



PIP Healthcare



***The cleaning
revolution***

Table of content



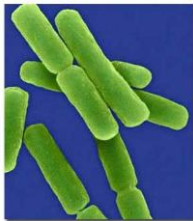
Introduction

3.



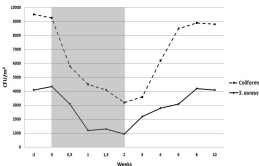
The PIP principle

4.



PIP Healthcare - Mode of action

7.



PIP Healthcare - Scientific validation

9.



Benefits

11.



Conclusion

11.

1. Introduction

A broad range of pathogenic (= disease causing) bacteria pose numerous health problems to humans. Some examples are *Clostridium difficile*, *E. coli*, *Enterococcus*, *Legionella*, *Listeria*, *Salmonella*, *Staphylococcus aureus* (MRSA) and *Streptococcus*. In addition to the dangers induced by these organisms in each of our (personal) environment, they are also responsible for large economic losses and costs (e.g. medical costs, health insurance). Using antibiotics and disinfectants, these problems could easily be controlled during the past decennia. However, the past years a rapidly increasing resistance against these 'miracle agents' has been noticed in the overall healthcare sector, to such an extent that a radical new approach is eminent.



Chrisal, a Belgian company active in over 50 countries, has specialised in the development of innovative and sustainable hygiene solutions, including cleaning and personal care products. By the creation in 2006 of the **PIP – Probiotics In Progress – cleaning products**, Chrisal offers an innovative and sustainable solution to the emerging resistance problems with multiple hospital bacteria. All PIP products contain beneficial environmental bacteria that remain on the surface after cleaning in order to install a safe microbiota.

Since the launch in 2006, the PIP products have been successfully applied in more than 50 countries, targeting a broad range of fields:

- hospitals, old age homes
- schools
- sports clubs
- hotels
- food industry
- wellness centers
- public buildings
- ...

This document has the intention to provide anyone who is interested in PIP with the basic information on the concept, the mode of action, the validation and application. More detailed information is always available on request at your local Chrisal distributor.

2. The PIP principle

The PIP philosophy is that of **microbial management**, in which no longer complete sterile environments are desired, but **a stable and healthy microbial community** is created. This can be achieved by means of probiotic micro-organisms. Those are safe and useful bacteria, already known and exploited for years in food and healthcare industry because of their health promoting properties to man and animal. All PIP products contain probiotic bacteria as a crucial ingredient, which possess the unique property of sporulation. This process makes it possible for these bacteria to survive harsh conditions and regain their activity as soon as environmental parameters improve. PIP Healthcare products are no disinfectants, but probiotic cleaning products.

Especially in case of disinfectants, an important disadvantage is the unspecific action of these agents, killing both good and bad micro-organisms. This results in a surface free of organisms, allowing any remaining or newly arriving pathogen to bloom within a very limited timeframe. After all, each disinfection procedure leaves sufficient organic matter behind that may serve as carbohydrate and protein source to sustain a fast (pathogenic) recolonisation of the surface. Hence, disinfection results in a fast reduction of the number of micro-organisms of which, however, the effect is very short and unstable. Because of the current resistance problems, continuously increasing concentrations and frequencies of disinfectant have to be applied, which is detrimental to man and the environment due to their aggressive chemical nature.

<u>Disinfection/chemical cleaning</u>	<u>PIP cleaning</u>
- Risk at high number of pathogens	+ Constantly low number of pathogenic bacteria
- Short and local effect	+ Long lasting effect (stability)
- Resistance problems	+ No resistance possible (sustainability)
- Detrimental / unsafe products	+ Harmless / safe products
- Chemical / environment unfriendly	+ Biological / environment friendly
- Aggressive chemicals	+ Neutral composition

Why are these problems not relevant to the probiotic PIP Healthcare products?

During PIP cleaning, a layer of probiotic bacteria is placed on the treated surface, immediately occupying the 'field' by good bacteria. They will consume all remaining food sources, leaving nothing behind for potential pathogenic invaders looking for space and food. Because the probiotic PIP bacteria remain active for several hours or days, the PIP Healthcare cleaning

procedure has a long lasting effect and creates stability in the microbiological results. Given a minimal frequency of application, the products will replace most pathogenic bacteria by good bacteria, which will lead to a stable and healthy microbial (hospital) environment. Because pathogenic organisms can not gain resistance against the PIP bacteria, the PIP Healthcare cleaning products provide a sustainable solution to problems with various hospital bacteria.

In conclusion, PIP Healthcare introduces a revolutionary and efficient concept of hygiene in any healthcare facility, which is above all sustainable.

Frequently Asked Questions

1. What is PIP – Probiotics In Progress?

The PIP products represent a new generation of cleaning products, containing good bacteria to replace 'bad bugs' such as *Salmonella*, *E. coli*, *Staphylococcus*, *Clostridium*...

2. What are probiotics?

Probiotics are safe and good bacteria imposing a health promoting effect on humans and animals.

3. How does PIP Healthcare work?

During cleaning with PIP Healthcare products a large portion of the pathogenic bacteria is removed by physical means as is the case with regular cleaning. The innovative aspect of PIP Healthcare is that immediately after cleaning; a layer of good bacteria is placed on the treated surfaces (floors, walls, furniture, beds, sanitary...). These PIP bacteria will immediately occupy all space, food and water, thereby preventing newly arriving pathogens from multiplying.

4. Are PIP Healthcare products disinfectants?

No, PIP products have no direct biocidal effect on other bacteria. As such, they will not lead to the build-up of resistance among pathogenic micro-organisms.

5. Where are PIP Healthcare products applicable?

PIP Healthcare products are applicable in all healthcare facilities and in all places facing pathogen problems. However, certain areas in hospitals need additional disinfection in order to keep the total count as low as possible for the stay of severe immune-compromised patients (e.g. chemotherapy).

6. Do I keep disinfecting when using PIP Healthcare?

No, the best results with PIP products are obtained when no disinfection is done anymore. When certain conditions should require disinfection (e.g. MRSA contaminated room), we advise a PIP treatment immediately after the disinfection in order to stabilize the environmental microbiota.

7. Are PIP Healthcare products safe to humans, is protective clothing recommended?

Due to their biological nature, all PIP products are perfectly safe, environment friendly and harmless. No protective clothing is required and contact with bare skin will have no negative effect. Additional information on the safety aspects of our products can be found in the downloadable MSDS files of each product.

8. What happens when I interrupt the application of PIP Healthcare?

The probiotic bacteria in the PIP products colonise the environment and create a stable and healthy microbiota. They maintain their activity for a couple of days, but a frequent addition of 'fresh' PIP bacteria is required to maintain optimal results. We do not recommend an interruption any longer than 3 days.

9. What are the consequences of an overdose?

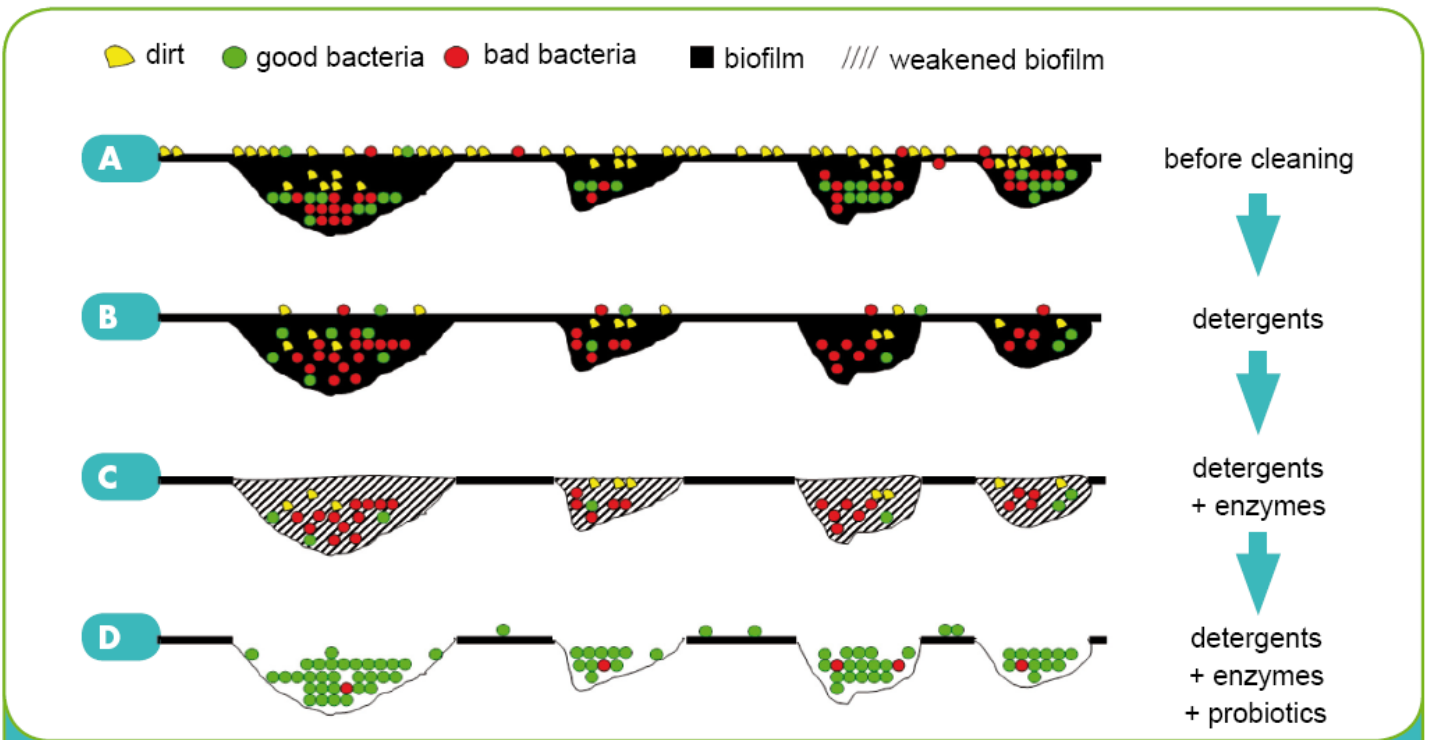
An over-concentrated use of PIP products will lead to a higher number of good PIP bacteria on the treated surface. This will in turn only result in more pronounced beneficial and longer lasting effects.

10. What are the optimal storage conditions for the PIP Healthcare products?

Given the presence of probiotic bacteria in the products, storage between 10-30°C is recommended. Direct sunlight is to be avoided.

3. PIP Healthcare - Mode of action

Every surface contains biofilm, which is an accumulation of micro-organisms held together by a highly persistent matrix of organic compounds such as proteins and exopolysaccharides. This provides the ideal environment for unwanted bacteria to thrive. The biofilm acts as a shield for these bacteria from the outside world. As a result, cleaning and disinfection does not affect bacteria 'hiding' in the biofilm. PIP Healthcare products work using a combination of environmentally friendly detergents, enzymes and probiotic bacteria to remove surface dirt, eliminate the biofilm and consequently reduce the risk of infection. The probiotic bacteria will occupy space on the surface and will sense and consume any food (= dirt) available on that surface. The composition of the PIP bacteria has been chosen to such an extent that in a broad range of temperature, pH and humidity the activity is guaranteed. Through the production of *in situ* enzymes, the PIP products result in a profound microscopic cleaning.



- A: Surface with contamination and biofilm
- B: Surface after chemical cleaning/disinfection; intact biofilm
- C: Surface after a few days of PIP Healthcare cleaning; weakened biofilm
- D: Surface after two weeks of PIP Healthcare cleaning; biofilm eliminated

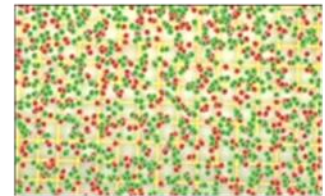
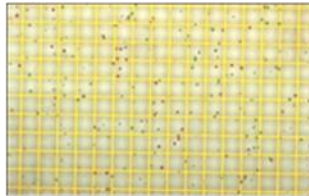
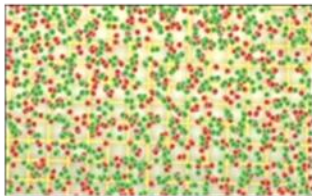
The combination of environmentally friendly detergents, enzymes and probiotics result in a clean surface without any biofilm, substantially reducing the risk of infection.

Chemical
cleaning



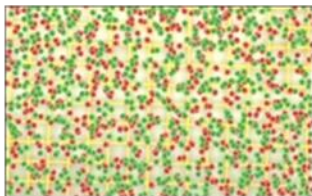
Probiotic
cleaning

Disinfection



- Good bacteria
- Bad germs

PIP®



Stability!

4. PIP Healthcare - Scientific validation

PIP Healthcare are the most intensely researched cleaning products in the world, both towards safety as well as performance.

Regarding safety; the bacterial strains used in the PIP products are:

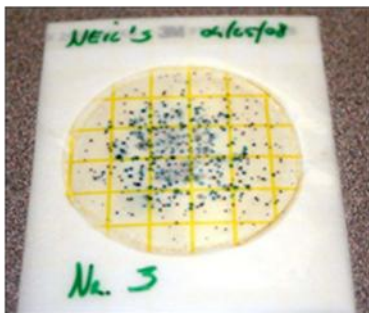
- Classified as biosafety level 1 by the American Type Culture Collection (ATCC)
- Of natural origin and listed at the ATCC bank
- Not genetically modified (not GMO bacteria)
- OECD screened and approved by external accredited laboratories for
 - Skin sensitisation
 - Oral toxicity
 - Eye irritation
- Food grade organisms according to
 - US FDA - AAFCO listed
 - European Food Safety Agency - Qualified Presumption of Safety
 - Canadian Domestic Substance List

Regarding performance; the following academic studies have been performed:

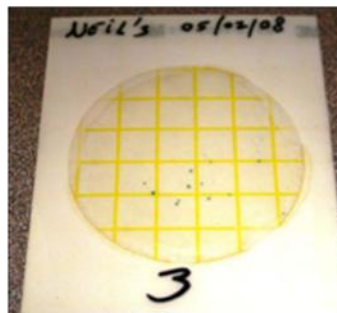
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|----------------|--|-----------------|
| - 2007 Belgium | Ghent University trial at Lokeren hospital | Positive report |
| - 2008 USA | Miami Jewish Hospital | Positive report |
| - 2009 UK | University of Liverpool | Positive report |
| - 2009 UK | University of Ulster | Positive report |
| - 2011 Italy | St. Anna University Hospital of Ferrara | Positive report |
| - 2012 USA | Shriner's Children's hospital chain | Positive report |

All trials were performed independent and the full scientific reports are available on request.

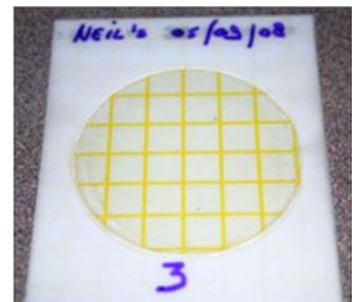
S. aureus (3M Petrifilm)



Day 0

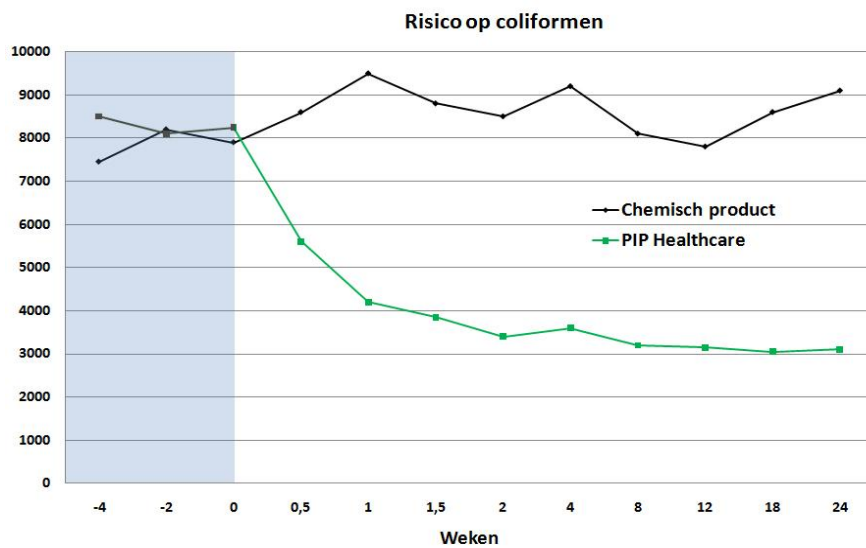
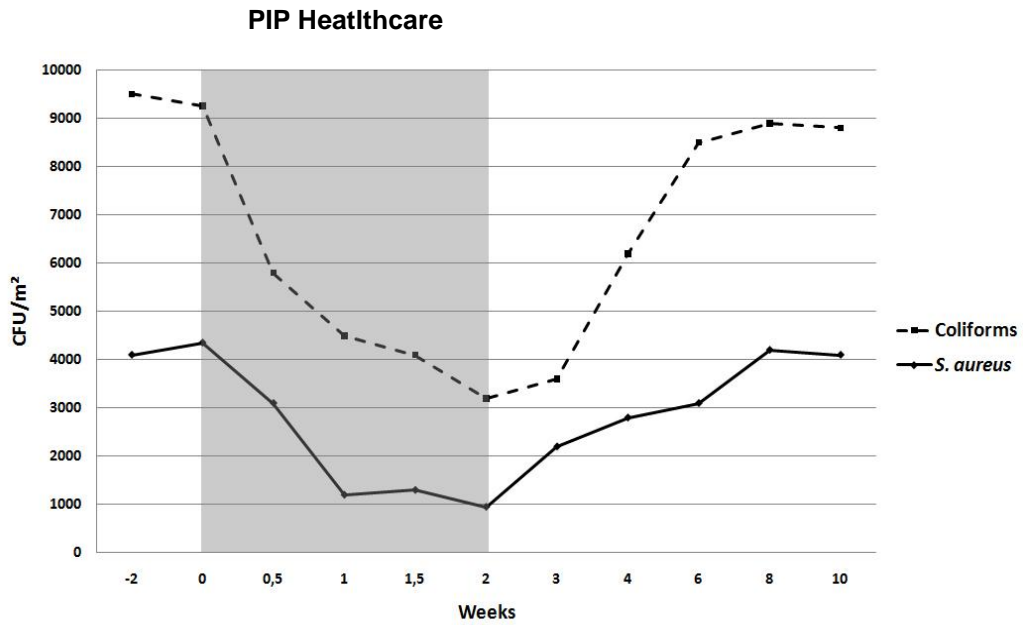
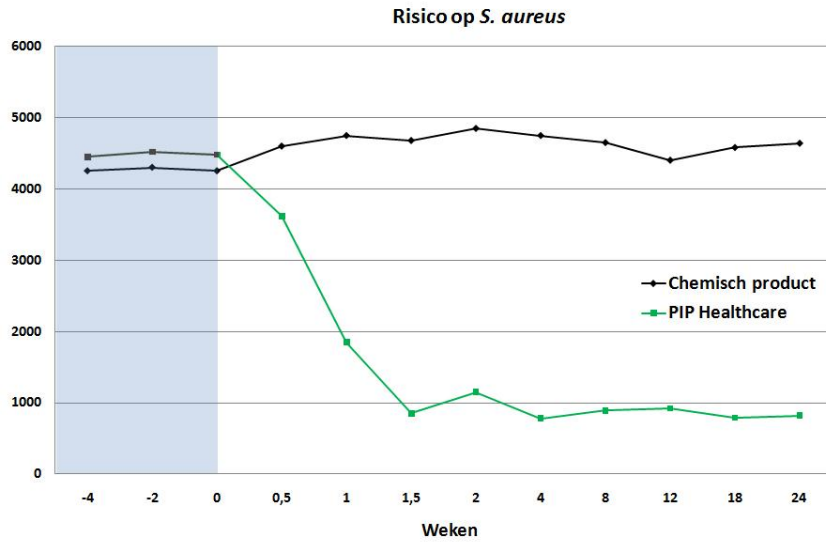


Day 7



Day 14

PIP Healthcare - The cleaning revolution



5. Benefits

By means of several clinical trial it is unarguably shown that a good cleaning protocol for the environment immediately results in the lowering of infections within the hospital. The safety of a healthcare institute largely depends on the microbial purity of its environment, minimizing the risk of cross-contamination with microbes.

Benefits for all

The positive results of probiotic cleaning in the healthcare sector are first of all obvious at the patient level, who can count on a good recovery of his original disease without the risk of complications due to hospital bacteria. Based on the latest numbers **for the USA** (Germ Warfare Magazine), **31.000 lives could be saved** using probiotic cleaning.

However, numerous other benefits can be listed:

- Safety to the medical and nursing staff due to a lower infection pressure
- Safety to the cleaning staff because of the neutral biological composition of the products, permanently banishing all problems with skin, eye and respiratory tract irritations
- Environment friendly because of the biological degradability of the products
- Sustainability through blocking the build-up of resistant microbes against disinfectants

Also of great importance are the economical benefits:

- The hospital saves money through cutting down overall cleaning and disinfection costs
- The patient no longer suffers from an elevated healthcare bill due to complications
- The government significantly lowers its healthcare costs. For the USA an annual saving of **\$4 billion** is achievable when performing PIP cleaning

6. Conclusion

The international clinical trials performed in several hospitals show that probiotic cleaning offers a sustainable solution to the enormous problems with hospital bacteria. The combination of PIP Healthcare cleaning with a good hand hygiene protocol and targeted disinfection guarantees a safe healthcare facility and the lowering of human suffer and medical costs. Chrisal immediately introduced this revolution in healthcare cleaning in over 50 countries worldwide.

7. Contact

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