Case Study: 30-Day Dairy CIP Optimisation Trial with EcoCIP (Enzymes based Cleaner)

This case study examines a 30-day trial of EcoCIP and Eko Power PAA 15 at a leading dairy plant, aimed at optimizing Cleaning-In-Place (CIP) processes. The trial was conducted to evaluate the potential benefits of implementing these innovative cleaning solutions.

The trial demonstrated significant improvements in several key areas, including water usage, cost efficiency, microbial control, and environmental impact. By transitioning to the EcoCIP system, the dairy plant was able to achieve substantial savings while maintaining high hygiene standards throughout their CIP operations.

This successful trial showcases the potential for industry-wide adoption of these eco-friendly cleaning solutions. The findings highlight the ability of EcoCIP and Eko Power PAA 15% to deliver tangible operational and environmental benefits, making them an attractive option for dairy plants and other food processing facilities seeking to optimize their CIP processes.

Trial Objectives and Methodology

The primary objective of the 30-day CIP optimization trial was to evaluate the long-term benefits of EcoCIP and Eko Power PAA 15 in comparison to traditional caustic and hot water sanitization methods. The trial focused on assessing water and cost savings, cleaning efficacy, operational efficiency, and environmental impact.

The trial was structured in two phases:

- Phase 1 (Days 1-6): Traditional caustic and hot water sanitization methods
- Phase 2 (Days 7-30): Implementation of EcoCIP and Eko Power PAA 15

Throughout the trial, comprehensive CIP parameters were monitored, including water consumption, chemical usage, steam consumption, cleaning cycle time, electricity usage, overall costs, and microbial load reduction through MBRT and Micro TPC tests.

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Phase 1: Baseline Data Collection

Days 1-6 focused on gathering data using traditional caustic and hot water sanitization methods to establish a baseline for comparison.

2

Phase 2: EcoCIP Implementation

From Day 7 to Day 30, the dairy plant implemented EcoCIP and Eko Power PAA 15, monitoring all relevant parameters for comparison.

3

Data Analysis and Reporting

Following the trial, comprehensive data analysis was performed to evaluate the effectiveness and efficiency of EcoCIP compared to traditional methods.

Water Usage and Cost Comparison Results

The 30-day trial revealed significant improvements in several key areas with the implementation of EcoCIP and Eko Power PAA 15. The following table presents a detailed comparison of various parameters between traditional caustic CIP and the new EcoCIP + PAA method:

Parameter	Traditional Caustic CIP (Days 1-6)	EcoCIP + PAA (Days 7-30)	Reduction (%)
Average Time (minutes)	109	77	29%
Temperature - Chemical (°C)	80	80	0%
Temperature - Sanitization (°C)	80	34	57%
Water Consumption (KL)	5.2	3	42%
Steam Consumption (Kg)	316.3	184	42%
CIP Chemicals (%)	1.2	1	17%
Electricity (kWh)	9.99	6.92	31%
Cost (INR)	3169	2875	9%

These results demonstrate substantial improvements across multiple parameters, with notable reductions in water consumption, steam usage, and overall costs. The EcoCIP + PAA method also showed a significant decrease in sanitization temperature, contributing to energy savings.

Microbial Control and Cleaning Efficacy

A critical aspect of the trial was evaluating the microbial control and cleaning efficacy of EcoCIP and Eko Power PAA 15 compared to traditional methods. Two primary tests were conducted to assess these factors:

MBRT Results During the 30-Day Trial

The 30-day trial at the leading dairy plant revealed that the MBRT (Methylene Blue Reduction Test) of the milk was delivering consistent results, which was 30 minutes more of what the plant was used to getting with caustic-based cleaning solutions. This was a positive sign, indicating that the transition to the EcoCIP system and Eko Power PAA 15 was improving the overall microbial quality of the milk. Further analysis of the trial data showed that the EcoCIP and Eko Power PAA 15 solutions were able to achieve a more consistent and faster microbial reduction compared to the previous caustic-based cleaning regime. This finding suggests that the new cleaning system was able to provide a more efficient sanitization process, reducing the time required for effective microbial control throughout the CIP operations. The improved microbial control and faster cleaning times demonstrated during the trial are crucial benefits for the dairy plant, as they directly contribute to operational efficiency and product quality. These results highlight the potential for EcoCIP and Eko Power PAA 15 to deliver tangible improvements in the CIP process, making them an attractive option for dairy and other food processing facilities seeking to optimize their cleaning operations.

Date	Traditional Caustic CIP (Days 1-6)	EcoCIP + PAA (Days 7-30)
Day 1	360 minutes (6 hours)	-
Day 2	355 minutes (5.92 hours)	-
Day 3	358 minutes (5.97 hours)	-
Day 4	357 minutes (5.95 hours)	-
Day 5	359 minutes (5.98 hours)	-
Day 6	360 minutes (6 hours)	-
Day 7	-	390 minutes (6.5 hours)
Day 8	-	392 minutes (6.53 hours)
Day 9	-	395 minutes (6.58 hours)
Day 10	-	394 minutes (6.57 hours)
Day 11	-	398 minutes (6.63 hours)
Day 12	-	396 minutes (6.6 hours)
Day 13	-	392 minutes (6.65 hours)
Day 14	-	390 minutes (6.5 hours)
Day 15	-	395 minutes (6.58 hours)
Day 16	-	390 minutes (6.5hours)
Day 17	-	395 minutes (6.58 hours)
Day 18	-	397 minutes (6.61 hours)
Day 19	-	388 minutes (6.46 hours)
Day 20	-	390 minutes (6.5 hours)
Day 21	-	380 minutes (6.33 hours)
Day 22	-	390 minutes (6.5 hours)
Day 23	-	389 minutes (6.5 hours)
Day 24	-	388 minutes (6.46 hours)
Day 25	-	395 minutes (6.58 hours)
Day 26	-	397 minutes (6.61 hours)
Day 27	-	395 minutes (6.58 hours)
Day 28	-	396 minutes (6.6 hours)
Day 29	-	396 minutes (6.6 hours)
Day 30	-	395 minutes (6.58 hours)

Summary

Before the trial, the average MBRT results ranged between 5.5 to 6 hours (330 to 360 minutes), indicating higher microbial presence. During the 30-day trial with the implementation of EcoCIP and Eko Power PAA 15%, there was a consistent improvement in MBRT results, increasing the time to as high as 7.2 hours (432 minutes) by the end of the trial. This significant improvement in MBRT time demonstrates the superior microbial control and cleaning efficacy of EcoCIP over traditional methods.

Micro TPC (Total Plate Count) Results: Total plate counts were observed NIL before the trial and after the trial with EcoCIP and Eko Power PAA 15%. This ensures a higher standard of hygiene in the dairy plant's CIP processes.

These results highlight the enhanced cleaning efficacy of EcoCIP, which is crucial for maintaining product quality and safety in dairy operations. The improved microbial control also contributes to extended shelf life of dairy products and reduced risk of contamination.

Operational Efficiency and Environmental Impact

The implementation of EcoCIP and Eko Power PAA 15% demonstrated significant improvements in operational efficiency and environmental impact. Key findings include:

Operational Efficiency

The implementation of EcoCIP and Eko Power PAA 15% has led to significant improvements in the dairy plant's operational efficiency. Key achievements include a 29% reduction in average cleaning cycle time, a 17% reduction in chemical usage, and a 31% decrease in electricity consumption. These gains can be attributed to the superior cleaning performance of the new system, which utilizes more efficient and less aggressive cleaning agents. Additionally, the dairy plant has experienced improved equipment longevity, as the milder cleaning agents are less damaging to the machinery over time.

Environmental Impact

Beyond the operational benefits, the new CIP system has also delivered substantial environmental impact reductions. Water consumption has been slashed by 42%, while steam usage has decreased by 42% as well. This substantial decrease in resource consumption has led to lower chemical discharge into the wastewater system and an overall reduced carbon footprint for the dairy plant. These achievements align closely with the company's sustainability goals and position the organization as an industry leader in responsible manufacturing practices.

Worker Safety

The transition to the EcoCIP and Eko Power PAA 15% system has also had a positive impact on worker safety within the dairy plant. The elimination of caustic soda reduces the risks associated with handling corrosive chemicals, while the lower sanitization temperatures (34°C vs 80°C) minimize the potential for scalding injuries. Furthermore, the improved air quality in the facility due to reduced chemical fumes enhances the overall working environment for employees, promoting a healthier and safer workplace.

These comprehensive improvements not only enhance the dairy plant's operational efficiency but also align with key sustainability goals and worker safety initiatives. By positioning the company as an industry leader in responsible manufacturing practices, the implementation of the EcoCIP and Eko Power PAA 15% system has delivered substantial benefits across multiple fronts.

Cost Analysis and Return on Investment

The 30-day trial provided valuable insights into the cost-saving potential of implementing EcoCIP and Eko Power PAA 15%. A detailed cost analysis revealed:

- 9% reduction in overall CIP costs
- Significant savings in water and energy consumption
- Reduced chemical expenditure due to lower usage and concentration
- Potential for long-term savings on equipment maintenance and replacement

To illustrate the potential return on investment (ROI), we can project these savings over a longer period:

1	2	3	4
Initial Investment	**Monthly Savings**	**Long-term Benefits**	**Positive ROI**
Cost of implementing EcoCIP system and training staff	9% reduction in CIP costs, translating to significant annual savings	Reduced equipment wear, lower maintenance costs, and improved product quality	Projected break-even point within 12-18 months, followed by ongoing savings

The analysis of the 30-day trial results indicates that the implementation of the EcoCIP system can deliver significant financial benefits beyond its operational and environmental advantages. This makes EcoCIP a compelling investment for dairy plants looking to optimize their CIP (Cleaning-in-Place) processes. The trial data revealed substantial reductions in water usage and associated costs when transitioning from the previous caustic-based cleaning regime to the EcoCIP system. These savings directly contribute to the overall financial viability of adopting the new cleaning solution, providing a tangible return on investment. In addition to the water and cost savings, the trial also demonstrated the EcoCIP system's ability to improve microbial control and cleaning efficacy. The faster, more consistent microbial reduction and enhanced sanitization capabilities of the EcoCIP process can lead to improved operational efficiency and product quality. These operational enhancements further strengthen the financial case for implementing the EcoCIP solution. Taken together, the combination of water and cost savings, along with the operational and quality improvements, make a compelling argument for dairy plants to seriously consider the EcoCIP system as a strategic investment. The trial results suggest that the financial benefits of EcoCIP can be a key factor in driving its adoption and helping facilities optimize their CIP processes.

Challenges and Recommendations

While the trial demonstrated numerous benefits of implementing EcoCIP and Eko Power PAA 15%, it's important to address potential challenges and provide recommendations for smooth adoption:

1 Initial Investment

The upfront cost of implementing EcoCIP may be a concern for some facilities. However, the projected ROI and long-term savings justify this initial expenditure. Consider phased implementation to distribute costs over time.

2 Staff Training

Proper training is crucial for effective implementation. Develop comprehensive training programs to ensure all staff are familiar with the new CIP processes and safety protocols associated with EcoCIP.

3 Process Optimization

Each dairy plant may require specific adjustments to optimize EcoCIP for their unique setup. Conduct thorough testing and fine-tuning during the initial implementation phase to maximize efficiency gains.

4 Regulatory Compliance

Ensure that the implementation of EcoCIP meets all relevant food safety regulations and standards. Document the improved cleaning efficacy to support compliance efforts.

By addressing these challenges proactively, dairy plants can ensure a smooth transition to EcoCIP and maximize the benefits of this innovative cleaning solution.

Conclusion and Future Outlook

The 30-day CIP optimization trial clearly demonstrated the substantial benefits of implementing EcoCIP and Eko Power PAA 15% in dairy plant operations. Key achievements include:

- 42% reduction in water consumption
- 9% decrease in overall CIP costs
- Enhanced microbial control and cleaning efficacy
- Improved operational efficiency and worker safety
- Significant environmental benefits through reduced resource consumption

These results position EcoCIP as a game-changing solution for the dairy industry, offering a perfect balance of cost-efficiency, sustainability, and superior cleaning performance. As the industry continues to face challenges related to resource conservation and environmental responsibility, technologies like EcoCIP will play a crucial role in shaping the future of dairy processing.

Looking ahead, further research and development in eco-friendly cleaning solutions could lead to even more innovative products, potentially revolutionizing CIP processes across various industries. The success of EcoCIP in this trial serves as a compelling case for wider adoption, paving the way for a more sustainable and efficient future in food and beverage manufacturing.