

Monitoring of hygiene in institutional kitchens in Belgium

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INTRODUCTION

Good hygiene in institutional kitchens is essential for the prevention of foodborne illness. Respecting the basic rules of hygiene is the basis to guarantee safety in this sector where many steps are manual and different equipment is used.

To have a better understanding of the hygiene situation and problems, critical food contact surfaces and hand contact in institutional kitchens were monitored with classic microbiology.

These results will be compared in a later stage with metagenomics of the same samples (results not shown).

MATERIALS AND METHODS

40 kitchens

- 10 hospitals
- 10 schools
- 10 retirement homes
- 10 daycares

➔ 589 surfaces sampled



Sampling method

- New pair of gloves before every surface
- Swab using moistened cotton pad
- Repeated swab with dry cotton pad
- Checklist of 36 questions regards to food handler's practices and hygiene conditions



Parameters

- Total aerobic count
- Enterobacteriaceae
- *Bacillus cereus*
- *Escherichia coli*
- *Staphylococcus aureus*

Surfaces: hands, cutting knives, cutting boards, ladles, workbenches, trays and extras (whisks, strainers, blenders or cutting machines)

Always sampled before and after cleaning

Also sinks and aprons

RESULTS

Table 1: Descriptive values for total mesophilic aerobic microorganisms counts on swab samples of surfaces before cleaning.

Surface	Positive (%)	log CFU/20 cm ²
Hands	40 (100)	3.4 ± 1.0
Cutting Knife	37 (95)	2.3 - 4.0 - 5.0
Cutting Board	31 (100)	2.5 - 3.8 - 5.2
Ladle	33 (87)	2.3 ± 1.3
Worktable	39 (100)	2.0 - 3.3 - 4.3
Tray	30 (94)	1.8 - 2.2 - 2.8
Extra	31 (89)	1.9 - 3.0 - 5.2
Sink	40 (100)	4.0 ± 1.5
Apron	30 (97)	2.4 ± 0.9

Table 2: Descriptive values for total mesophilic aerobic microorganisms counts on swab samples of surfaces after cleaning.

Surface	Positive (%)	log CFU/20 cm ²
Hands	40 (100)	2.9 ± 1.1
Cutting Knife	33 (83)	2.7 ± 1.5
Cutting Board	38 (100)	1.7 - 2.1 - 3.6
Ladle	36 (97)	1.4 - 2.2 - 3.0
Worktable	36 (92)	3.1 ± 1.6
Tray	35 (100)	2.3 ± 1.0
Extra	38 (78)	2.6 ± 1.3

Mean and standard deviation are given for normally distributed counts. First quartile, median and third quartile are given for not normally distributed counts.

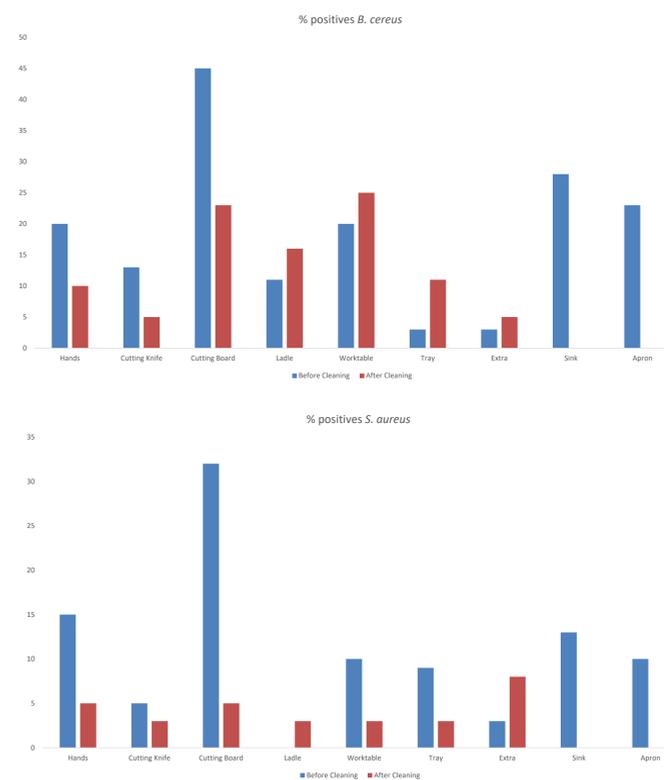


Fig 1: Percentages of surfaces with counts for *B. cereus*, before and after cleaning.

Fig 2: Percentages of surfaces with counts for *S. aureus*, before and after cleaning.

CONCLUSIONS

- Remarkably, used cutting knives and –boards had highest counts for total mesophilic aerobic microorganisms and were comparable with sinks; highest reduction was also obtained after cleaning.
- Cleaned worktables had highest counts for total mesophilic aerobic microorganisms of cleaned surfaces. Also lowest reduction after cleaning.
- Ladles, worktables, trays and extra's, more samples tested positive for *B. cereus* after cleaning than before cleaning. For ladles and the extra's, same situation for *S. aureus*.
- 45% of worktables and 33% of cutting boards still test positive for Enterobacteriaceae after cleaning.
- Hygiene score lowest in day cares.

Table 3: Hygiene scoring (based on checklist) of kitchens per sector (maximum score = 36).

Sector	N	Score
Hospitals	10	28.8 - 30.4 - 32.0
Schools	10	29.3 - 31.7 - 34.2
Retirement homes	10	30.1 - 30.5 - 32.4
Day cares	10	24.4 - 26.8 - 28.5

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