

# Decontamination of non-critical vessels used for patients in ward by small dishwasher

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## BACKGROUND

In most smaller healthcare facilities in Japan, reusable small noncritical vessels used in wards are usually immersed in hypochlorite solution for reuse. However, most occasion residual air remains in the vessels are likely to result in the ineffective decontamination. In this study the cleaning effects of a domestic dishwasher for those items were examined.



Figure 1  
Dish washer(NP-TR5® Panasonic)

## OBJECTIVE

This study examines the effect of the decontamination by a domestic dishwasher as the noncritical small vessels.

## METHODS

- The temperature of the dishwasher was measured every five seconds by a data logger with eight channels (GL220-UM-801®, Graphtec). The test vessels with *Enterococcus faecalis* JCM5803 ca.10<sup>7</sup> CFU dried were employed in the decontamination test of the washer without detergent. Each test vessel was soaked in the phosphate buffer to recover the residual *E. faecalis* and the recovery liquid was cultured on a tryptic soy agar at 30°C, for 48 hours.
- Polypropylene test pieces (14 × 70mm) and reusable vessels smeared and dried with 50μL of test soil(Artificial TEST SOIL®, Health Mark) including hemoglobin 670μg/mL were also employed for the test. It was used in an enzyme detergent of low foam (deconex®POWER ZYME®Borer ChemieAG).
- The effectiveness of decontamination was evaluated by a hemoglobin indicator (HemoCheck-s®, PEREG GmbH). The results were evaluated by color reactions in twelve steps.

## RESULTS

Results are shown in Table 1 and Figure 2 to 7.

Table 1. The Bacterial Counts on the Vessels.

Vessels	Before washing(CFU)	After washing(CFU)
Cap of pet bottle	$6.3 \times 10^7$	0
		1
		0
		0
		1
Pet bottle	$8.5 \times 10^7$	0
		0
		1
Cap (blue)	Not experiment	0
Film case	Not experiment	0
		0
		0

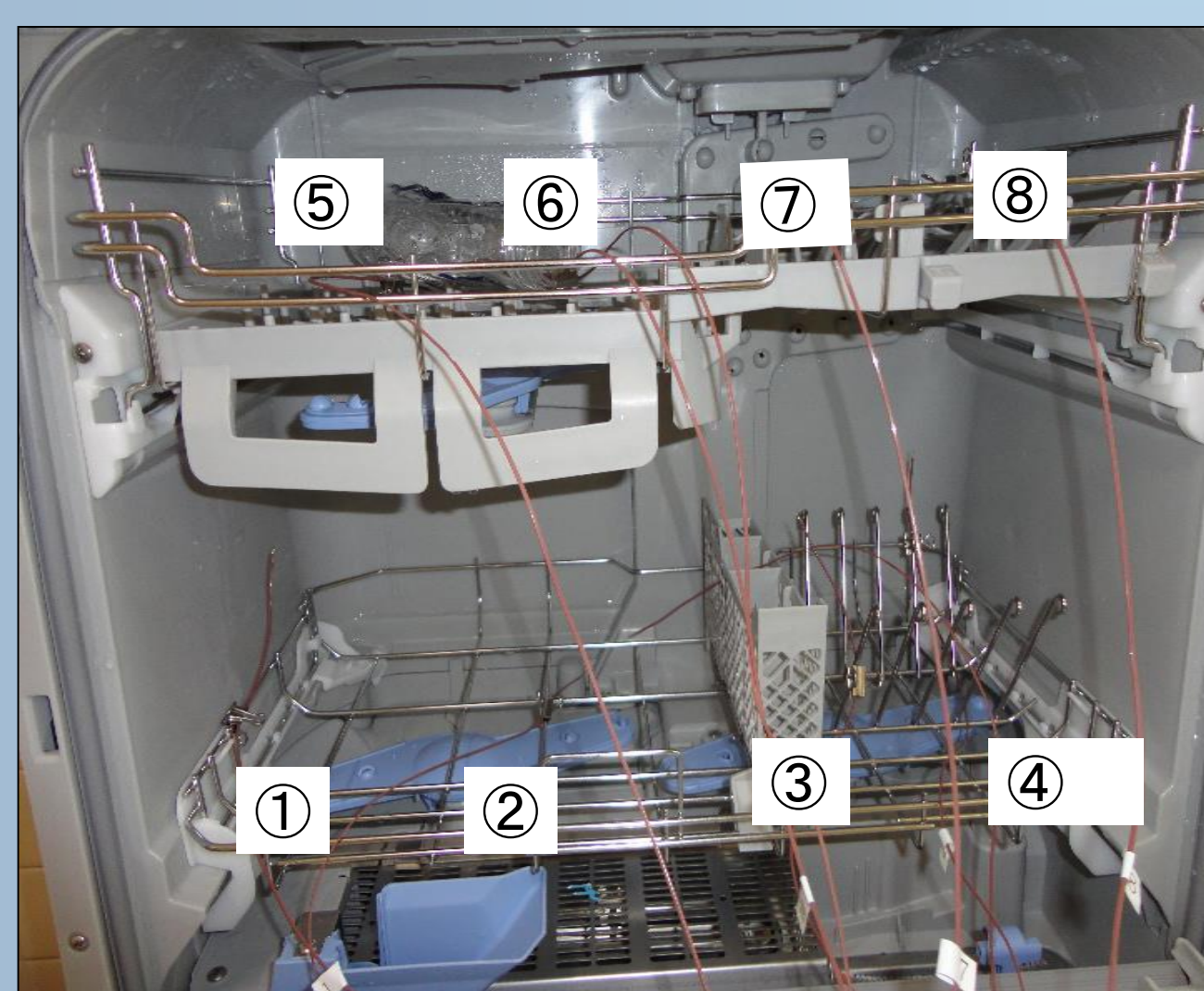


Figure 2. The Temperature of the Cleaning Process Inside the Dishwasher  
Eight sensor tips were positioned on the different places.



Figure 3. Layout Diagram of the Test Piece  
The test pieces smeared with the ATS of the upper and lower inside and were measured the residual hemoglobin after the washing.

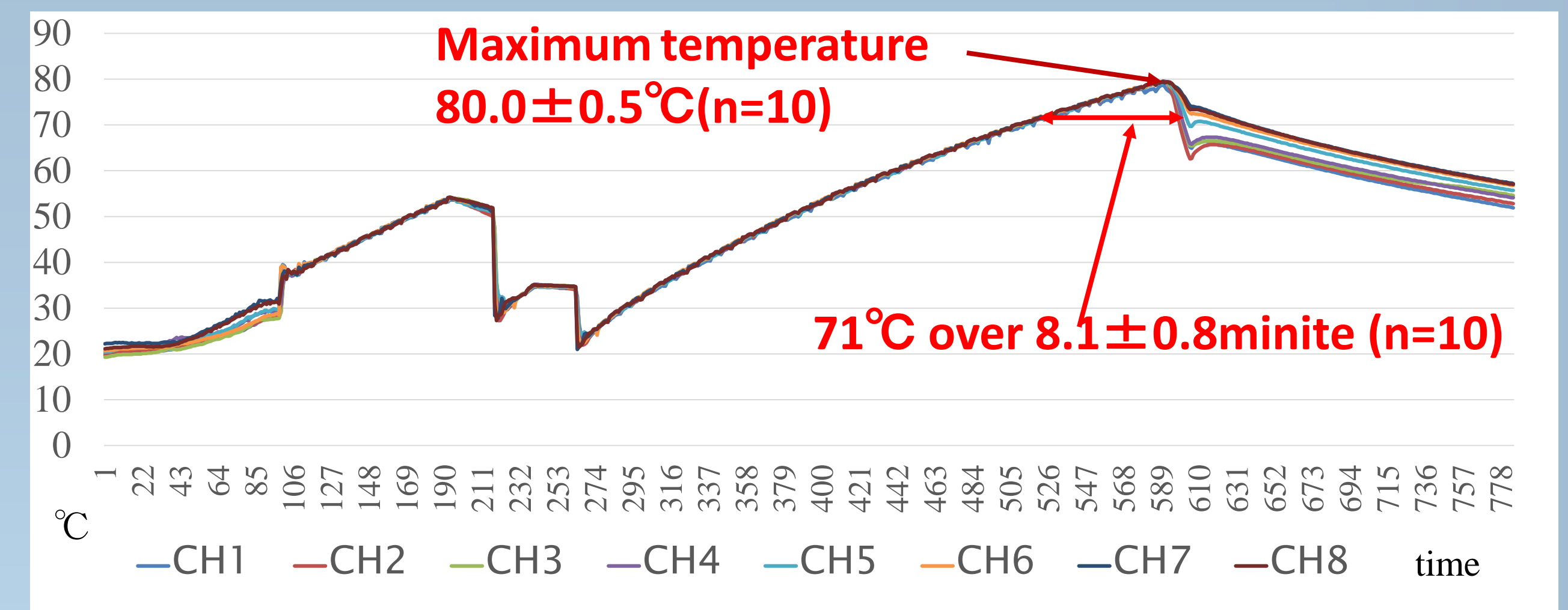


Figure 4. The Temperature Changes of Cleaning Process in the Dishwasher

This figure shows one of the ten times of tests.  
Mean time over 71°C : 8.1 ± 0.8min.  
Maximum temperature of ten times of tests : 80 ± 0.5°C

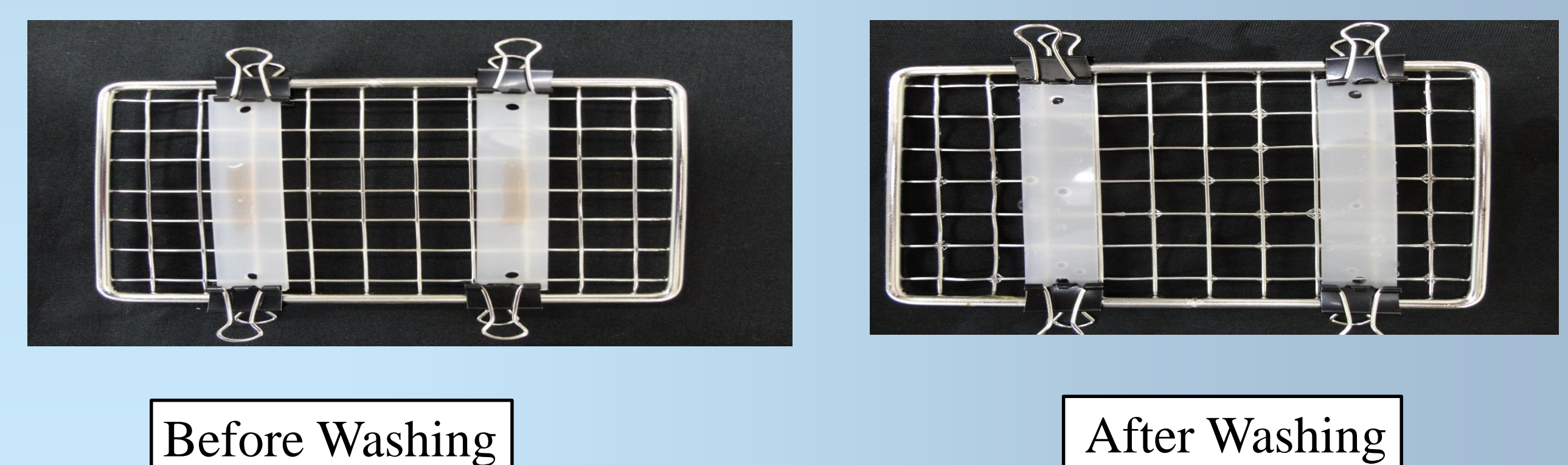


Figure 5. The Cleaning Effect

After the washing, there was no residues visually.

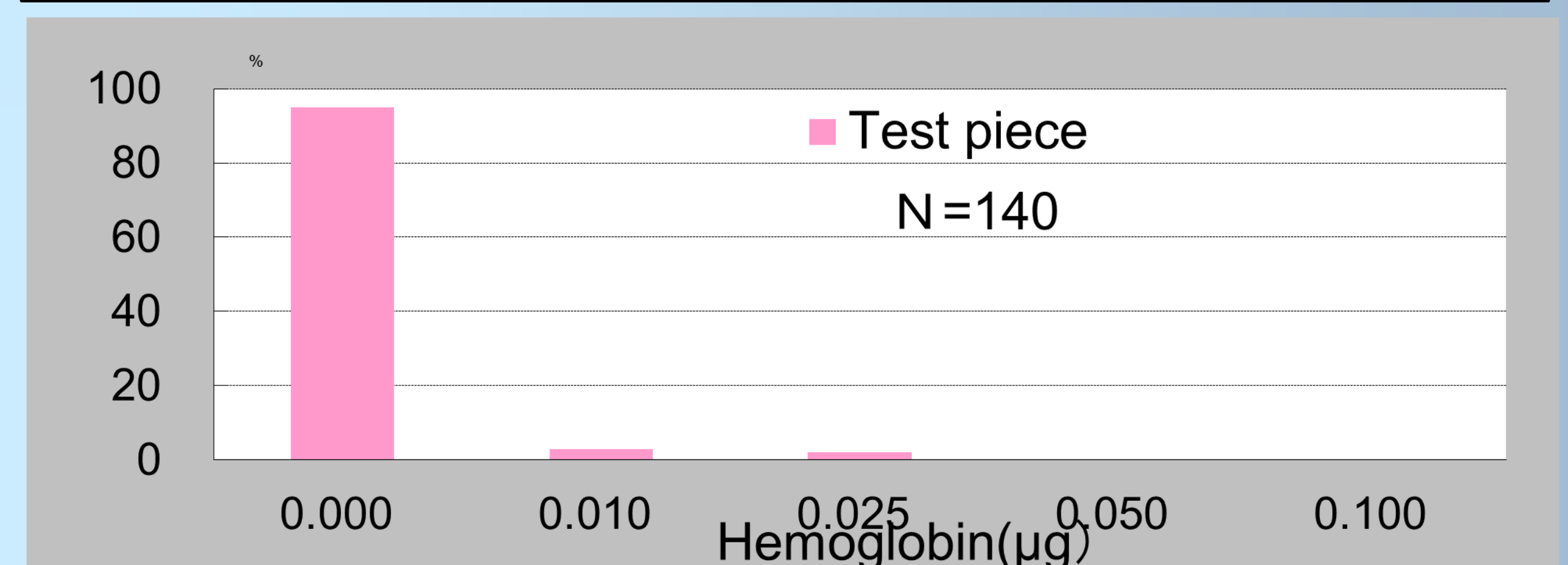


Figure 6. The Residual Hemoglobin on the Test Pieces

Despite the direction of the water flow in the washing machine, in the residual hemoglobin measurement, the 95% of test pieces showed none of hemoglobin.

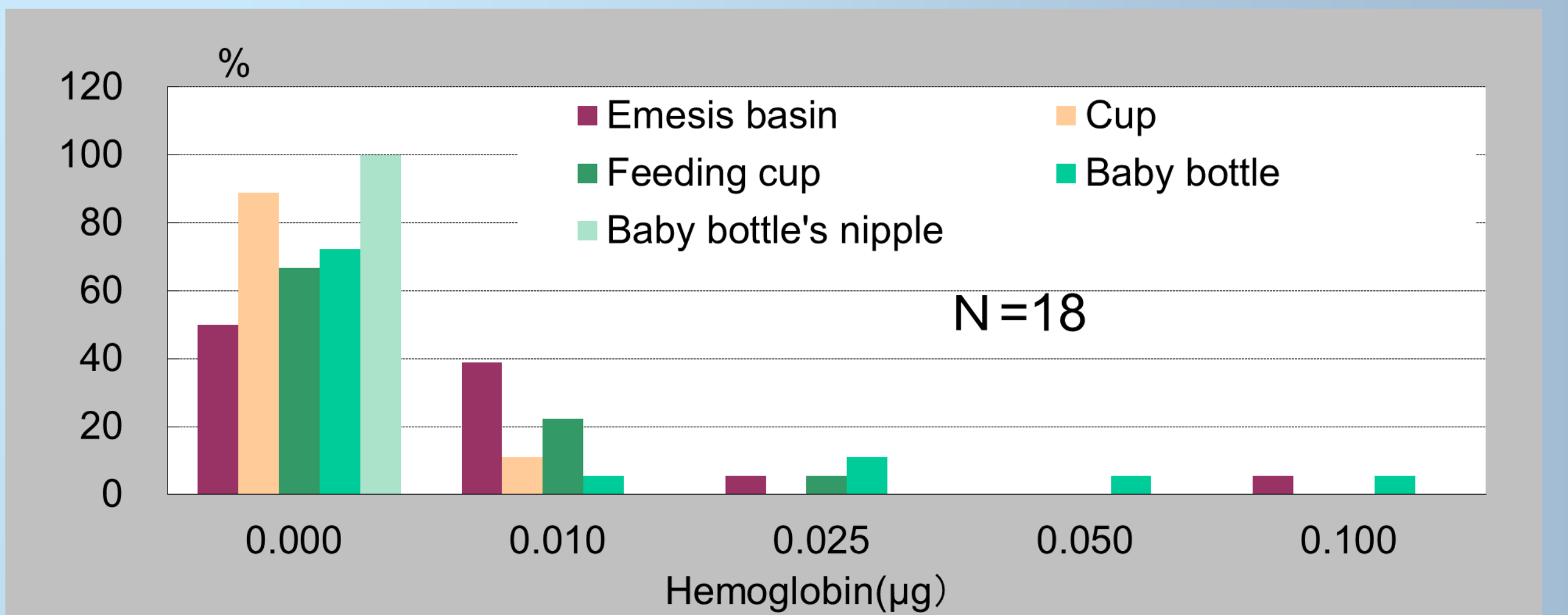


Figure 7. The Residual Hemoglobin After the Cleaning

All the baby bottle's nipples (N=18), 88.9% (n=16/N=18) of the cups, 66.7% (n=12/N=18) of the intricately-shaped feeding cup, and 72.2% (n=13/N=18) of the baby bottles became negative.

## CONCLUSIONS

The results demonstrated that even an inexpensive dishwasher is a fully effective equipment in a washing treatment. The temperature in the dishwasher exceeded 71°C for over three minutes, which is the recommended temperature and length of disinfection in the United Kingdom. The bacteria count on the vessels drastically decreased by more than 6 log<sub>10</sub>. Although blood contamination on reusable vessels is not frequently observed, the strict condition measuring residual hemoglobin in this study revealed that a dishwasher is a good enough equipment in a washing treatment.

The dishwasher examined in this study which is used routinely in home kitchen was found to be an effective device to disinfect reusable vessels in the ward. However, a further investigation is necessary to assure the effect on more intricately-shaped vessels by means of examining an optimal washing program.