

Assessment of microbiological contamination in different catering units related in food handling in the district of Bragança

Salgado A^{1*}, Cunha J^{1*}, Abreu J^{1*}, Barros P⁴, Pires B², Nogueira A^{1,3}, Afonso A²

¹Department of Therapeutic and Diagnostic Technologies, Polytechnic Institute of Bragança (IPB), Bragança, Portugal; ²Public Health Laboratory of Bragança (PHLB), Bragança, Portugal; ³Department of Veterinary Sciences, University of Trás-os-Montes and Alto Douro (UTAD), Vila Real, Portugal; ⁴Clinical Pathology Laboratory, Hospital of Bragança, Portugal; * The authors had the same contribution in this work

INTRODUCTION: Microbial contamination of food is a major public health problem since it affects millions of people worldwide. Unproved hygiene practices within the food processing environment can cause the contamination with pathogenic particles, turning food into a risk for the safety of the consumers. For the assessment of the hygienic conditions related to food handling is essential to know the sanitary conditions of the establishments since that can reduce the risks of food contamination. Those food contaminations can cause severe problems to the consumer's health.

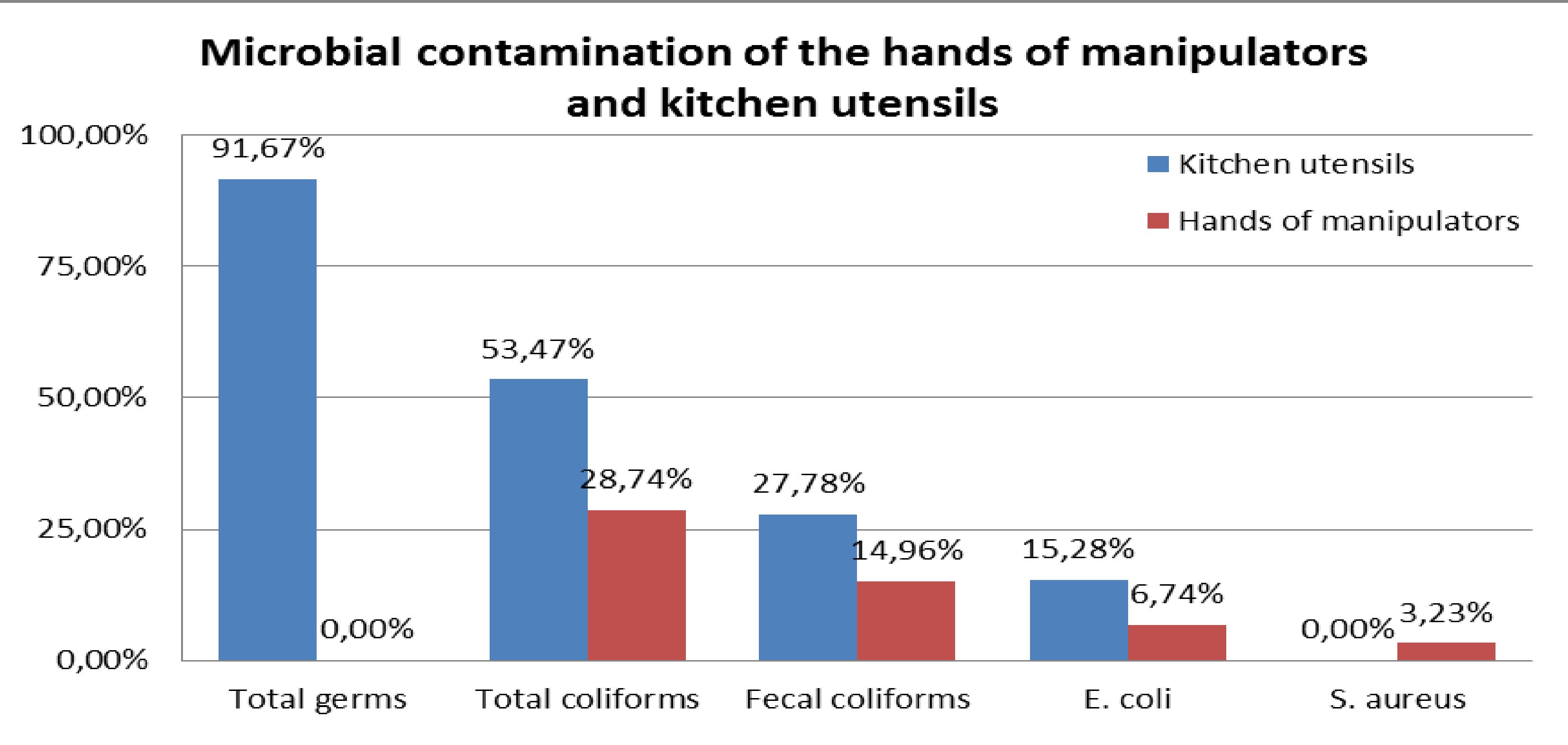
OBJECTIVES: Assessment of microbial contamination in the materials and hands of food handlers in different restoration units in the district of Bragança.

MATERIALS AND METHODS: Microbiological assessment of the following microorganisms: *Staphylococcus aureus*, total and fecal coliforms and *Escherichia coli* in the hands of food handlers, and analysis of total germs, total and fecal coliforms and *Escherichia coli* in handling utensils in different restoration units in the district of Bragança, analyzed in the Public Health Laboratory of Bragança, in the period between January and December 2013. For the statistical analysis plan the program of Microsoft Office Excel 2007 was used.

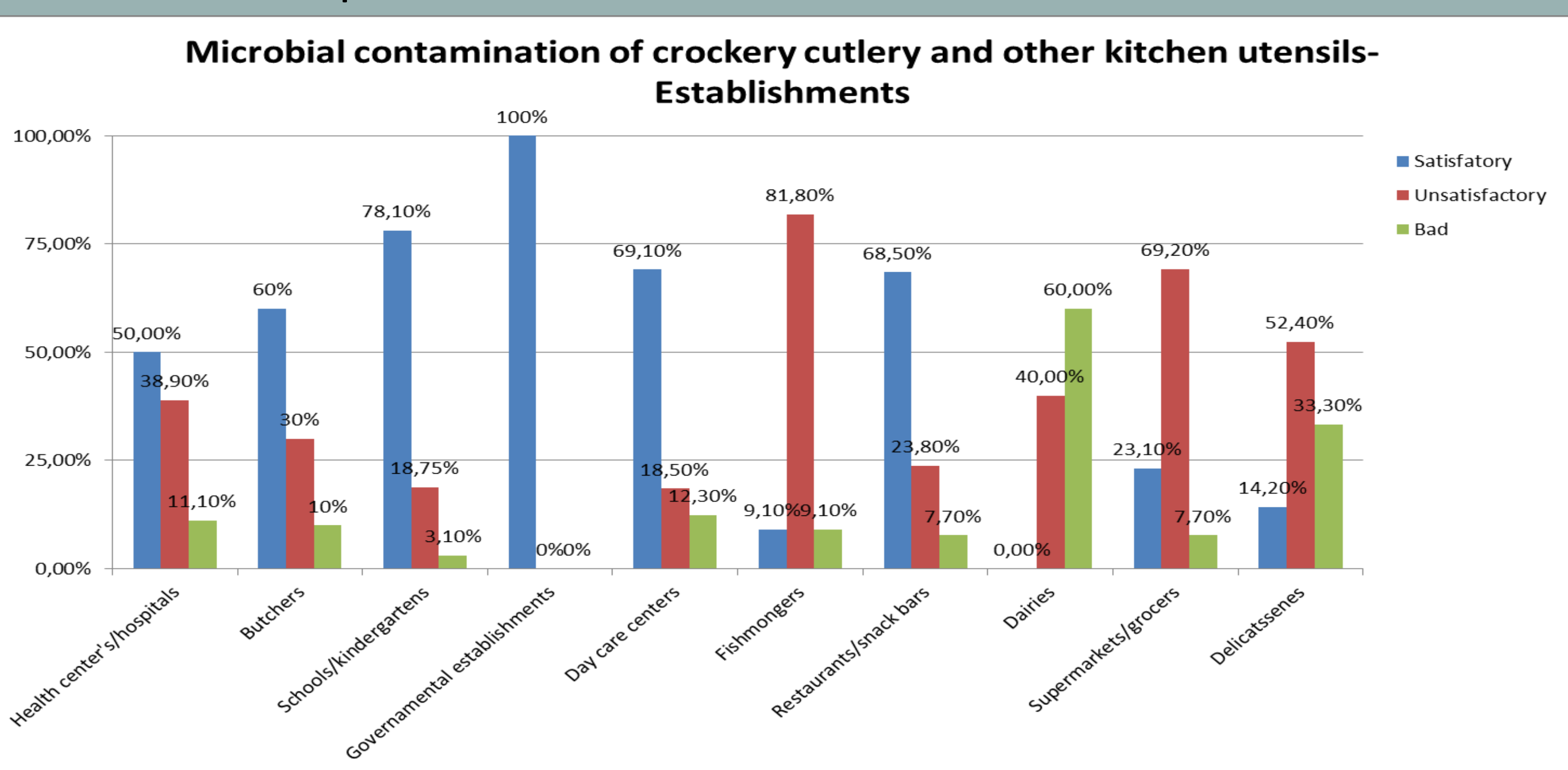
RESULTS AND DISCUSSION: Regarding the hands of manipulators, 53.67% of the cases showed contamination. Data analysis of hands samples showed 28.74% of total coliform, 14.96% of fecal coliforms, 3.23% of *Staphylococcus aureus* and 6.74% of *E. coli*. The contamination of crockery, cutlery and other kitchen utensils, was confirmed in 28.80% of the samples, with "unsatisfactory" results and 10.87% with "bad" results. These contaminations stand out 91.67% of the samples with the presence of total germs, 53.47% with total coliforms, 27.78% with fecal coliforms and 15.28% with *E. coli*. It was also found that 60.33% of the samples had "satisfactory" results (Graph 1).

Regarding the hands of manipulators, the data analysis showed that the highest "satisfactory" results were from governmental establishments (100%), the highest "unsatisfactory" results were from dairies (88.9%). As for the contamination of crockery and kitchen utensils, the highest "satisfactory" results were from governmental establishments (100%), the highest "unsatisfactory" results were from fishmongers (81.8%), and the highest "bad" results were from dairies (60%) (Graph 2).

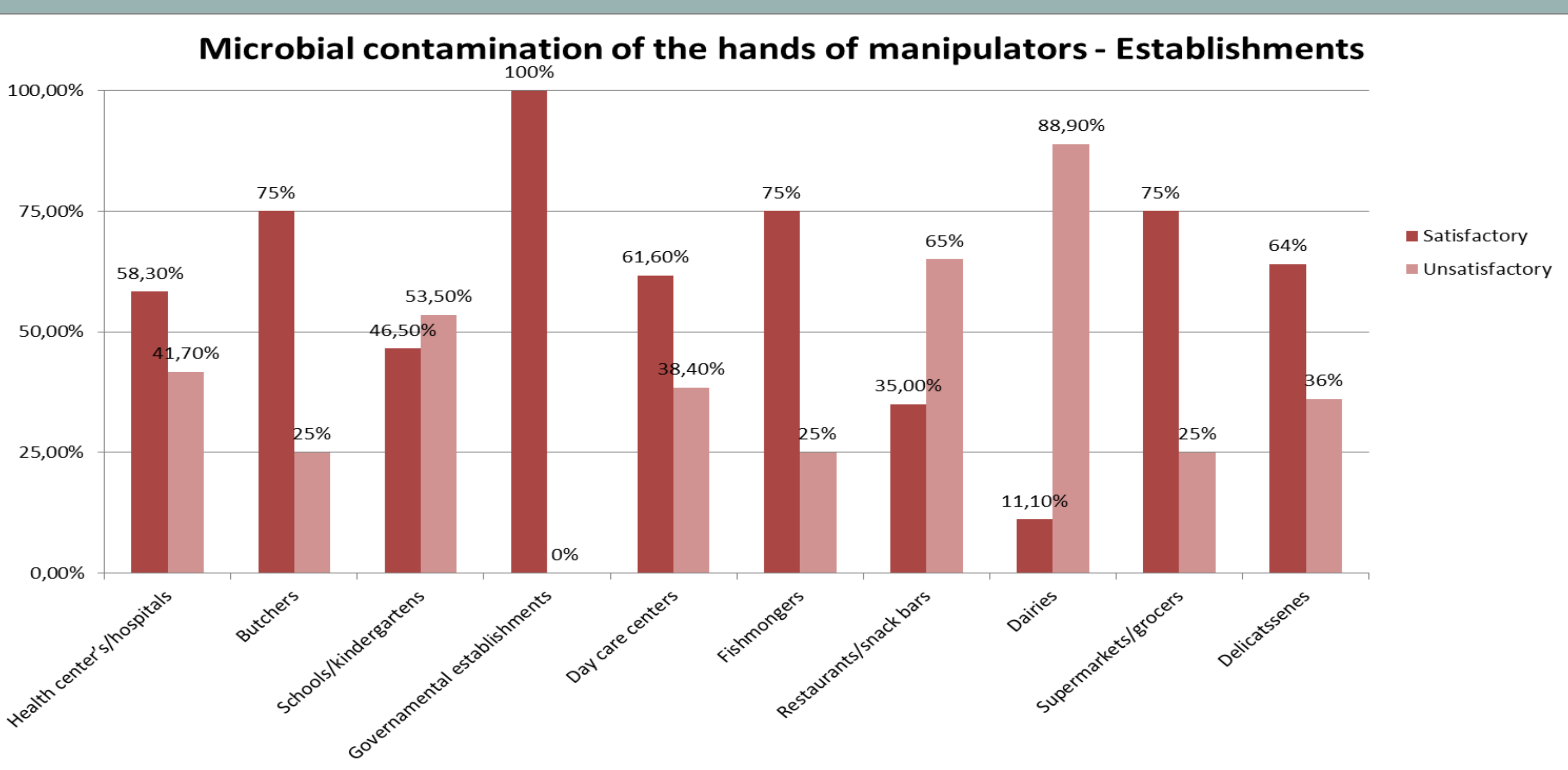
Regarding the hands of manipulators, the city of the district with the highest "satisfactory" results was Bragança (73%) and the city with the highest "unsatisfactory" results was Vimioso (83%). As for the contamination of crockery and kitchen utensils, the highest "satisfactory" results were from Vimioso and Macedo de Cavaleiros (100% for both), the highest "unsatisfactory" results were from Bragança (46.9%) as for the highest "bad" results (31.25%), (Graph 3).



Graph 1: Evaluation of microbial contamination in the 2013



Graph 2: Evaluation of microbial contamination of crockery cutlery and other kitchen utensils in Establishments in the 2013



Graph 3: Evaluation of microbial contamination of the hands of manipulators in establishments in the 2013

CONCLUSION: We conclude that food handler contamination is the main cause of bad hygiene in the food manipulation. The hygiene of the crockery, cutlery and other kitchen utensils used in food manipulation was better, however it have some levels of contamination.

REFERENCES:

- SCHELIN J, WALLIN-CARLQUIST N, COHN MT, LINDQVIST R, BARKER GC, RÅDSTRÖM P. (2011). The formation of *Staphylococcus aureus* enterotoxin in food environments and advances in risk assessment (Virulence), 2 (6), (580-592).
- QUINLAN J. J. (2013). Foodborne Illness Incidence Rates and Food Safety Risks for Populations of Low Socioeconomic Status and Minority Race/Ethnicity: A Review of the Literature (International Journal of Environmental Research and Public Health), 10, (3645-3652).
- MCMEKIN T. A., HILL C., WAGNER M., DAHL A., ROSS T. (2010). Ecophysiology of food-borne pathogens: Essential knowledge to improve food safety. (International Journal of Food Microbiology), 139, (S64-S78).
- SEUNG-HEE R., JIP-HO L., SANG-HOON P., MI-OK S., SUN-HEE P., HYO-WON J., GEON-YONG P., SUNG-MIN C., MOO-SANG K., YOUNG-ZOO C., SEONG-GEE P., YOUNG-KI L. (2012). Antimicrobial resistance profiles among *Escherichia coli* strains isolated from commercial and cooked foods. (International Journal of Food Microbiology), 159, (263-266).