A REVOLUTIONARY VISION ON HYGIENE

PROBIOTIC CLEANING TECHNOLOGY FOR HEALTHCARE FACILITIES
Est. 1989, Belgium

Cleaning, hygiene and personal care products

PIP – 2006
Probiotics in Progress line is released

Pure, with respect to man and nature
Presentation overview:
Probiotics in Progress “PIP”

• What is a probiotic cleaner?
• Where and why are they used?
• How do they work? mechanisms of action
• Efficacy - historical & present day research
• Discussion/Questions – Implementation & Use
• Resources – Email List
• Follow up: Individual Facility Discussions
PIP probiotic cleaning products uses

Probiotic Detergents

Healthcare Facilities
Elder Care - Long term
Childcare / Daycare
Schools Homes
Offices Airports
Transit - buses
Recreation centers
Fitness Facilities
Bars Sports Stadiums
Apartments
Swimming Pools
Flood Clean up
Lonely Death company

Probiotic Concentrates
What is Probiotic Cleaning?

Probiotic cleaning products are **detergents**. They are NOT biocides/disinfectants!

**DO NOT NEED** or **QUALIFY** for DIN numbers.

**European Commission. July 2016:**
Following discussions with DG GROW and industry, it has been established that the **Detergents Regulation** should be interpreted to mean that **microbial cleaning products** that have the combined action of traditional surfactants and bacteria **fulfil the definition of a detergent** as set out in the Detergents Regulation and fall, therefore, under its scope.
<table>
<thead>
<tr>
<th>Product ingredients</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Detergents</td>
<td>(chemical)</td>
</tr>
<tr>
<td>• Immediate removal of superficial dirt</td>
<td></td>
</tr>
<tr>
<td>• Immediate action - up to 30 min activity</td>
<td></td>
</tr>
<tr>
<td>2. Enzymes</td>
<td>(biochemical)</td>
</tr>
<tr>
<td>• Removal of organic dirt</td>
<td></td>
</tr>
<tr>
<td>• Active after 10 min - up to 2 hrs activity</td>
<td></td>
</tr>
<tr>
<td>3. Probiotics</td>
<td>(biological)</td>
</tr>
<tr>
<td>• Removal of organic dirt and biofilm</td>
<td></td>
</tr>
<tr>
<td>• Active after 20 min - up to 3 days active</td>
<td></td>
</tr>
</tbody>
</table>

Combination provides ongoing hygiene & pathogen control
Probiotic Cleaning
Mechanisms of Action:

1. Competitive Exclusion
2. Biofilm Removal
3. Quorum Sensing
1. Bacteria Produce Enzymes  
2. Enzymes break down large particles  
3. Bacteria digest small particles as food
PROBIOTIC ACTION #1
COMPETITIVE EXCLUSION

From the moment they become active, the probiotics produce a broad range of substrate specific enzymes that break down organic matter (& BIOFILMS, DUST MITE WASTES) which the probiotic bacteria to use as a food source.

By consuming organic matter, there is less food for other microorganisms = lowered risk of pathogens on surfaces

Surfaces are being continuously cleaned in a biological way!
Micro-organisms (bacteria, fungi, archaeb, algae...)

Biofilm binding matrix made of organic structures (exopolysaccharides, proteins...)

Universal presence on surfaces
Very tenacious - difficult to remove
Pathogen reservoir
Source of bad smells/odours
Disinfectants cannot penetrate
Develops chemical resistance
Resistance adds to AMR
Representation of normal microflora distribution on the average surface note open spaces important for future colonization

Application of PIP makes the probiotic bacteria dominant filling up the spaces

When all spaces are filled, and food becomes scarce, the bacteria release quorum signals ‘saying’ there is no food or space left!
When quorum sensing signals are released, all bacteria cease activity / reproduction. This eliminates more remaining pathogen colonies.

This naturally occurring QS mechanism happens at approximately the 72 hour mark after PIP application (germination).

Routine cleaning will continually repopulate surfaces with probiotic bacteria, leaving no space for pathogens to colonize into.

Example: fogging / cleaning every three days can maintain high numbers of probiotic bacteria and minimize pathogen growth - even in a kindergarten room!
Healthcare Challenges

• **Antibiotic Resistance**
  drugs used in healthcare, agriculture, aquaculture...
  

• **Chemical Resistance**
  disinfectants (bleach, quats), hydrogen peroxide, metals,
  

• **Biofilm Resistance**
  disinfectants, drugs, antimicrobial surfaces, autoclave
  
  *Stewart and Costerton. Antibiotic resistance of bacteria in biofilms. Lancet 2001*
Healthcare Challenge

What we now know...

Biocide resistance can stimulate resistance to antibiotics

Antibiotics + Biocides (and biocidal metals) = Increased Antibiotic Resistance

Literature:
Addressing Resistance Issues

Remove substances that trigger resistance!

1. Decreased use of antibiotics

2. Decreased use of
   - Disinfectants: bleach, quats, hydrogen peroxide
   - Sanitizers
   - Antimicrobial products: bedding, clothes, water bottles

3. Above combined with populating areas with high numbers of probiotic bacteria reduces resistance genes!
Probiotic cleaners are proven to offer a safe, easy, sustainable and highly effective method to decrease these issues.
Healthcare Challenge Efficacy

Presence of S. aureus

- Chemical Cleaner
- Chirisal Cleaner

This study was conducted in operational hospitals with 20,000 samples.
ADDITIONAL (HIDDEN) COST SAVINGS

- Staff, patients, patrons, custodians health:
  Immune function preservation
  Allergen Reduction in Facility
  Respiratory Issue Reductions

- Facility hygiene, appearance, perception
  Odours addressed at source – not covered up
  Improved air quality – continuous pathogen ‘control’

- Facility Infrastructure, Equipment
  No corrosion of metals, plastics, vinyls, floor finishes

- Environment – air quality, waste water
  Cleaner drains, waste water ‘cleans’ as it leaves
Microscopic deep cleaning

Chemical cleaning

Probiotic cleaning

Chemical cleaning

Probiotic cleaning
Good microflora replace pathogens

Staphylococcus aureus

Day 0    Day 7    Day 14

Miami Home and Jewish Hospital Study, Florida, 2009
Environmentally beneficial vs Environmentally friendly

Environmentally friendly (eco-friendly, nature-friendly, and green), are marketing terms for products that claim reduced, minimal, or no harm upon the environment.

Environmentally beneficial:
products that actively contribute to a cleaner healthier environment

Bacillus bacteria used for 1. Removing oil contaminations of palm oil from waste water, Removal/recovery of light and heavy crude oil. 2. Removing toxins from soil or water: Cyanide removal from (waste)water. 3. Removing harsh chemicals from soil or water: Treatment of tannery waste water, Removal of Fipronil from soil. 4. Removing heavy metals from soil or water: Removal of lead from wastewater, Removal of heavy metals from waste water. See Environment Beneficial resource for study information.
Why use Probiotic cleaning?

1. Microscopic cleaning sustainable and long lasting effect
2. Active odour control reduces labour / material costs
3. Lowers pathogen risks reduces HAI, cross contamination
4. Reduces airborne pathogens / allergens linen changes
5. Continual biofilm removal reduce labour-improve hygiene
6. Reverse antibiotic resistance genes improved outcome
7. Non-toxic, Non-GMO improved immune function (staff too)
8. Non-caustic, Non-corrosive no damage to infrastructure
9. Environmentally beneficial – surfaces, air, soil, water
10. Cost saving – wide net of value added benefits
SANICA RESEARCH
Caselli et al. 2018

• **Duration:** 1st of January 2016 to 30th of June 2017

• **Hospitals involved in the study:** Roma, Foggia, Feltre, Tolmezzo, Vigevano, Messina.

• **Methodology:** 6 months of Conventional Cleaning and 6 months of PIP cleaning (Probiotics in Progress).

Reducing healthcare-associated infections incidence by a probiotic-based sanitation system: A multicentre, prospective, intervention study Caselli et al. https://doi.org/10.1371/journal.pone.0199616  Published July 12, 2018
Universities that participated in the study: Ferrara, Udine, Agostino Gemelli, Bocconi, Pavia, Messina and Foggia.
Reduction of Pathogens in 5 Hospitals Sanica Research

Before PIP  After PIP

Hosp 1  Hosp 2  Hosp 3  Hosp 4  Hosp 5

Average -82,71%  Average -78,84%  Average -68,54%  Average -93,75%  Average -71,29%

Rodac plates of Staphylococcal spp., enterobacteriaceae spp; acinetobacter spp., Candida spp; pseudomonas spp; clostridium spp).
### Number of HAI’s (Hospital Acquired Infections)

<table>
<thead>
<tr>
<th>Type of Infection</th>
<th>Before PIP cleaning</th>
<th>PIP Cleaning</th>
<th>Conventional vs PIP Cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N° (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Urinary Tract</strong></td>
<td>179 (57%)</td>
<td>70 (49%)</td>
<td>60.9%</td>
</tr>
<tr>
<td><strong>Blood</strong></td>
<td>54 (17%)</td>
<td>31 (22%)</td>
<td>42.6%</td>
</tr>
<tr>
<td><strong>Systemic infections</strong></td>
<td>22 (7%)</td>
<td>5 (3.5%)</td>
<td>77.3%</td>
</tr>
<tr>
<td><strong>Gastrointestinal</strong></td>
<td>17 (5.4%)</td>
<td>6 (4.3%)</td>
<td>64.7%</td>
</tr>
<tr>
<td><strong>Skin and soft tissues</strong></td>
<td>15 (4.8%)</td>
<td>6 (4.3%)</td>
<td>60.0%</td>
</tr>
<tr>
<td><strong>Lung infections</strong></td>
<td>22 (7%)</td>
<td>14 (9.9%)</td>
<td>36.4%</td>
</tr>
<tr>
<td><strong>Reproductive system</strong></td>
<td>1 (0.3%)</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>314</td>
<td>141</td>
<td></td>
</tr>
<tr>
<td><strong>Total patients during research</strong></td>
<td>5930</td>
<td>5531</td>
<td></td>
</tr>
<tr>
<td><strong>Incidence of HAI’s</strong></td>
<td>314/5930 (5.3%)</td>
<td>141/5531 (2.5%)</td>
<td>52.8%</td>
</tr>
</tbody>
</table>
FIGURES from 2018 Caselli Study

- 70 to 96% Reduction of pathogen risk
- 78% Reduction of Antibiotic Costs per patient
- 52% reduction of risk of infections
- 70 to 99% reduction of the resistance to antibiotics
- 45% Reduction in use of chemicals
11,842 patients and 24,875 surface samples were analyzed.
This study demonstrates that microbial (probiotic-based) cleaning is more effective in the long-term lowering of the number of HAI-related microorganisms on surfaces, when compared to conventional cleaning products, even those containing disinfectant molecules such as chlorine.
Caselli et al. 2016a

“Probiotic Bacillus strains, best known for their usefulness as food supplements or fungicides, can be also successfully exploited in sanification procedures, as they counteract the growth of pathogens and, most importantly, they decrease the population harboring drug resistance genes, which is a global concern and which is ultimately responsible for the onset of the most severe HAIs.”
Caselli et al. 2016b

“This suggests that probiotic Bacillus spp. do not cause infections, even in the subjects at high risk of opportunistic infections.”
Criteria for Probiotic Cleaners

Quality challenges associated with microbial-based cleaning products from the Industry Perspective  Steve M. Teasdale Ali Kademi

https://doi.org/10.1016/j.fct.2017.10.029

Abstract

Microbial-based cleaning products (MBCPs) continue to gain popularity… Although the microorganisms used in MBCPs are subject to regulation in Canada under the Canadian Environmental Protection Act, the products themselves are not…

...the use, manufacture and quality parameters of MBCPs in Canada and other countries are poorly defined and not specific…these products feature unique quality challenges.

... A good understanding of the mechanisms …and manufacture are ….essential for achieving high-quality performance standards
Assessing Quality of Probiotic Cleaners

Probiotic cleaning products require quality criteria:

- **Type of probiotics used** - not all are effective
- **Number of probiotics** - enough are needed
- **Shelf-life** - the products needs to be stable
- **Quality control** - the products need to be pure
Chrisal R&D

- Quality Control
  Raw materials and production batches
- Product development
  New formulations and applications
- Customer services
  Field trials and sampling
WE MUST LEARN HOW TO SPEAK TO OUR BIOLOGY WITHOUT TOXIC CHEMICALS

PIP uses naturally occurring biological principles to:

- improve cleaning efficacy
- reduce odours
- remove biofilm
- lower pathogen presence
- reverse chemical resistance genes in pathogens.

Best of all, probiotic cleaners effectively and easily fit into an infection control strategy!
What is a probiotic cleaner?
Where are they used?
Why are they used?
How do they work? mechanisms of action
Efficacy - historical & present day research
Discussion/Questions – Implementation & Use
# Implementation & Use

### QUESTIONS & DISCUSSION

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<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>APPLICATION</th>
<th>INSTRUCTIONS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PIP ALLERGY FREE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spray for habitat, appliances, furniture, fixtures, doors, clothing, personal items, kitchen, clothes, toys, electronics, remote controls, electronics</td>
<td>DAILY</td>
<td>Use with spray bottle on cloth and bucket.</td>
<td></td>
</tr>
<tr>
<td><strong>PIP INTERIOR CLEANER or ECONOMIC PRO</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal Cleaner:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furniture and fixtures</td>
<td>Daily</td>
<td>Shake before using Claro 1:100 (100 ml product/1L water)</td>
<td>Use with spray bottle on cloth and bucket.</td>
</tr>
<tr>
<td>Doors, windows, mirrors, walls, floors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PIP INTERIOR CLEANER or ECONOMIC PRO</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal Cleaner:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaner, signing, toilet, bath, sink, sink</td>
<td>Daily</td>
<td>Shake before using Claro 1:100 (100 ml product/1L water)</td>
<td>Use with spray bottle on cloth and bucket.</td>
</tr>
<tr>
<td>Doors, windows, mirrors, walls, floors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PIP FLOOR CLEANER or ECONOMIC PRO</strong></td>
<td></td>
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<td></td>
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<tr>
<td>Floor Cleaner:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All types of surfaces</td>
<td>Daily</td>
<td>Shake before using Claro 1:100 (100 ml product/1L water)</td>
<td>Use with spray bottle on cloth and bucket.</td>
</tr>
<tr>
<td>Carpets</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>PIP SANIGEL</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ready to use Hot Spray:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floors, walls, windows, doors, mirrors, fabrics, towels, fabrics</td>
<td>Daily</td>
<td>Shake before using Claro 1:100 (100 ml product/1L water)</td>
<td>Use with spray bottle on cloth and bucket.</td>
</tr>
<tr>
<td><strong>ORGANIC DESCALER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Descaler for:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sticks, showers, tubs</td>
<td>Weekly</td>
<td>Weekly cleaning: 1:100 (1L of product/1L water)</td>
<td>Use with spray bottle on cloth and bucket.</td>
</tr>
<tr>
<td><strong>PROBIOTICS IN PROGRESS—Creating probiotics to create safe and healthy environments.</strong></td>
<td><a href="http://www.chrisalcleaning.com">www.chrisalcleaning.com</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Townst@choiceprobiotics.com
Cell: 250-485-2360
Choice Probiotics Ltd, Abbotsford, BC

Available through
Choice Probiotics

Stevens
Inspired by the care you deliver