

August
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Instrument Assessment Report

Sureclean

Assessment of the suitability of Sureclean as a beer
dispense line cleaner



Executive Summary

Aqualution Systems' Sureclean beer line cleaner is a powerful tool against micro-organisms encountered in the beer dispense trade. Sureclean proved to be more effective than a standard beer line cleaner used for comparison in this study. It has the added advantage of not needing to be diluted as many other cleaners do, saving time and resources. Based on its chemistry (hypochlorous acid) Sureclean is claimed to be a safe to handle and environmentally friendly cleaner.

Background

Aqualution Systems Ltd produce a non-corrosive novel beer line cleaner called Sureclean (also marketed as Zygosan). It is claimed to clean lines faster and be easier to handle than standard line cleaners. Aqualution Systems requested Campden BRI to test the efficiency of the cleaner since Campden BRI's recommendation is well regarded by brewing companies.

Scope of work

This study evaluated the capability of Sureclean to efficiently clean artificially aged beer line sections and thus its potential suitability as a beer line cleaner.

Experimental method

A two meter nylon beer dispense line was artificially aged by introducing physical damage and microbiological contamination by circulating Campden BRI's proprietary biofilm culture. This culture consists of micro-organisms typically encountered in pub beer lines. This technique introduced a background level of microbiological contamination to the internal line surface and was attempting to simulate soiled lines as encountered in trade.

Following contamination, the line was flushed with water to remove all cells not bound to the inner line surface. The line was then cut into four sections of 50 cm length. Before cleaning the individual lines, short line samples were cut off in duplicate from the four lines at two locations (both ends) using aseptic technique.

One of the four lines was cleaned with a widely accepted beer line cleaner as a reference. This cleaner is an industry standard, chlorinated, alkaline solution. It was diluted according to the manufacturer's instructions, the line filled and left for 30 minutes. In accordance with the instructions, the reference cleaner was refreshed every 10 minutes throughout the 30 minutes and water was then pumped through to flush the line.

Three lines were cleaned with Sureclean following three different cleaning regimes. Sureclean was left to rest in the line for either 10, 20 or 30 minutes. Water was then pumped through all the lines to stop the cleaning process.

All four lines were emptied of water before duplicate samples were taken from the two locations as described above. The external surface of the lines and the cutting device were sprayed with 70% ethanol before sampling to eliminate cross contamination. A 2 cm line section was cut off each end and discarded after which the duplicate samples were collected from both ends of the line. Pre- and post-cleaning samples were stored in sterile containers until they were analysed the same day. The experiment was carried out at room temperature with mains water straight from the cold tap.

Traditional plate-based microbiological analysis was used to investigate the levels of micro-organisms present in the lines. The internal surface of each line section sample was swabbed and the swab soaked in Ringers solution. A serial dilution was performed and an aliquot of each dilution was plated on growth media. The media was chosen to determine the presence and numbers of aerobic bacteria and yeast as well as anaerobic bacteria.

Results

Figures 1, 2, 3 and 4 show the average colony forming units (CFU) per line section present pre- and post-cleaning with Sureclean and the reference cleaner. The average was calculated from the duplicate samples taken at each location, A and B. 10, 20 and 30 denote how long, in minutes, Sureclean was left to rest in the line. Figure 5 shows the total number of aerobic and anaerobic micro-organisms on the inner line surface before and following treatment with Sureclean and the reference cleaner.

The number of micro-organisms recovered from the line sections pre-cleaning show some variability, from 230 to 9000 aerobic CFU/line section (Figures 1 and 3) and 815 to 10250 anaerobic CFU/line section (Figures 2 and 4). This variation is not surprising as biofilm development, being a biological process, is known to occur unevenly rather than homogeneously over a surface.

No viable aerobic or anaerobic micro-organisms were present following cleaning with Sureclean (Figure 1, 2 and 5). Leaving Sureclean to rest in the line for only 10 minutes was sufficient to rid the line of any viable micro-organisms (Figures 1, 2 and 5).

A low number of viable aerobic and anaerobic micro-organisms remained following the 30 minutes cleaning regime with the reference cleaner (Figures 3, 4 and 5). The reference cleaner reduced the microbial load of the lines by over 90%, however, in most cases not by 100% as was seen following the Sureclean clean (Table 1).

On comparison of the efficacy of the two cleaners, Sureclean showed to be the more effective cleaner, eliminating 100% of viable aerobic micro-organisms in just a third of the time it took for the reference cleaner to eliminate 93 – 97% of aerobic micro-organisms (Table 1).



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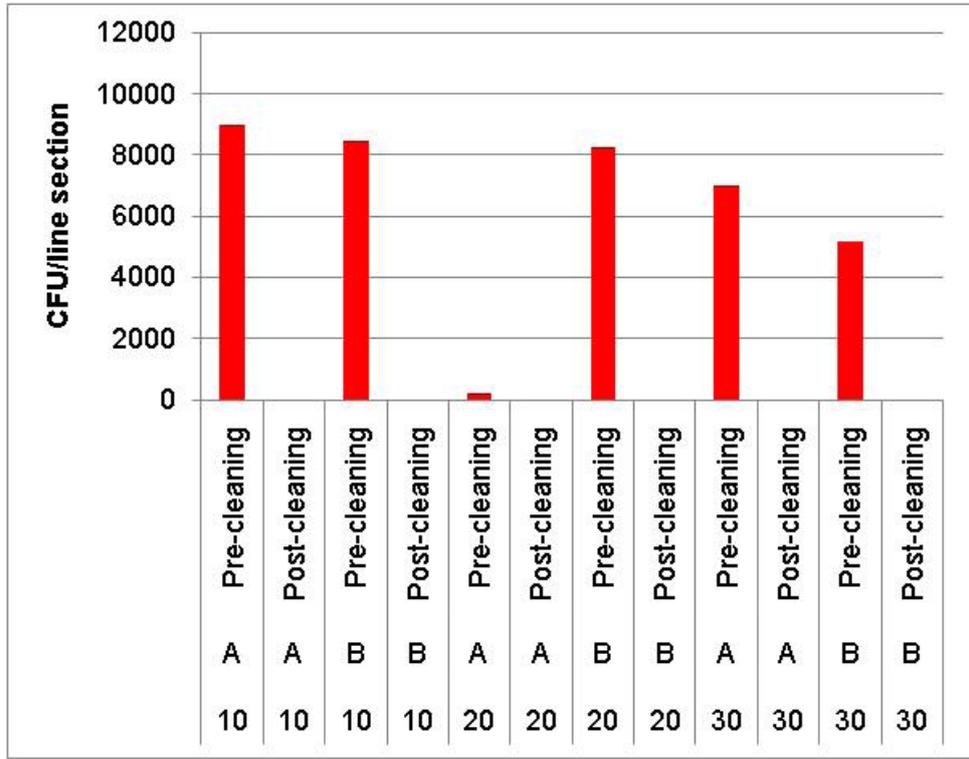


Figure 1: Bar graph representing the average number of aerobic micro-organisms on the inner line surface at location A and B before and after either 10, 20 or 30 minutes of cleaning with Sureclean

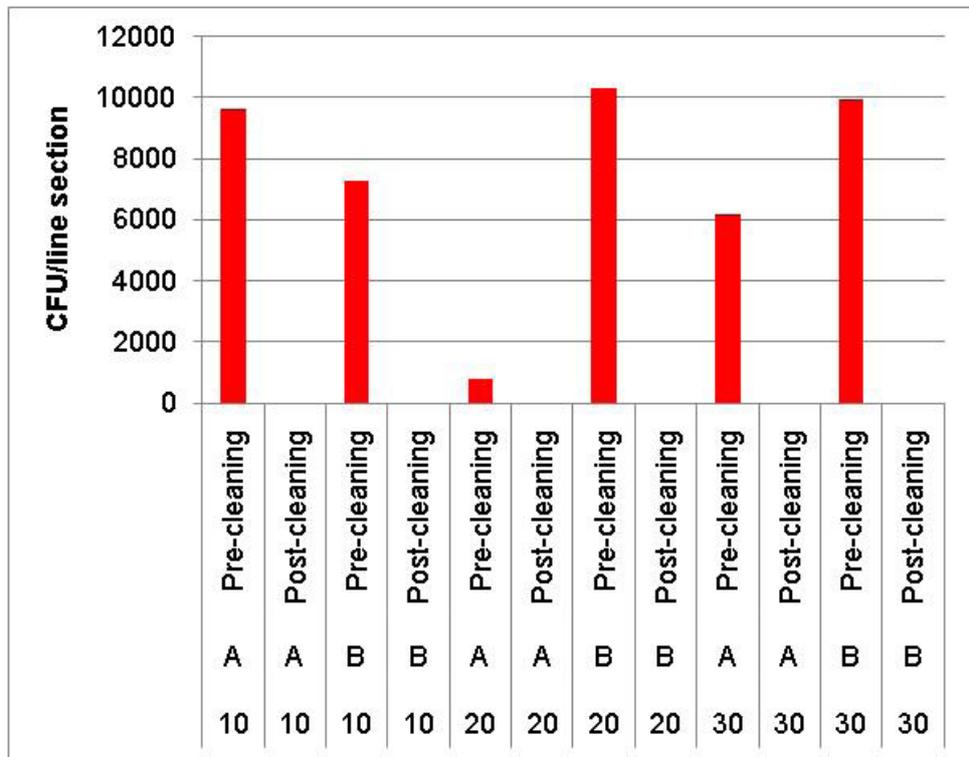


Figure 2: Bar graph representing the average number of anaerobic bacteria on the inner line surface at location A and B before and after either 10, 20 or 30 minutes of cleaning with Sureclean



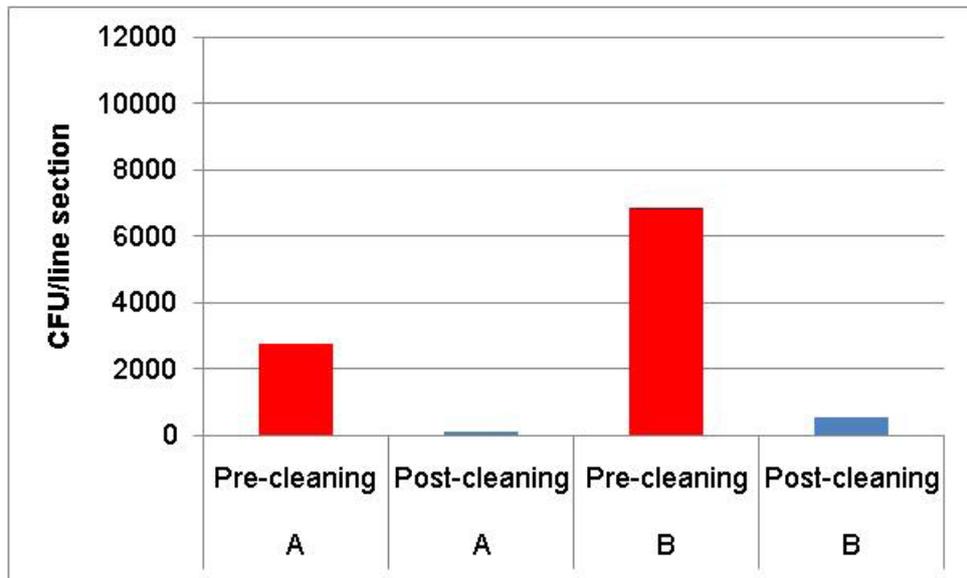


Figure 3: Bar graph representing the average number of aerobic micro-organisms on the inner line surface at location A and B before and following treatment with the reference cleaner

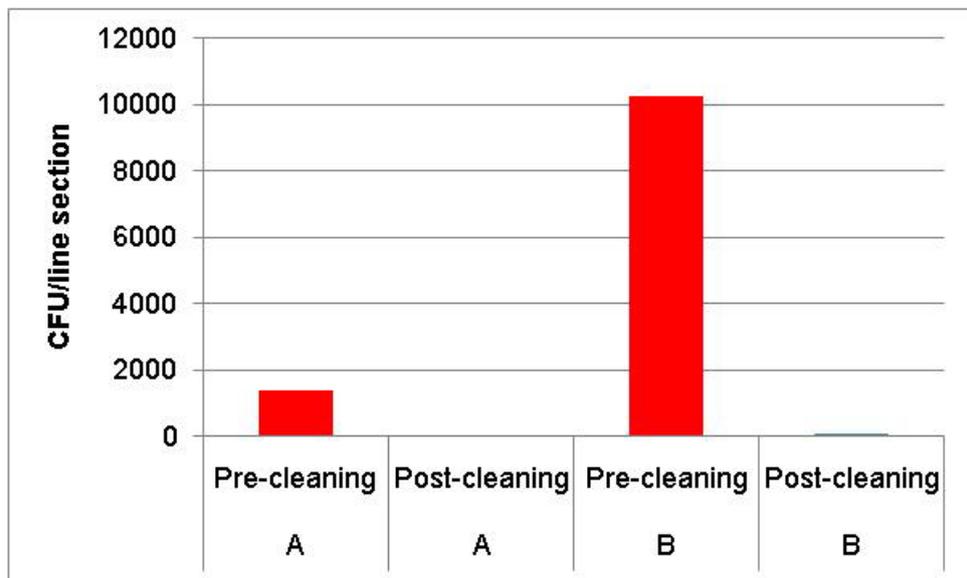


Figure 4: Bar graph representing the average number of anaerobic bacteria on the inner line surface at location A and B before and following treatment with the reference cleaner



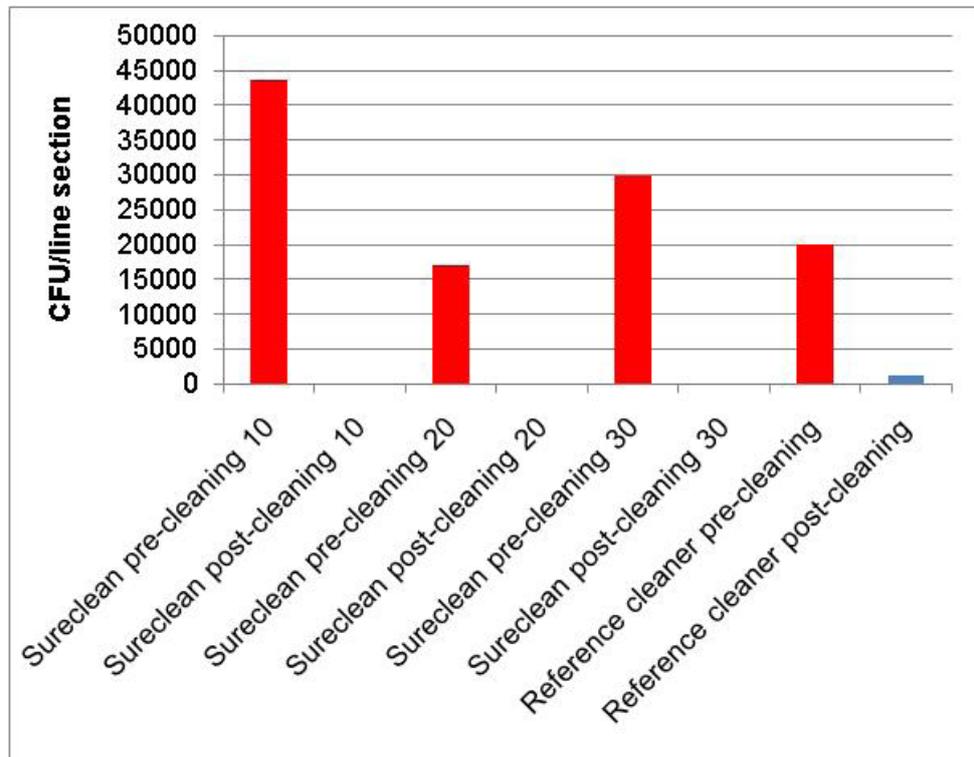


Figure 5: Bar graph representing the total number of aerobic and anaerobic micro-organisms on the inner line surface before and following treatment with Sureclean and the reference cleaner

Sample			Micro-organism reduction	
Cleaner	Cleaning time (min)	Location	Aerobic	Anaerobic
Sureclean	10	A	100%	100%
		B	100%	100%
	20	A	100%	100%
		B	100%	100%
	30	A	100%	100%
		B	100%	100%
Reference cleaner	30	A	97%	100%
		B	93%	99%

Table 1: The percentage reduction in viable micro-organisms present on the inner line surfaces after cleaning with Sureclean and the reference cleaner

Conclusions

In this study Sureclean has been shown to clean beer dispense lines very effectively in a very short time. The microbial loading on the inner line surfaces was reduced by 100% within 10 minutes of cleaning. The clean was more rapid than with the reference cleaner used for comparison. Sureclean is used straight from the container, whilst other cleaners on the market need to be diluted, saving time and resources. It has the great advantage of being safe to handle. Furthermore, it is environmentally friendly as it allows water savings to be made since it does not need to be diluted and does not require a water rinse at the end of the cleaning procedure.