

Cleaning manual

Probiotic Cleaning

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1 Basic principles of cleaning

1.1 Why clean?

There are two important reasons, why you should clean.

- Aesthetic aspect: making a surface more visually appealing; such as windows, cleaning a car, floor...
- Functional aspect: the cleaning of a surface might be needed prior to a specific treatment or action on that surface; such as degreasing before painting.

1.2 What is cleaning?

Cleaning is (re)moving dirt. The dirt must be moved from point A (where it does not belong) to point B (where it belongs).

To do this, the dirt:

- has to be detached from the surface
- has to be made transportable
- has to be transported.

In order to do this there are four important principles. These are summarized in the circle of Sinner.

1.3 Circle of Sinner

The effectiveness of the cleaning is always determined by the following four factors:

- Chemical action
- Time
- Temperature
- Mechanical/Physical operation

These parameters are represented by the German chemist Sinner in a circle. This circle represents the cleaning process. In an ideal situation, all four factors are equally important (see Figure 1). However, such an ideal situation appears rarely or never. The emphasis always lies on one or more of these factors.

CircleofSinner

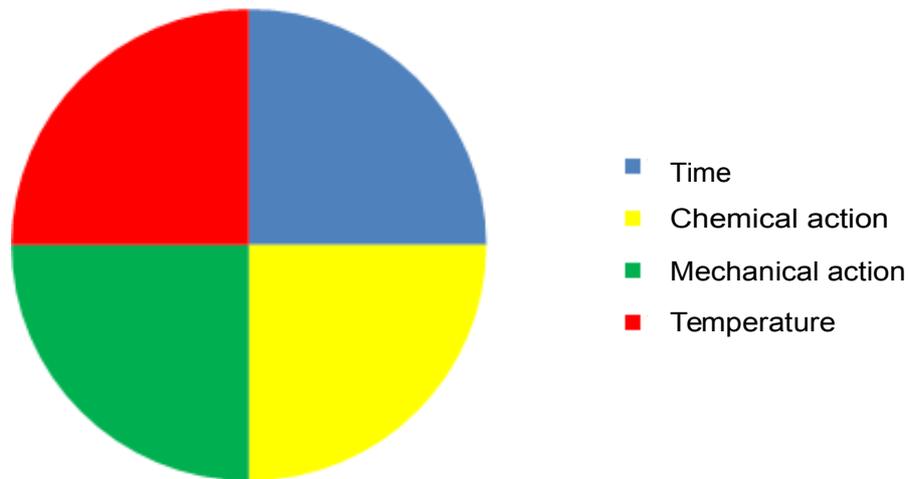


Figure 1: Circle of Sinner

2.3.1 Chemical action

This refers to the cleaning agent used. The chemistry of cleaning agents is discussed in detail in the next chapter.

2.3.2 Time

This means the total time which is required to do the cleaning. This includes:

- The preparation
- The application of the product
- The exposure time
- The processing of the surface
- The rinsing
- The drying
- The cleaning up

2.3.3 Temperature

This refers to the temperature of the applied product, the temperature of the surface that has to be cleaned, the temperature of the rinsing water, the ambient temperature, ...

Generally, the higher the temperature, the better the cleaning. Obviously there is a maximum temperature, depending on the application.

2.3.4 Mechanical/Physical action

This refers to the method of cleaning:

- Spraying and removing
- Cleaning with a sponge
- High-pressure cleaning
- Degreasing baths/ultrasonic
- Scrubbing and mopping
- Sweepers
- Carpet Cleaners
- ...

The choice of the proper mechanical action determines for a very large part the result of the cleaning.

An optimal implementation of the circle of Sinner ensures efficient cleaning. One should always keep in mind that if one factor (eg time) is reduced, it should be combined with the increase of another factor (eg temperature).

2.3.5 Case study of the circle of Sinner

The circle of Sinner can be further explained by using an example such as doing the dishes. In normal conditions the dishes are done manually (mechanical action) and with a shot of dish soap (= chemical action). When we also use hot water, less time and less mechanical action is necessary to do the dishes. The circle of Sinner then looks as in Figure 2. The dishes can also be done by means of a dishwasher (see figure 3). In this case the factors time and temperature become more important which results in a less important mechanical factor.

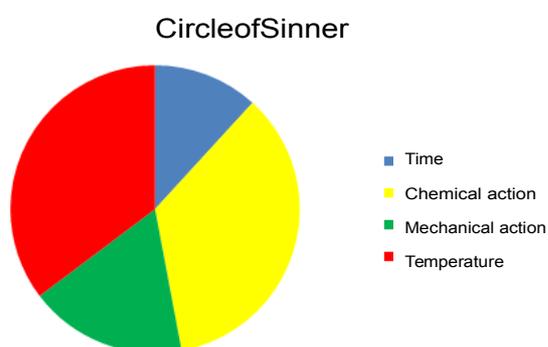


Figure 2: Circle of Sinner – Manually doing the dishes

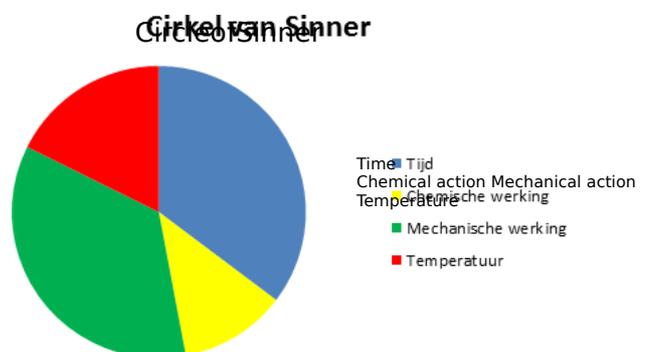


Figure 3: Circle of Sinner -Dishwasher

2 Chemical support

2.1 Surfactants

3.1.1 Surfactension

The basic ingredients of a cleaning agent are tensides, also known as surfactants or surface active agents. These ingredients will make sure that the surface tension of the water will decrease. This allowsto cover a larger surface with the same amount of water. In addition, the water will more easy removedirt.

Because of surface tension, water has the characteristics to form droplets, and not to distribute itself evenly over a surface. Water molecules attract each other strongly causing droplet formation to occur. By the addition of surfactants, surface tension is lowered and the water will more easily spread over the surface instead of forming droplets (see Figure 4).

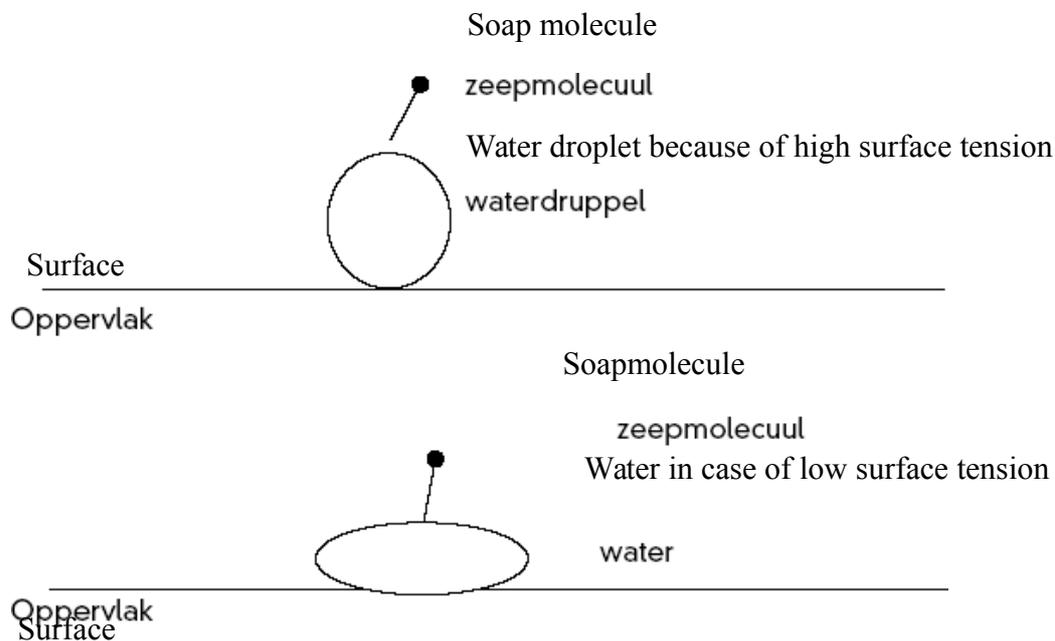


Figure 4: surface tension

3.1.2 Structure surfactants

A surfactant consists of two parts: a hydrophobic and a hydrophilic part. Usually, they talk about a hydrophilic head and hydrophobic tail. The hydrophilic part has strong affinity with water. The hydrophobic portion repels water, and has a preference for greases.

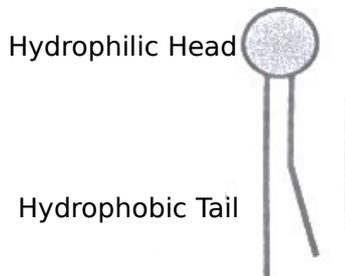
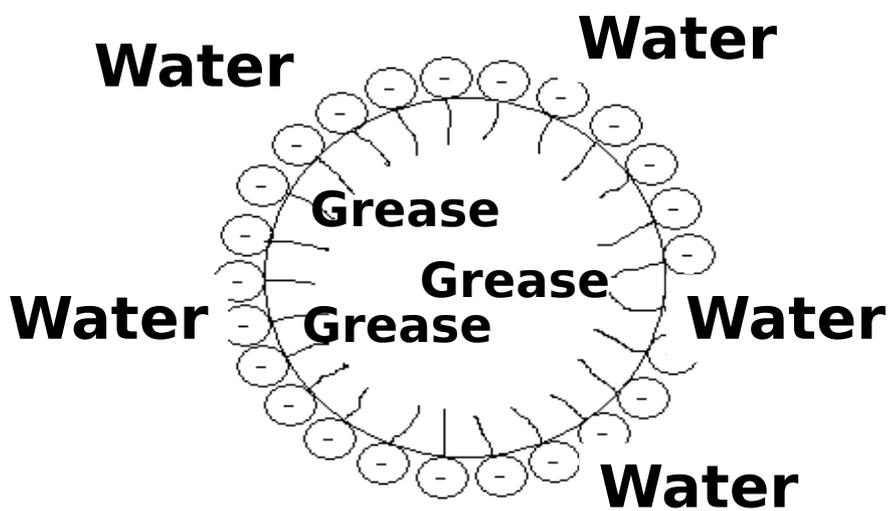


Figure 5: structure surfactants

3.1.3 Surfactants and oil

Oil and grease will be encapsulated by surfactants. The hydrophobic tail is sticking inside the fat particle. The hydrophilic heads stay on the surface of the fat particle. As a result, the fat particles are made water soluble and can be transported with water.

Figure 6: Surfactants and greases



3.1.4 Different types of surfactants

There are 4 types of surfactants. Each of these types comprise more than 100 surfactants.

3.1.4.1 Anionicsurfactants

The anionic surfactants have a negatively charged head. In general, they are strong foaming agents but they have a lower ability to remove oil and fat. Because of these reasons, they are often used in cosmetics; they foam well, and they are not so strong degreasers so the skin doesn't dehydrate too much.

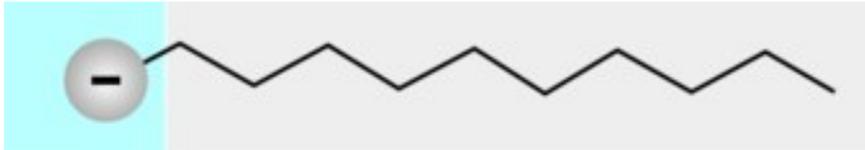


Figure 7: Anionic surfactants

3.1.4.2 Non-ionicsurfactants

The non-ionic surfactants have a head that is not charged. These surfactants are often used in combination with anionic surfactants because they positively affect each other's action (wat isde actie van de non-ionics?). Furthermore the action of the non-ionic surfactants will only be affected by hard water.

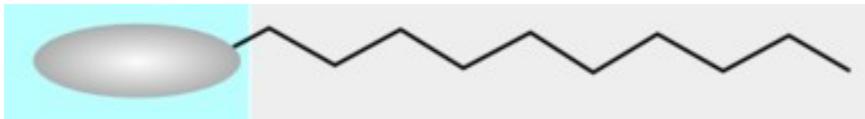


Figure 8: Non-ionic surfactants

3.1.4.3 Cationicsurfactants

The cationic surfactants have a positively charged head. Cationic surfactants are less good cleaners but are often combined with non-ionic surfactants. They have a tendency to attach itself strongly to various surfaces and make it antistatic.



Figure 9: Cationic surfactants

3.1.4.4 Amphotericsurfactants

The charge of amphoteric surfactants depends on the acidity of the solution. In an acidic environment they behave like anionic surfactants. In an alkaline environment they behave like cationic surfactants.

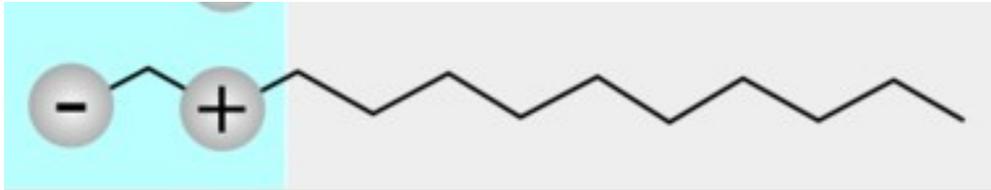


Figure 10: Amphoteric surfactants

3.2 Complexingagents

In some areas the water supply contains a lot of calcium (= hard water). This is an important drawback in the cleaning world. Surfactants have the characteristic that they have a greater affinity for calcium than for dirt. The binding of surfactants to calcium results in a part of the cleansing effect being lost. In order to counter this problem, complexing agents are added to the cleaning agents because they bind calcium even better than surfactants.

3.3 pHregulators

The pH of a product is a number that indicates the acidity of a particular product. The pH scale is gradually divided from 0 to 14. Products with a pH of less than 7 are referred to as acidic; while products with a pH greater than 7 are referred to as alkaline. A pH of 7 is neutral.

Generally speaking, products with a pH of less than 3 or greater than 11 are considered aggressive/corrosive. Such products may affect different materials, but also the skin. Figure 11 gives an overview of the pHscale.

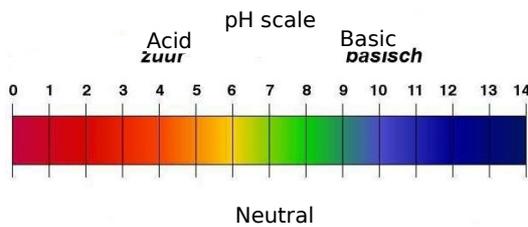


Figure 11: pH-scale

In general, acidic cleaners are often used in order to remove calcium (descaling) or rust. Alkaline cleaners work very strong on all kinds of dirt and grease.

However the pH value of a product alone doesn't say much. There are some exceptions to the rule. Chrisal has a range of products with a very high (> 11) pH. Normally these should be aggressive. Nevertheless, this is not the case. Chrisal uses a unique concept to achieve this high pH but keep the product non-aggressive. The high pH is achieved by a 'synergistic' action. This means that different substances are combined in order to get "constructive" effect. There are several available test reports showing that the products are not aggressive for washable surfaces, and even the skin. Therefore Chrisal has a nice range of highly efficient, but safe cleaners in itsrange.

4 Biological substantiation of cleaningagents

4.1 Enzymaticaction

4.1.1 Definition of enzymes

An enzyme is a protein that can accelerate a particular reaction without being consumed by it. The enzyme is released every time and can participate in the next reaction.

The enzyme attaches itself to a particular substance (= substrate) and will cut it into pieces which reduces the substrate. Enzymes are in general specific for a certain substrate; this means that one enzyme can only react with one type of substrate. For example, enzyme X will only be able to respond with the substrate X and enzyme Y will have no effect on substrateX.



4.1.2 Function in cleaningagents

Enzymes are added to cleaning agents to break down organic substrates (eg fats, sugars, proteins, ...). They particularly find a large application in laundry detergents for the removal of all kinds of stains. Usually this is mentioned on the packaging, in the form of "biologically active".

4.1.3 Disadvantages of enzymatic cleaning agents

Since enzymes are substrate specific and for example only break down fats, the action of a product depends on the type of dirt and the enzymes present in the product. If there are fats present as an impurity, and if the product does not contain a lipase (= enzyme that breaks down fat), then the product will not be effective.

The operation of the product thus depends on the enzymes that the manufacturer has added. And since enzymes are an expensive ingredient, there are usually only a limited number of enzymes added, which limits the spectrum of activity

An enzyme is a protein, and proteins are very sensitive to external conditions and are effective only in very limited area (eg neutral pH and a temperature between 20-30 ° C). At a different temperature, acidity, humidity, ... the activity of an enzyme stops. Upon further deviation of the optimum conditions, denaturation of the enzyme (= a form of coagulation) will appear and the enzyme loses its activity.

This means that an enzyme only stays active for a maximum of a few hours in reality.

Enzymes may cause allergic reactions (eg by inhalation, in contact with skin, ...). Individuals who are susceptible to this, may be inconvenienced when using the cleaning agent.

4.2 Bacterial action

4.2.1 Definition of a bacterium

A bacterium is a single-celled organism that can't be observed with the naked eye. They are only visible under a microscope and are found everywhere. In our daily life we are surrounded by countless bacteria. Fortunately, most bacteria are harmless; but we mostly know these bacteria that make us sick (eg MRSA, ...). Other bacteria are even useful; just think of the bacteria in our digestive system.

Bacteria can also multiply very quickly. Under favorable conditions, they can make a copy of themselves every 20 minutes.

4.2.2 Function in cleaningagents

Bacteria have the characteristic that they can produce enzymes in order to break down organic substrate and use it as a food source. The production of enzymes depends on the food/substrate that is available. If a bacterium gets on a surface by means of cleaning, then the bacteria start producing the enzymes needed to consume the dirt (=organic substrate) present on that surface. A bacterial cleaner ensures, in other words that the proper enzymes are being produced in any case. If there is only fat in the environment, then the bacteria will only produce enzymes to break down fats and not break down proteins.

Bacteria will remain active on surfaces relatively long because they are less sensitive to external conditions such as temperature and acidity. They remain active for several days after cleansing and thereby provide a prolonged biological cleaning effect.

4.2.3 Disadvantages of bacterial cleaningagents

Unlike enzymes, bacteria are living organisms. This makes it much more difficult to make a stable bacterial cleaner compared to making a stable enzymatic cleaner.

The stabilization of the bacteria in cleaning agents requires advanced technology in which various parameters play an important role (eg osmotic conditions, pH, acidity, and choice of chemical components in the cleaning agent, ...).

Stability problems are the number one problem for new companies that start with the production of bacterial cleaners and can be recognized by shifting of the product, the production of bad odors,

4.3 Conclusion

Enzymatic cleaners entered the market a dozen years ago and were then very innovative. They were cleaning agents where a pinch 'environment friendliness' was added.

It soon became clear that enzymatic cleaners were just a part of the solution because of the known problems (eg limited operation, stability, ...).

Hier klopt iets niet; decades ago is meer dan a dozen years en toch zou het erachter moeten komen... Chrisal has spent a lot of time and resources to develop good and stable bacterial cleaners that provide a very broad and strong prolonged activity compared to enzymatic cleaners. The future clearly lies with the bacterial cleaners!

5 Probiotica In Progress(PIP)

5.1 BackgroundProblems

5.1.1 Antibiotics and disinfectantsera

A wide range of pathogenic (= disease causing) bacteria and fungi cause numerous health problems in humans and animals. Some examples are Camphylobacter, Candida, Clostridium, E. coli, Legionella, Listeria, Salmonella, Staphylococcus (MRSA hospital bacteria), and Streptococcus. In addition to the dangers that these organisms entail to the privacy of all of us, they also provide huge economic losses such as increased animal mortality (agriculture), loss of production (food) and increasing health costs (hospital bacteria). The discovery of antibiotics and disinfectants offered a solution in the big fight against these bacteria. When in World War II the first antibiotic penicillin was applied in practice, this proved to be a panacea to suppress infection. In the decades that followed, these chemicals have been used fully. It was under the assumption that diseases and bacteria could thus be suppressed forever.

Unfortunately, it soon became clear that certain bacteria began to oppose the commonly used antibiotics. They were resistant. This means that a certain pathogen is no longer affected by a given dose of antibiotic. Healing is thus hampered.

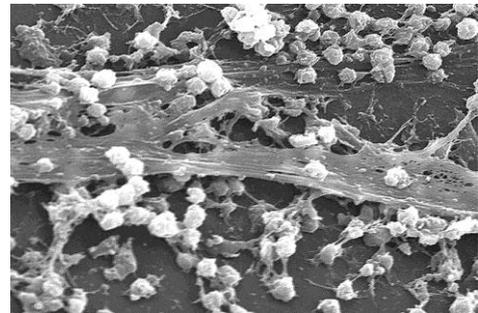
In the next phase, multi-resistant bacteria appeared. These are bacteria that are resistant to different types of antibiotics. The known MRSA bacteria (which stands for Multi-Resistant Staphylococcus aureus) was one of the first which arised. This bacterium still causes major problems in hospitals worldwide.

The issue of multi-resistant bacteria led to the start of a bad and dangerous development in the general hygiene. Suddenly it was a strong emphasis on the 'sanitizing' of an area. They used the motto: if you can not suppress it with antibiotics once they have caused illnesses, it should just be killed on and around all the people.

The last ten years we also see a dramatic increase in sales of disinfectants, which are becoming more 'normal' household devices equipped with a touch dangerous chemicals. The consequences are dramatic. In recent years, we see that many of the resistant bacteria very quickly develop resistance to these disinfectants. It is clear that the use of antibiotics and disinfectants era comes to an end and that alternative, such as probiotic cleaning, are necessary.

5.1.2 *Biofilm*

A biofilm is a complex aggregation of micro-organisms in a protective and adhesive matrix. Although innumerable different types of biofilm can arise, they do have some characteristics in common: they are attached to a (carrier) surface, have an irregular structure, home to sometimes very diverse microbial community and are strongly reinforced by the extracellular matrix of polymeric substances. In no time, the biofilm grows into a macroscopic structure with which a very persistent matrix is produced which protects the microorganisms from the outside world. A mature biofilm is a very complex structure in which the various micro-organisms interact with each other and each perform their own metabolic functions. Their common goal: shielding the outside world and the maintenance of the protective matrix. The extracellular matrix can be seen as the "glue" that holds the whole biofilm together. It consists of polymers, which are called collectively extra cellular polymeric substances or exopolysaccharides (EPS). This matrix protects the cells and allows internal communications by using biochemical signals. There will also often be "channels" found in the matrix, which allow a transport of nutrients. It is known that micro-organisms in a biofilm will behave differently. They are often more pathogen and in particular are more resistant (up to 1000x) against antibiotics, detergents and biocides.



5.2 The PIPConcept

5.2.1 Microbialmanagement

One of the alternatives for disinfection is microbial management. Bacteria are vital for life on earth. The majority of the bacteria are useful. It is therefore not advisable to get rid of them all. Instead, it may be better to strive for a healthy balance between the bacteria, so the risk of harmful bacteria will be much smaller. With microbial management you try to achieve a stable microflora in the area, not by fighting against the bacteria but fighting with them. This can be done by the probiotic cleaners Chrisal.

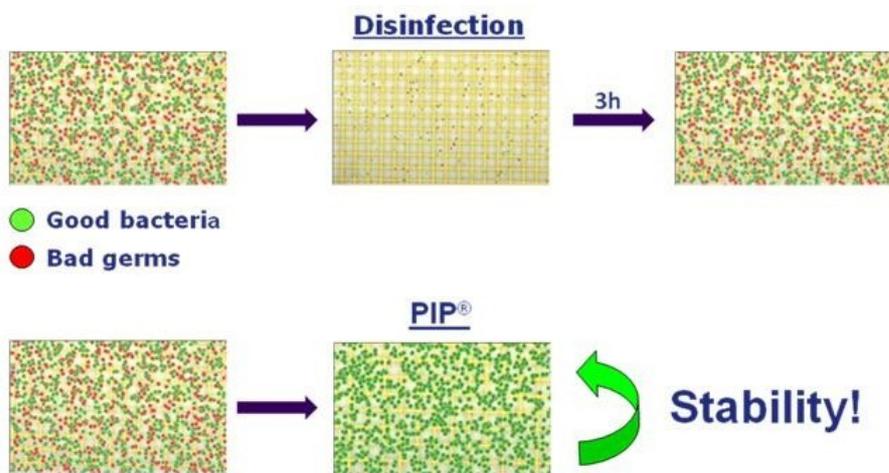


Figure 12: Microbial management

5.2.2 How to approach the biofilm

The formation and presence of biofilm is, as the name clearly states, a problem of a biological nature. It is known that a biofilm will shield itself strong and effective of all kinds of chemicals such as detergents, biocides and antibiotics. The only way to prevent the formation of biofilms and to remove existing instances efficient, is by using biological infiltrators from inside to do their work. The probiotic bacteria in the PIP products Chrisal ensure that:

- (1) The basic building blocks such as proteins, sugars, and glycerides will be consumed, and therefore are not available for the build-up of an extracellular matrix. This way they pro-actively avoid the formation of biofilm.
- (2) The present active biofilm will be broken down. The probiotic bacteria will be admitted to the biofilm, where they can act on the components of the matrix from the inside so that it is weaker. PIP bacteria also consume a large proportion of the nutrients, so that an increase or restoration of biofilm is prevented. Thus the existing biofilm will weaken and crumble.
- (3) After the removal of the biofilm, the surface will be kept clean retro-active.

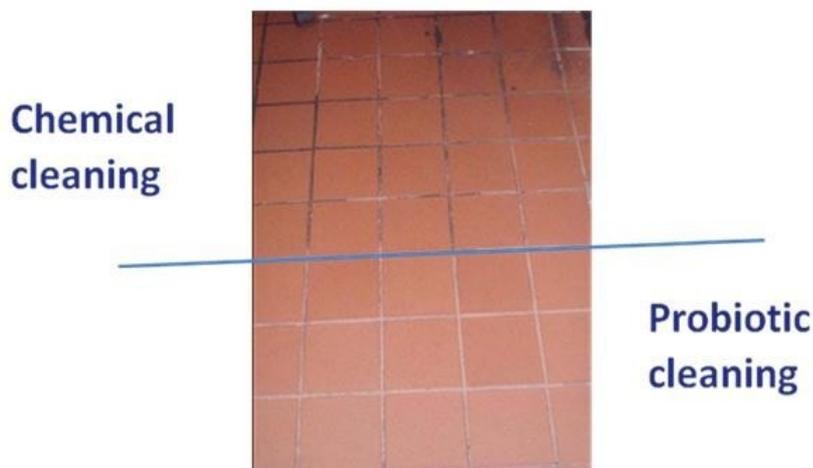


Figure 13: Biofilm

5.2.3 Composition of probiotic cleaning

In Probiotic cleaning products there are these so called "green" cleaning products that provide the first, superficial cleaning; the removal of visible dirt. To substantiate the green aspect of the PIP products, Chrisal has requested and obtained the Ecolabel for the non-probiotic version of the PIP products. They did this because the bacteria are not included in the current Ecolabel criteria. PIP products are thus Ecolabel products with the addition of probiotic bacteria.

Furthermore the probiotic cleaners contain a combination of enzymes and probiotic bacteria, which are responsible for cleaning aftereffect. They provide a stabilization of the microflora. Besides cleaning the probiotic bacteria also provide an "occupation" of the areas with harmless, "good" bacteria. As a result, there is no longer sufficient space available for food and other organisms that "land" on the surface and it reduces the risk of the development of harmful bacteria. With probiotic cleaners you actually do two things at once: on the one hand, a healthy microflora will be applied to the surfaces, on the other hand, you no longer use harmful chemical disinfectants so the resistance of bacteria is no longer encouraged.

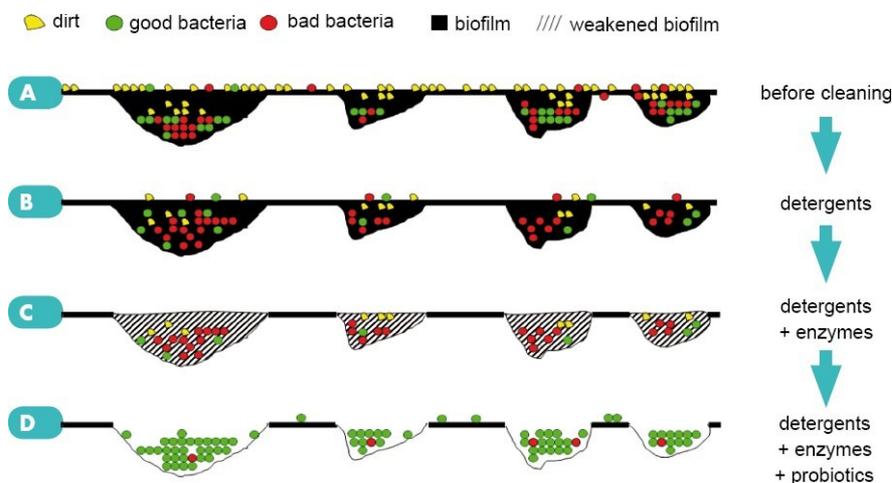


Figure 14: Probiotic cleaning

5.3 Application: Agriculture

5.3.1 General

The PIP Animal Housing range was developed in order to give the people a durable and full-fledged alternative for the harmful chemical disinfectants. These cleaning and hygiene products use the latest scientific knowledge on microbial management, with which beneficial organisms are used to mitigate the risk on problems with harmful organisms.

The PIP Animal Housing range includes the following core products:

1. PIP AnimalHousingCleaner (PIPAHC)
2. PIP AnimalHousingStabilizer (PIPAHS)
3. PIPPLUSWATER (PIP PW)

5.3.2 Benefits

- A significant cut down of the expenses concerning the overall animalhealth,
- Healthier animals, less risk of mortality in the birth week and in times of stress,
- Rapid weight gain through improved feed intake and-conversion,
- Reduced risk of high infectionpressure,
- A significant reduction in unpleasantodors,
- A greatly reduced use of antibiotics, dangerous disinfectants and inefficient chemical pre-soak.

5.3.3 PIP Animal Housing Cleaner (PIP AHC)

PIP AHC is a foam cleanser with stabilized PIP probiotic bacteria for the thorough cleaning of animal housing and their infrastructure. PIP AHC removes dirt thoroughly and has a long residual effect on enzymes and probiotics. PIP AHC actively works against odor.

Instruction manual PIP AHC:

Use: 1 to 2 liter PIP AHC-concentrate per 100m².

Frequency: When vacant and right before bringing new animals in.

Application: First remove coarse dirt.

Shake the product for use.

Foam the surface completely from bottom to top with 3 to 5% PIP AHC in WARM water (max. 60°C). However, if hot water is not continuously available, one makes a premix in advance by mixing PIP AHC with an equal part of hand warm water. Foam the surface completely from bottom to top with 6 to 10% PIP AHC premix.

In open areas with little infrastructure, such as poultry houses, they consume at least 1 liter PIP AHC per 100m². Use in smaller spaces with lots of infrastructure, such as farrowing: 1 liter per PIP AHC 50m².

Let the diluted product act 10 to 20 minutes.

Rinse the foam- and dirt remains away under high pressure, so they can dry and hard again.

Note: sometimes the use of a scrubbing brush or sponge is needed, especially in the thorough cleaning of drinking and feeding bowls, buckets, tools, instrumentation panels, etc.

One can wash some animals, like sows (before giving birth) with PIP AHC as described above.

5.3.4 PIP Animal Housing Stabilizer (PIPAHS)

PIP AHS is a spray liquid for the permanent colonization of the animal housing and infrastructure with stabilized probiotic PIP bacteria. PIP AHS prolongs the action of PIP AHC. It provides a healthy microflora in the animal housing and fights unwanted odors. 100%organic!

Instruction manual PIP AHS:

Use: 1 liter PIP AHS-concentrate per 400m².

Frequency: First week every day, next 3 times a week

Application: Shake the product for use.

Dilute the product: 1 liter PIP AHS with 2 liters of cold or warm water. Mist the surface lightly with the PIP AHS dilution according to the prescribed dosage, for example with a Backpack Sprayer or via an automatic nebulizer system. The sprayed surface should definitely NOT feel wet. Do not skip surfaces, infrastructure or animals.

Note: If a barn was cleaned with PIP AHC and was empty for a period of time, then you need to stabilize it several times with PIP AHS before it is being used again.

5.3.5 PIP PLUS Water

PIP PLUS Water reduces the risk of germs in the water pipes and prevents clogging of nozzles through the stabilized probiotic organisms. PIP PLUS Water is completely safe for humans and animals.

Important: Before cleaning the drinking water system with PIP PLUS water, it is best to measure the extent to which certain pathogens such as *Enterobacteriaceae*, *staphylococci*, *clostridia*, *streptococci*, *E. coli* and *fungi* are present.

Instruction manual PIP PLUS Water:

Use: 0.01% (= 100ml per 1000 liter water).
Frequency: Continuous dosing in the water (via pump or reservoir).
Application: Shake the product well before use and if possible daily repeat about.

Notes:

- PIP Water PLUS can withstand water temperatures between 5 and 70°C with a pH between 5,5 and 9.
- It is important to rinse vigorously the drinking water systems that are not used more than 2 days vigorously, before the animals drink of it. Afterwards you fill the pipes with water and sufficient PIP PLUS water.
- In case of contaminated drinking water systems one will, whenever it is possible keep no animals in the stables for several days, consider to proceed to a more rapid cleaning of the drinking water system by means of the insertion of 5% PIP AHC for a minimum of 4 hours. Where possible, turn the water system on circulation all that time. Afterwards, rinse out the pipes plentiful and thoroughly. Repeat this faster cleaning when much dirt residues came from the pipes. A few hours before the new animals arrive you fill the pipes with water and sufficient PIP PLUS water.

5.4 Application:Healthcare

5.4.1 General

The Healthcare products developed by Chrisal are initially 'normal' detergents, which guarantee a good cleaning of the treated surfaces. However, as an extra ingredient probiotic bacteria were added, who via a long residual ensure a clean, healthy and stable (hospital) environment. A flaw in the cleaning schedule by lack of staff or oblivion will not give rise to a decline in hygiene with potentially higher risk of infection as a result, thanks to the PIP Healthcare products. The biological nature (environmentally friendly, biological degradable) of the PIP Healthcare products also makes them safer and more enjoyable for the cleaning staff to workwith.

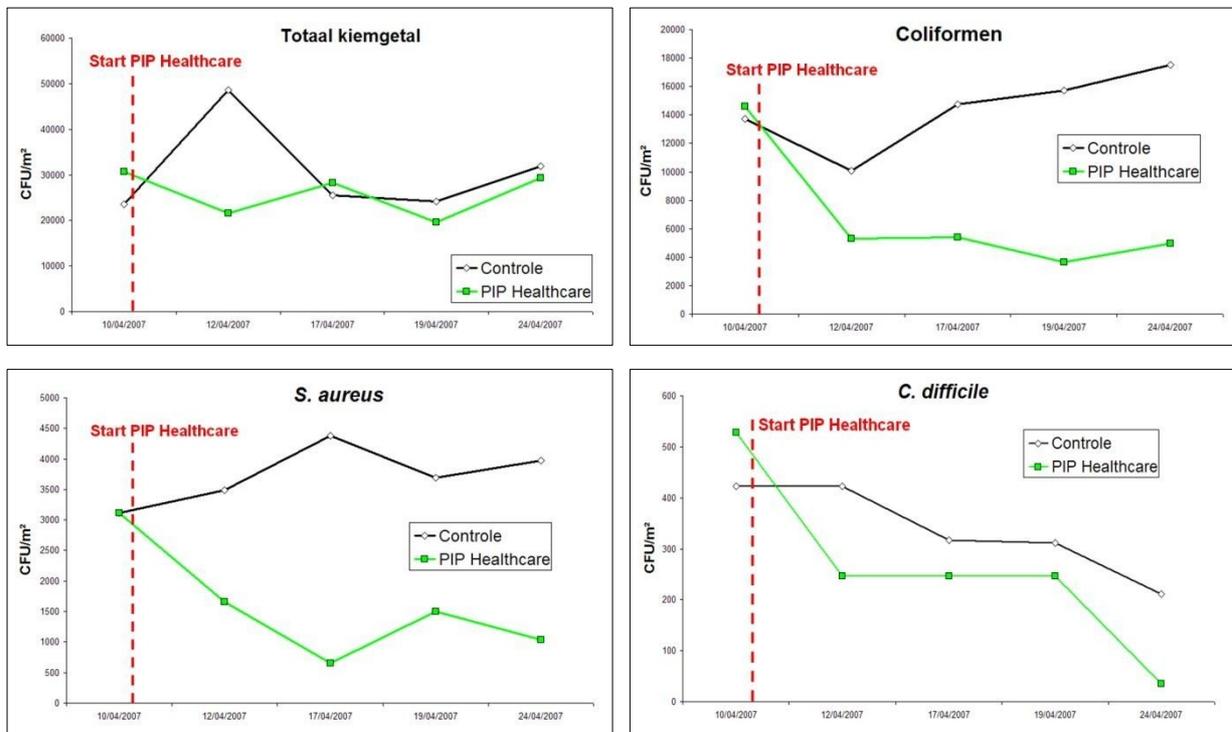
PIP Healthcare products were initially developed and validated in hospitals. However, the very good results allow us to conclude that this probiotic cleaning is much more generally applicable. However, the entire target sector of PIP Healthcare is dedicated to all institutions where people frequently come into contact with each other where hygiene or health poses a potential problem.

These institutions include:

- Hospitals
- Nursing Homes,homes
- PsychiatricInstitutions
- Rehabilitation
- Sports Clubs
- Doctors Cabinets and practices of dentists, physiotherapists,...
- Wellness centers, spas, ...
- Schools, nurseries,...

5.4.2 Results

To validate the effectiveness of the PIP Healthcare products a thorough study was conducted in collaboration with the Hospital of Lokeren, the University of Ghent and consultancy company Avecom NV. The approved by the ethics committee (og217) official clinical trial (B2652006814) showed that compared to conventional sanitizing / disinfecting the probiotic **PIP Healthcare cleaning resulted in a distinctly safer and more hygienic hospital environment**. Although the 4000 analyzes yielded a significant amount of evidence for the effectiveness of PIP Healthcare cleaning, only four representative graphs are shown in phase 2 clinical study below. The graphs show the measured number of bacteria of a certain type (see chart title). The black line represents the number of floors with conventional cleaning; the green line for the number of floors with PIP Healthcare cleaning.



The average effect of PIP Healthcare cleaning for some bacterial groups were:

- Totalbacterialcount +10%
- Number of coliforms (indicatorhygiene): -50%
- Number of S. aureus (MSSA, MRSA) bacteria: -80%
- Number of Clostridiumdifficilebacteria: -90%

More detailed results and study descriptions can be found in the study report of Ghent University and Avecom NV. Upon request.

5.4.3 Products

The basic range of probiotic Healthcare products consists of floor-, sanitary- and interior cleaners that can easily be used to replace the 'standard cleaners. In most cases, only the products are replaced, and there should be no change executed to the cleaning protocol.

The basic range can be extended to other probiotic products. Here we think about a probiotic soap and alcohol gel for optimal hand hygiene, and a probiotic textile spray for addressing problems with dust mite allergens.

6 Frequently Asked Questions about PIP – Probiotics InProgress

1. What is PIP – Probiotics InProgress?

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 work?

By applying good bacteria a competition with bad bacteria for space, food and fluid occurs on the treated surfaces (floors, walls, cages, animals, ...). Since the PIP bacteria are very active, they still win this competition and thus a healthy and stable microflora arises.

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 is PIP applicable?

PIP products are used everywhere where problems with germs exist. Current applications are eg. animal housing (cows, pigs, chickens, goats, sheep, horses, ...), food, health care, transportation (animals, food ...). The animals themselves can be treated with the PIP products (eg through high-pressure foaming or just washing). For certain problems such as Mortellaro, there are special PIP products for specific application to the animals.

6. Do I keep disinfecting when using PIPHealthcare?

No, the best results with PIP products are obtained when no disinfection is done anymore. When certain conditions should require disinfection, 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 PIPHealthcare?

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 3days.

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.