Microbiological Contamination of Domestic Kitchen Dishcloths

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Introduction

As a result of unsafe food handling practices implemented by consumers[1,2], the domestic kitchen is widely accepted to be responsible for the transmission of foodborne pathogens and a frequent source of foodborne illness[3,4].

Items such as dishcloths and sponges are commonly utilised by consumers to implement 'cleaning' tasks including washing dishes and equipment or wiping food-contact surfaces; however, dishcloths are recognised as reservoirs for microorganisms and can contribute to the contamination of the domestic kitchen by transferring pathogens to food-contact surfaces and equipment[5].

To reduce such associated risks, consumers are advised to regularly wash or replace their dishcloths[6]. However, data suggest consumers may use dishcloths for prolong periods[7]. Consequently, there is a need to determine the microbiological contamination and the associated practices of in-use domestic kitchen dishcloths.

Research Aim

The aim of the study was to determine the microbiological contamination of 'in-use' domestic kitchen dishcloths and ascertain any association between self-reported practices relating to dishcloth usage and microbiological contamination.

Methods

In-use dishcloths (*n*=187) were collected from participants of a parallel study conducted at the Cardiff School of Health Sciences.

Self-reported practices relating to the usage, replacement and type of dishcloth were recorded using a domestic kitchen survey.

Data was entered into a specifically designed Microsoft Access 2010 database, statistical analysis was conducted using Microsoft Excel 2010 and IBM SPSS Statistics 20.

Results

Types of dishcloths included cotton cloths, sponges and disposable j-cloths, no statistical differences were determined between dishcloth type and microbiological contamination ($p > 0.05$).

Of the sampled dishcloths, 51% were single-use (used for one day only) and 49% were repeated-use (average 15 days usage, maximum 6 months usage). Of those participants reporting that dishcloths would be subject to repeated-use, the majority (72%) also indicated that they would be utilised for multiple task, i.e. washing dishes and wiping surfaces.

Majority of dishcloths (97%) were found to be contaminated with one or more of the target pathogens. ACCs were most frequently isolated (92%), whilst *S. aureus* was isolated on only 8% of dishcloths and *L. monocytogenes* was not isolated on any dishcloths. As indicated in Figure 1, a significantly greater percentage ($p < 0.001$) of repeated-use dishcloths (90%) were contaminated with *Enterobacteriaceae* than single-use (61%).

Figure 1: Percentage of domestic dishcloths contaminated

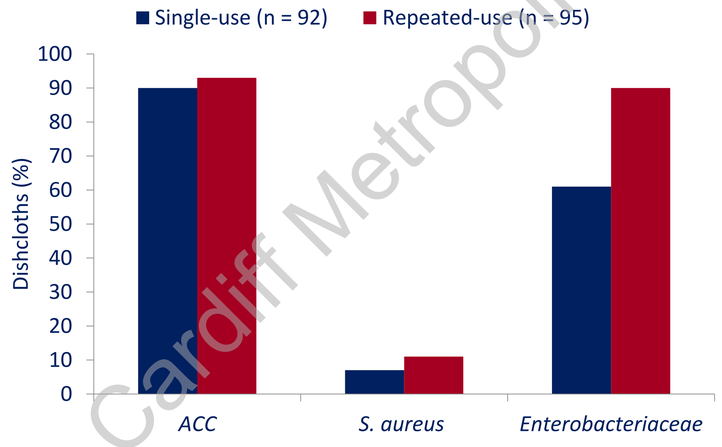
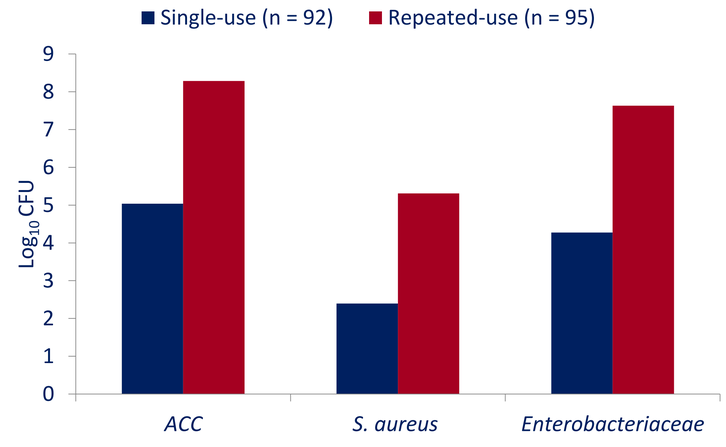


Figure 2: Pathogen contamination of domestic dishcloths



Although, as illustrated in Figure 1, the percentage of dishcloths contaminated with ACCs and *S. aureus* was not statistical different between single-use and repeated-use dishcloths ($p > 0.05$); it can be seen in Figure 2 that the average contamination levels for the two most frequently isolated pathogens were determined to differ significantly between single-use and repeated-use dishcloths ($p < 0.001$), with the mean contamination of repeated-use dishcloths (8.3 $\log_{10}$ CFU ACC, and 7.6 $\log_{10}$ CFU *Enterobacteriaceae*) being greater than that of single-use dishcloths (5.05 $\log_{10}$ CFU ACC and 4.27 $\log_{10}$ CFU *Enterobacteriaceae*).

Conclusion

- Findings increases our knowledge of not only consumer practices relating to dishcloth hygiene but also of the microbiological contamination of in-use dishcloths, both of which may indicate that consumer practices have implications for domestic food safety.
- This study determines that many consumers fail to adhere to recommendations relating to dishcloth hygiene and report to use dishcloths for prolonged lengths, which consequently results in significantly greater levels of microbial contamination.
- Future food safety initiatives should aim to increase consumer knowledge of the risks posed by domestic dishcloths and encourage that consumers wash or replace dishcloths daily to reduce the associated risks.

References

1. Redmond, E. C., and C. J. Griffith. 2003. Consumer Food Handling in the Home: A Review of Food Safety Studies. *J. Food Prot.* 66:130-161.
2. Scott, E. 2003. Food safety and foodborne disease in homes of the 21st century. *Can. J. Infect. Dis.* 14:277 - 280.
3. FSA. Date, 2000, Foodborne Disease: Developing a strategy to deliver the agency's targets. Paper FSA 00/05/02. Available at: http://www.food.gov.uk/multimedia/pdfs/board/fsa-00-05-02.pdf Accessed 24th October 2013.
4. Gorman, R., Bloomfield, S. and Adley, C.C. (2002) A study of cross-contamination of food-borne pathogens in the domestic kitchen in the Republic of Ireland. *International Journal of Food Microbiology* **76**, 143-150.
5. Hilton, A.C. and Austin, E. (2000) The kitchen dishcloth as a source of and vehicle for foodborne pathogens in a domestic setting. *Int J Environ Health Res* **10**, 257-261.
6. Food Standards Agency (2013) Food Safety Week 2013 Campaign: Kitchen Check. Available at: http://food.gov.uk/news-updates/campaigns/kitchen-check Accessed 10th June 2013
7. Food Standards Agency (2004) Microbiological risk factors associated with the domestic handling of meat. Project B02016 Available at: http://food.gov.uk/science/research/foodborneillness/microriskresearch/b13programme/b13list/b02016/#.Uz68bqhdV8E Accessed 4th April 2014