risks

3. Storage and handling
   • Use probiotic bacteria to improve storage
Growth promotion – biostimulant

By improving the natural growth process of plants, probiotic bacteria can increase crop yield.

Photosynthesis

\[ \text{Ingredients} : \text{Sunlight} + \text{H}_2\text{O} + \text{CO}_2 + \text{Nutrients} \rightarrow \text{Product} : \text{“CH}_2\text{O”} + \text{O}_2 \]

- Water
- Carbon dioxide
- Nitrate NO\textsubscript{3}
- Phosphate PO\textsubscript{4}
- Iron
- Silica

“Organic matter”

Oxygen
Growth promotion – biostimulant

1. Cleaning the plant leaves
   - Consumption of organic dirt
   - Improve sunlight penetration

2. Feeding CO2 to the leaves
Growth promotion – biostimulant

3. Improving root bacterial ecosystem

Warning:
Using the wrong type of bacteria can have severe negative effects !!!
Infection control

(Sprout) crops can be subject to infection by:

- Fungus (mildew, fusarium, stem rot…)
- Insects (flea beetle, cabbageworm, cabbage looper…)
- Bacteria (black rot)

Specific probiotic/bacterial strains are known as registered biocides. They always have a specific activity!

E.g. Bacillus thuringiensis, Bacillus subtilis…
Storage and handling

1. Storage

Some probiotic bacteria can be used to wash or spray freshly harvested crops in order to prolong their storage time at non-freezing temperatures.

2. Handling

Equipment and personal hygiene are often sources of crop contamination. A probiotic maintenance and hygiene greatly helps lowering the risk of contamination.
Bacterial products for plant treatment

Legal situation in EU

In Europe, products for use on plants are divided into 4 categories:
- Biocides
- Pesticides
- Fertilisers
- Biostimulants

Bacterial cultures can belong to any of these 4 categories, based on their mode of action and claims.
Probiotic vs biocide

biocide

Good bacteria
Bad germs

Probiotic

Stability!
Removal of organic dirt

Chemical cleaning

Probiotic cleaning
Hard Surface Biocontrol in Hospitals Using Microbial-Based Cleaning Products

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Abstract

Background: Healthcare-Associated Infections (HAI) are one of the most frequent complications occurring in healthcare facilities. Contaminated environmental surfaces provide an important potential source for transmission of many healthcare-associated pathogens, thus indicating the need for new and sustainable strategies.

Aim: This study aims to evaluate the effect of a novel cleaning procedure based on the mechanism of biocontrol, on the presence and survival of several microorganisms responsible for HAIs (i.e. coliforms, Staphylococcus aureus, Clostridium difficile, and Candida albicans) on hard surfaces in a hospital setting.

Methods: The effect of microbial cleaning, containing spores of food grade Bacillus subtilis, Bacillus pumilus and Bacillus megaterium, in comparison with conventional cleaning protocols, was evaluated for 24 weeks in three independent hospitals (one in Belgium and two in Italy) and approximately 20,000 microbial surface samples were collected.

Results: Microbial cleaning, as part of the daily cleaning protocol, resulted in a reduction of HAI-related pathogens by 50 to 89%. This effect was achieved after 3–4 weeks and the reduction in the pathogen load was stable over time. Moreover, by using microbial or conventional cleaning alternatively, we found that this effect was directly related to the new procedure, as indicated by the raise in CFU/mL when microbial cleaning was replaced by the conventional procedure. Although many questions remain regarding the actual mechanisms involved, this study demonstrates that microbial cleaning is a more effective and sustainable alternative to chemical cleaning and non-specific disinfection in healthcare facilities.

Conclusions: This study indicates microbial cleaning as an effective strategy in continuously lowering the number of HAI-related microorganisms on surfaces. The first indications on the actual level of HAIs in the trial hospitals monitored on a continuous basis are very promising, and may pave the way for a novel and cost-effective strategy to counteract (bio)control healthcare-associated pathogens.


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Introduction

Healthcare-Associated Infections (HAI) are one of the most frequent complications occurring in healthcare facilities and represent a problematic concern regarding the safety and quality of healthcare worldwide [1], as also stated in a recent report by the World Health Organization estimating hospital-wide prevalence in high-income countries at 8% [2]. The European Center for Disease Control prevalence study confirmed that healthcare-associated infections are a major public health problem in Europe with a prevalence of 5.7% (4.3–7.4%) which means 81.089 (64,624–105,895) patients with one HAI for each day in European acute care hospitals [3]. In particular, this European survey reported a similar estimation of nosocomial infections for Italy and Belgium, where the percentage of patients with HAI has been calculated as 6.3% (5.4–7.4%) and 7.1% (6.1–8.3%), respectively [1]. Based on this study, the estimated total annual number of patients with an HAI in European acute care hospitals in 2011–2012 was 3.2 million, albeit with a wide confidence interval from

Chrisal is the only manufacturer of probiotic cleaning products in the world that has an official scientific publication to prove the effect of its product line!

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Type of probiotics in the products

A lot of different species of probiotic bacteria exist, but only a few are suitable to be applied on surfaces for cleaning. When the wrong type of probiotic is used, no benefits in terms of cleaning and hygiene shall exist. After many years of research Chrisal has selected the best performing probiotics for cleaning applications.

Each probiotic product from Chrisal contains at least 5 different *Bacillus* species for optimal effect in many different environmental conditions.
Criteria for Probiotics

QUANTITY AND STABILITY

Besides the correct type of probiotics, a good probiotic cleaning product should also contain a high enough quantity of probiotics. Furthermore, this minimum number of probiotics should remain present in the product for the entire shelf-life of the product.

All PIP Healthcare products contain a minimum of 50 million probiotics per ml and have a shelf-life of 24 months!
QUALITY CONTROL

The production of bacterial cleaning products is more complex than regular chemical products and as such demands strict quality control of the production processes.

Chrisal obtained the ISO9001:2008 quality certificate.

This ISO quality system also involves the R&D department of Chrisal, where we develop the newest probiotic cleaning products.
Sustainability

EU Ecolabel
The detergents used in the probiotic PIP Healthcare products are compatible with EU-Ecolabel. This guarantees that our probiotic products are green. As of 2016, EU Ecolabel also allows probiotics as ingredient in cleaning products.

The probiotic products from Chrisal are not just environment friendly, they are promoting the environment!

Green Seal
In October 2014, the PIP Healthcare products also obtained the Green Seal in the USA. www.greenseal.org