

## EVALUATION OF TEAT COVERAGE WITH AN AUTOMATIC POST MILKING TEAT DISINFECTANT SYSTEM USING SIX DIFFERENT SPRAY DURATION SETTINGS

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### INTRODUCTION

It is recognized within the industry that manual application of post-milking teat disinfectant is extremely varied between teats, with less than acceptable coverage on many farms. This was confirmed in a study of teat spraying in 2013 (1). It was suggested that an automatic system would remove this variation and apply disinfectant more consistently. In this study Locate'n'Spray™ automated teat spray devices were installed at six stalls on a 60 point rotary parlour. Between June and the beginning of August 2014 an observation and evaluation study was carried out by The Dairy Group over 12 milkings, using six different spray timing regimes.

The objective was to assess teat barrel and teat end coverage.

### EVALUATION METHOD

Teat barrel and teat end coverage were assessed post application of the teat disinfectant product, using the system described in 2013 (1).

The spray duration regimes evaluated were:

➤ 0.5 seconds	➤ 1.0 second
➤ 0.75 seconds	➤ 1.0 second given in two pulses, each of 0.5 seconds with a 4 second interval (double hit)
➤ 1.5 seconds	➤ 1.5 seconds given in two pulses, each of 0.75 seconds with a 4 second interval ((double hit)

The spray duration regimes were set randomly.

The aim was to obtain teat coverage scores for each spray regime for at least 100 cows. Due to herd size of around 550 cows in milk, and 10% of stalls having the automatic spray system installed, the evaluation was carried out at the afternoon and the following morning milking. Due to the seasonal calving pattern, the number of cows in milk for the 0.75 second spray duration was less than other regimes.

### RESULTS

**Table 1. Teat end and teat barrel coverage**

	Average Number - Teat end coverage	Number for No teat end coverage	Number of missing quarters	Average % for Left teats	Average % for Right teats	Average % for Rear teats	Average % for Front teats	Average % for All teats
0.5 seconds	3.84	15	1	60.55	63.13	64.48	59.15	61.83
0.75 seconds	3.87	8	0	73.63	68.43	71.05	71.01	71.03
1.0 seconds	3.89	11	0	86.54	86.59	83.23	89.90	86.57
1.5 seconds	3.92	8	0	91.05	90.58	90.60	91.03	90.81
2 x 0.5 seconds	4.00	0	0	89.58	88.24	87.48	90.35	88.91
2 x 0.75 seconds	3.94	6	0	89.35	88.44	88.22	89.57	88.89
<b>STUDY AVERAGE</b>	<b>3.91</b>	<b>8.00</b>	<b>0.17</b>	<b>81.78</b>	<b>80.90</b>	<b>80.84</b>	<b>81.83</b>	<b>81.34</b>
Minimum	3.84	0.00	0.00	60.55	63.13	64.48	59.15	61.83
Maximum	4.00	15.00	1.00	91.05	90.58	90.60	91.03	90.81

An average of 3.91 teat ends (97.8%) was "hit" with disinfectant. This compares favourably with the average teat end "hit" of 3.77 (94.3%) with manual teat spraying (1). For all spray time regimes, teat end "hits" were higher than the average for hand operated vacuum sprayers.

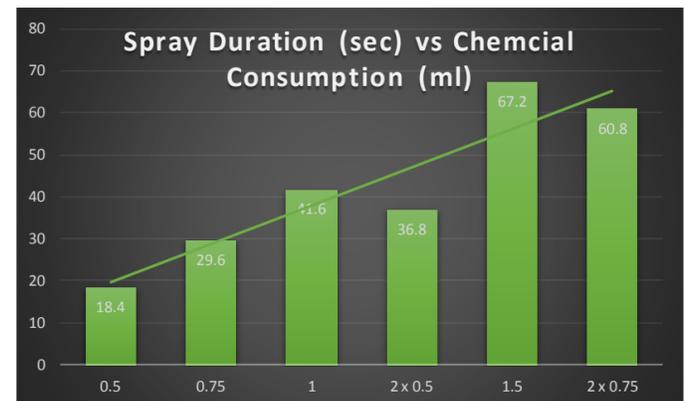
There was no difference in teat barrel coverage between left and right teats within any spray time regime, except for the 0.75 seconds single spray (identified as a problem with the air compressor). Comparing data with the 2013 manual teat spraying results, the 0.5 second spray pattern (lowest coverage in this study) gave 22% greater teat barrel coverage (61.8% v 50.3%).

The highest teat barrel coverage by manual spraying obtained in 2013 was 83.37% which is similar to the result for the 1.0 second spray regime.

In this study, with the exception of the 0.5 second regime, teat barrel coverage was either similar or slightly less on rear teats than front teats, due to the position of larger cows in the stall (no cows stood back in the stall for the 0.5 second regime), and is in contrast to the 2013 study. The coverage of the front plane of all teats was double that of the manual spraying study where coverage on average was only 42%, and was particularly poor where cows stood at 90° to the operator.

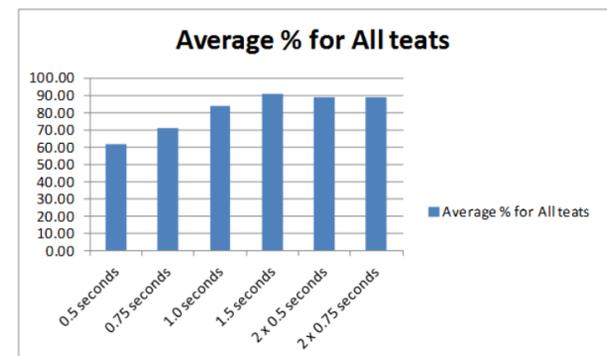
The volume of teat disinfectant used for each spray regime is given in Figure 1. Due to the mechanism in which the spray is generated, the volume of chemical used cannot be extrapolated between each regime. However, as expected, there is a broad linear correlation between duration and volume (Figure 1).

**Figure 1. Relationship between spray duration and volume of disinfectant used**



A comparison of the results of the 2013 manual and the 2014 automatic teat spraying studies indicates a greater amount of chemical is used with all time regimes for the automatic system compared to the average for manual spraying. However, there is uniformity and consistency with automation in teat barrel coverage (figure 2) and teat end coverage. This is a significant improvement on manual teat spraying. Within any one automatic spray regime the maximum variation in barrel coverage between front and rear teats and left and right teats was 6.7% and 5.2%, respectively. There was only a 4.0% difference in teat end coverage, but in contrast, the variation for manual spraying was 15.8%.

**Figure 2. Average teat barrel coverage by spray regime**



### CONCLUSION

This study indicates that an automatic spray system can achieve the aim of applying disinfectant consistently with acceptable levels of coverage, with a minimum of 96% of teat ends and between 61.8% and 90.8% of teat barrels covered (depending on spray duration).

Therefore the automation of Locate'n'Spray™ provides a level of process control which delivers consistently superior teat coverage and consistently higher teat end hit rates compared with manual spraying. The associated benefit of time saving in the parlour allows better targeting of labour, benefiting udder health and milking management, but partly offset by higher chemical consumption.

### REFERENCE

Pocknee, B.R., Thornber N., Kingston C., Hiley R., May R., Cinderey M. and Carlsson A. (2013). Effectiveness of teat coverage with post milking teat disinfectant using a vacuum operated teat spray system. Proceedings of the British Mastitis Conference, Worcester, 2013, pp 45-46.