



Assessing the Knowledge on Microbiological Quality of Kitchens Sponges Used among the Home Maker in the Households

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ABSTARCT

Background: Domestic environment, in particular, kitchen setting is a well-established source of microbial contamination. Kitchen sponges represent an important vehicle of microbial transmission and maintenance of spoilage bacteria and pathogenic strains responsible for food borne diseases. Many studies reported that women in household adopt of poor practices in kitchen regarding food hygiene, handling of kitchen cleaning equipments and food safety. Aim: The aim of this current study was to evaluate the household knowledge, practice and attitude on usage of kitchen sponges' and microbial contamination. Methods & Material: A total of 100 volunteers were participated and collected the data through unstructured questionnaire about 'in-use' kitchen sponges, improving the knowledge on their role in cross-contamination in domestic environment. Results: 36% of them share washing sponges with another member, 6% of them use the sponge more than 2 months, 52% of them said not received any sun ray on sponges and 48% of them not use separate sponges for cleaning oily and non- oily utensils. Results confirm the potential role of kitchen sponges as vehicle for food-borne pathogens. Conclusion: It is observed that high the necessity to improve a proper education of the consumers on the effective treatment to reduce their microbial loads.

Key words: kitchen sponges, cross -contamination, knowledge, Microorganism.

INTRODUCTION

Kitchen sponges are one of the main cleaning tools used to clean kitchen utensils and surfaces such as kitchen utensils cutting boards, sinks, oven tops and refrigerators. However, during cleaning food residues may adhere to the sponge surface and damp sites such as sink areas can act as further microbial reservoirs that can contaminate the sponges during their use. Subsequent poor handling, storage or improper disinfection of kitchen sponges will lead to further microbial growth at room temperature. Consequently, kitchen sponges are a major source of cross- contamination as they can transmit food borne pathogens, infectious agents and spoilage causing microorganisms to food contact surfaces.

In the last few years, many studies indicate that several food-borne diseases are related to domestic infection sources (EFSA, 2015). Improper food handling and un-hygienic practices are considered the major factors in foodborne illness episodes. Cross-contamination in household kitchens represent another most important domestic source of infection (Azevedo *et al.*, 2014). However, consumers risk perception of food borne illness in home environment is reported as very low (European Commission, 2016). Kitchens are included among the most contaminated domestic environments, even more of some bath's areas (toilette seat, door knob, light switch, toilet handle) or commonly used objects such as pen, keys, cellular phone, keyboards, etc. (Donofrio *et al.*, 2012). Furthermore, 37.3% of food borne outbreaks which happen in EU at 2014, founded their infection sources in home environments (EFSA, 2015). This evidence is confirmed by the frequent isolation of food-borne pathogens in tools, cloths, towels, sponges and kitchen surfaces (Mattick *et al.*, 2003). Among these, dish sponges were the most contaminated item in the household, and deserve great attention, for their potential role as vehicle for foodborne pathogens (Donofrio *et al.*, 2012). Their role as microbiological hot spots in domestic settings was recently well established (Cardinale *et al.*, 2017). They are, indeed, frequently used not only to clean dishes and cookware but also, different surfaces or even refrigerators, shelves, which increasing the risk of cross-contamination (Catellani *et al.*, 2014). The large surface/volume ratio, their constant humidity and the nutrients for bacterial growth contained sponges are indeed and an ideal habitat for microorganisms (Cardinale *et al.*, 2017). Several authors have investigated the microbiological quality of sponges used in domestic kitchens, reported that a high-level contamination and the frequent isolation of pathogens, such as *Salmonella* spp., *Staphylococcus aureus*, *Campylobacter* spp. and *Listeria monocytogenes* (Hilton and Austin, 2000).

These findings encourage much more concern, considering that common dishwashing soaps or chemical compounds do not reduce significantly microbial load in kitchen sponges (Sharma *et al.*, 2009). Moreover, multi-drug resistance bacteria were common in household's environment, and no significant differences were noted between biocide users and non-users; as well as the frequency of pathogen recovery (Marshall *et al.*, 2012). Among this, ESBLs (Extended Spectrum Beta Lactamase) are a group of evolving enzymes that are able to hydrolyze extended spectrum cephalosporin. ESBL producing enterobacteria are a wide range of resistant strains that have gained much more importance in public health in the recent years. Infections due to ESBL producers range from uncomplicated urinary tract infections to life-threatening sepsis representing a serious challenge for clinical treatments.

It is well established the role of animals and derived products as a source of diffusion of resistant strains (Beninati *et al.*, 2015; EFSA, 2011) For all these reasons, the aim of the present study was to improve the knowledge on the microorganisms frequently involved "in-use" kitchen sponges' colonization, and their role in maintaining and diffuse ESBL-producing organisms in domestic environment.

METHODOLOGY

The study took place at Coimbatore and the study participants where the people are all age groups. The information regarding the sanitation and drying method of used kitchen sponges, members in the house who are all sharing the same kitchen sponge, contamination of infections and diseases from kitchen sponges used for long time were collected using the questionnaire. The questionnaire was framed, distributed around 100 people of volunteers and collected the data completely from them. Incomplete forms were excluded from the study. The received responses were analyzed using Microsoft excel sheets. By using statistical tool in MS-Excel results were expressed in percentage.

RESULTS AND DISCUSSION

TABLE: 1- VOLUNTEERS SHARING THE SAME SPONGE TO CLEAN THE UTENSILS

OPTIONS	No. of subjects (n=100)	
	Frequency	Percentage (%)
1	28	28
2	36	36
2 and above	36	36
TOTAL	100	100

From the table:1 shows that among 100 volunteers 28% don't share the sponge, 36% of them share washing sponges with another member, and remaining 36% share sponges with 2 and more people.

Figure: 1 Usage of Sponge

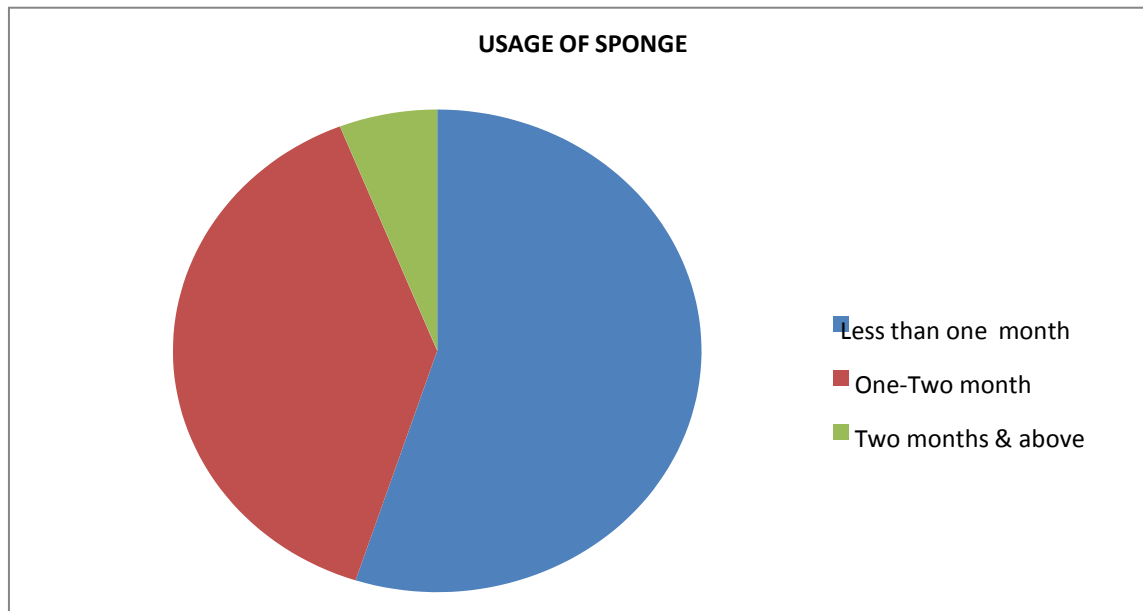


Figure :1 revealed that among 100 volunteers, 55% of them use it for less than 1 month, 39% of them use the sponge for 1-2 months and 6% of them use the sponge more than 2 months.

TABLE-2: THE SUN RAYS FALLON THE SPONGES AND SCRUB THROUGH KITCHEN WINDOWS

OPTIONS	No of subjects (n=100)	
	Frequency	Percentage (%)
Yes	48	48
No	52	52

TOTAL	100	100
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Table:2 reported that among 100 volunteers, 48% of them selected yes and remaining 52% of them said not received any sun ray on sponges, so it indicates that the growth of microbes can be happen and it will spoil when the sponges used on other things.

FIGURE:2 SEPARATE SPONGES FOR CLEANING OILY AND NON-OILY SPONGES

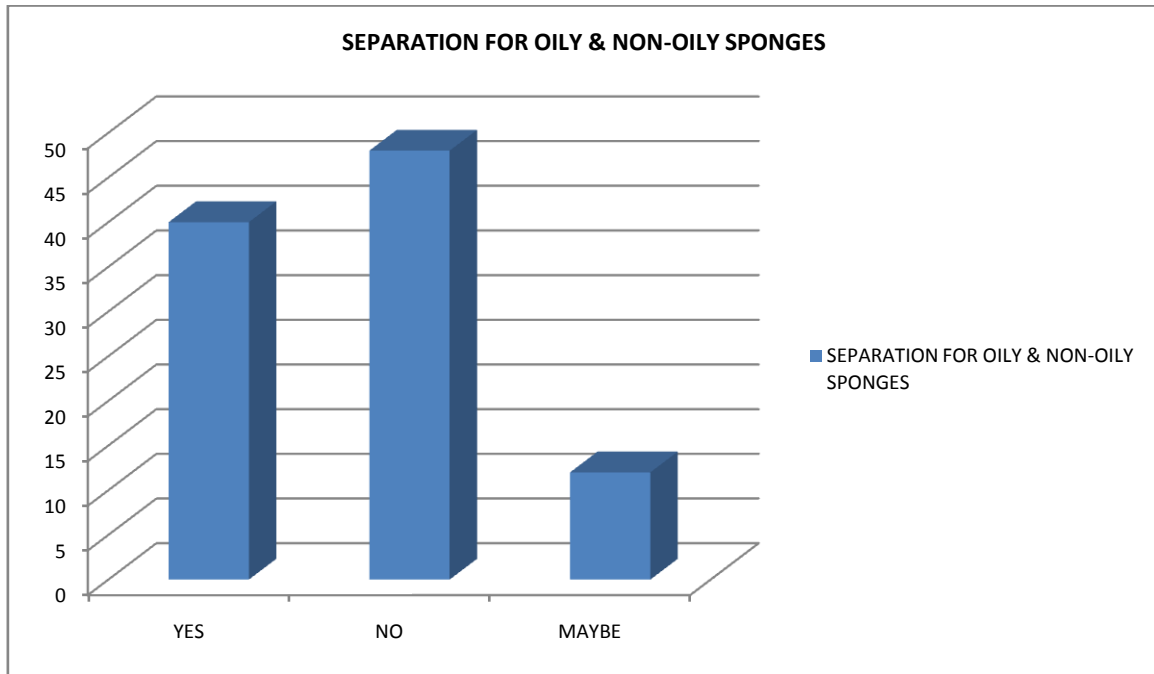
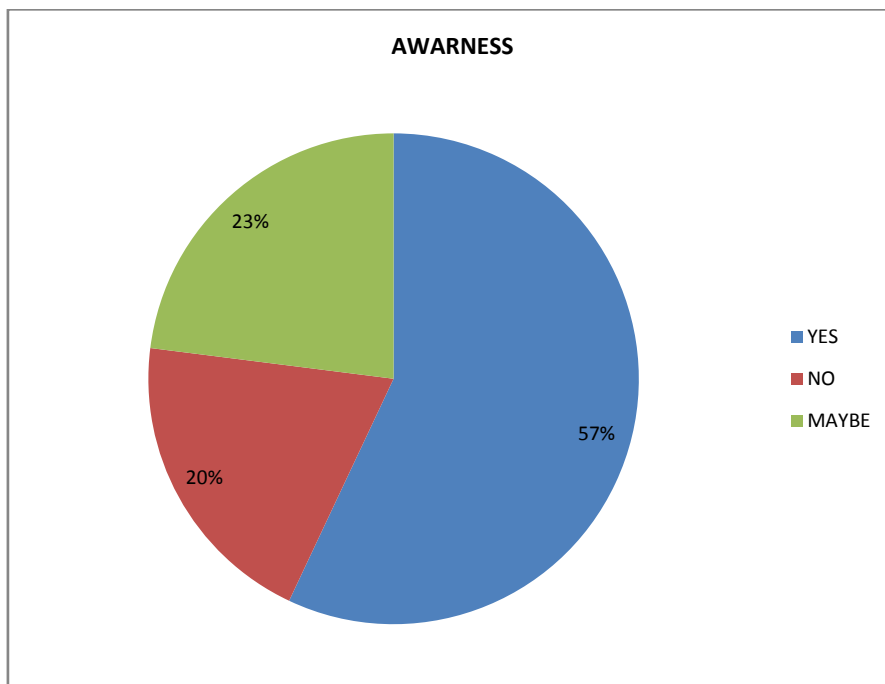
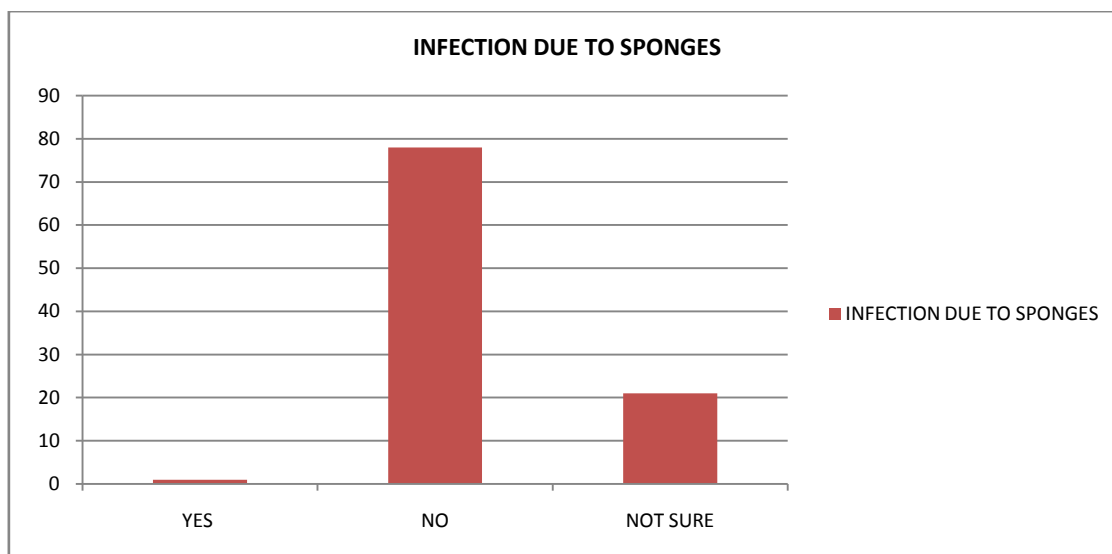


fig 2 shows how many people have separate place for oily and non-oily sponges, for which 40% of the population said yes, 48% said no and remaining 12% opted for maybe.

FIGURE: 3 AWARE OF CROSS CONTAMINATION DUE TO KITCHEN SPONGES



The Figure: 3 shows the awareness on cross contamination of microorganism due to kitchen sponges, 57% of them said (yes) they are aware about the contamination causes, 23% of them said not have awareness and 20% of them said maybe aware of it.

GRAPH- FACED ANY INFECTION DUE TO THE USAGE OF KITCHEN SPONGES

Graph: shows the infection they faced due to the usage of kitchen sponges and out of which 2% of the subjects opted for yes, 78% of them went with no and 20% of them aren't sure.

TABLE- 4: WHERE DO THEY KEEP THEIR KITCHEN SPONGES

OPTIONS	No of subjects (n=100)	
	Frequency	Percentage (%)
Separate storage tray	33	33
Along with dish washing detergent	55	55
Anywhere in and around the sink	12	12
TOTAL:	100	100

Table: 4 shows the placement of kitchen sponges in that 33% say they use separate tray for placing the sponge, 55% say they keep their sponges along with dish washing detergent and 12% place it anywhere in and around the sink.

CONCLUSION

This study conducted to found about the knowledge, practicing and awareness of common people towards the microbial contamination of kitchen sponges and scrubs. The study indicates people are well aware of cross contamination of micro-organisms due to kitchen sponges, which may justify that they are maintaining proper hygiene and sanitation in handling the kitchen sponges. Even though they practicing the certain things (not using separate sponges for oily utensils) which may leads to transmission of microorganism directly to the utensils and foods. This research shows that the necessity to improve a proper education of the consumers on the effective treatment to reduce their microbial loads. So, more studies are need to determine the knowledge and characteristic of different micro- organism which get transferred and cause food borne disease as health effects.

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