

# A Study on Bacterial Contamination of Butcher Hands Compared with the Efficacy of an Antibacterial Soap in Slaughter Houses of Telangana, India

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## ABSTRACT

Meat contamination generally occurs when something which should not be there gets into it by any mode. This causes the decrease in shelf life of the food and reduction in quality of meat. In some cases, where food is not properly checked it can also cause food poisoning. One of the major cause of meat contamination is found to be unhygienic hands of the butchers who does not clean their hands with an antibacterial soap. In this study 64 volunteers from 8 slaughter houses were checked for and it was found that 100% meat handlers when washed their hands with an antibacterial soap showed no contamination of meat. Although hands with a count of 0 cfu.cm<sup>-2</sup> were found in all of the slaughter houses, the results indicated that all the slaughter houses exceeded the legal limit for meat surfaces or hands of < 100 cfu.cm<sup>-2</sup> when the average bacterial counts on hands were compared. The study revealed the hands hygiene was unsatisfactory and a proper education about hygienic habits among the butchers is required.

**Keywords :** Bacterial Contamination, Butcher Hands, Antibacterial Soap, Slaughter Houses, Food Poisoning, Total Plate Count

## I. INTRODUCTION

It is being found since 1847 that hands hygiene has reduced the spread of puerperal fever among the woman which is considered to be a pioneering observation made by Semmelweis. Howes et al.,1996 state that improper food handler practices contributed to approximately 97% of foodborne illnesses in food service establishments and homes. Statistical evidence indicates that food poisoning caused by the catering industry is 70% higher than that caused by any other sector (Wilson M, 1997).

As hand washing reduces and in some cases stop the spread of disease causing organism from person to

person and also from person to food it should be given utmost importance to increase the shelf life of food and their products. It is much better to avoid the direct contact. Usage of gloves by food handlers to at least reduce the spread of contaminant into the food at ground level. Furthermore, it was established that a food worker's unwashed hands can transmit pathogens, especially faecal pathogens, to food products after a visit to the toilet. Investigations of foodborne illness outbreaks have shown that poor personal hygiene, primarily ineffective hand washing, is an important contributor to foodborne illness, second only to inadequate temperature controls of food (Scarborough MF,2002)

This study was done to evaluate the efficacy of hand washing practices amongst butchers before they start their work. The study is done to know the effect of hand wash on the number of staphylococcus present on the palm which tends to be the major contaminant found in meat samples collected from study area.

## II. MATERIAL AND METHODS

### a. Sampling protocol:

Samples of butcher’s hand were collected which accounted to 64. These volunteers were initially asked for the sample followed by hand wash by an antibacterial soap used in common. Sampling was performed by using sterile swabs which were wetted by sterile distilled water. The swabs so collected were serially diluted which were later used for isolation of bacteria on two different medias that is nutrient agar and mannitol salt agar. In order to ensure consistency of workers’ normal practices in washing and disinfection, they had no prior knowledge of the planned sampling runs. Furthermore, the samples were collected on working days and adequate time was allowed for workers to clean and sanitize their hands. Results are the means of duplicate analyses.

### b. Microbiological analysis

#### Total Plate Count (TPC):

For TPC determination, the routine pour plate technique was employed. After the short period the swabs were dipped into 9ml of nutrient broth which was further diluted by using serial dilution method. After dilution is performed 0.1 ml of the sample was transferred onto the respective medias and were spreaded by using spread plate method with the help of sterile glass rod. The plates were properly mixed, allowed to solidify and then incubated at 30°C for 72 h. The same process is repeated but this time Mannitol salt agar media is used, the TPC was determined and was expressed as colony forming units (cfu/ml).

**Table 1.** Distribution of samples collected from hands

S.NO	AREA	Total plate count	Staphylococcus aureus	Total number of samples per area
1	Area I	4	4	8
2	Area II	4	4	8
3	Area III	4	4	8
4	Area IV	4	4	8
5	Area V	4	4	8
6	Area VI	4	4	8
7	Area VII	4	4	8
8	Area VIII	4	4	8
TOTAL		32	32	64

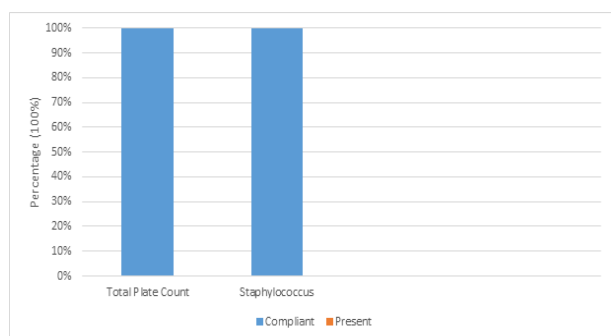
## III. RESULTS

It is being observed that all the samples at higher concentrations showed presence of more (<100) bacterial colonies before the use of any of the antibacterial soap but later when plates were checked for the presence of bacteria after the hands were washed there was a drastic decrease in the number and sometimes the result was found to be 0 cfu/cm<sup>2</sup>.

## IV. DISCUSSION

The primary action of hand washing is the mechanical removal of viable transient microorganisms, whereas the primary action of antimicrobial soap includes both mechanical removal and killing or inhibition of both transient and resident flora (Larson E, 1989). This states that washing hands just with water does not have any effect on the resident flora which is found to be the major contaminant causing spoiling of meat.

But on the contrary by using antibacterial soap the number of viable resident flora along with transient flora diminish which in turn results into zero contamination of the meat samples. Paulson, 1992 & Raspor, 2008 reported the importance of management training of all employees in the use of effective hand washing procedures, and that the safety of food chain supply can easily be broken proper enforcement these procedures.



**Gharp 1.** Percentage compliance of Total Plate Count (< 100 cfu.cm<sup>-2</sup>), Staphylococcus aureus samples collected from workers' cleaned and sanitised dominant hand surfaces in 8 slaughter houses

None of the samples showed positive for the presence of Staphylococcus. S. aureus and coagulase-negative Staphylococci (CNS) inhabit the human skin and mucous membranes, where they exist mostly as commensal flora (Nobel WC ,1992). Humans are the natural carriers of S. aureus and the organism can be found in a healthy human population (Montville TJ , 2008). Staphylococci exist in air, dust, sewage, water, milk and food or on food equipment, environmental surfaces, humans and animals. Humans and animals are the primary reservoirs of Staphylococci (Montville TJ, 2008). Before the hands were washed with antibacterial soap some of the nutrient agar plates showed the presence of E.coli which were identified and confirmed by biochemical test and the presence of this organism states that meat has been faecal contaminated. Faecal contamination, in turn, indicates that other harmful organisms, whether they be bacterial genera (Salmonella, Shigella, Campylobacter), viral (Hepatitis A, norovirus,

rotavirus) or helminthic or protozoal parasites (Taenia, Toxoplasma, Cryptosporidium, Giardia), could be present (Jay JM, 1997). In addition, the test for generic E. coli may also point to highly pathogenic strains of E. coli that have the ability to cause diarrhoea as well as systemic disease, resulting in multi-organ failure and death (E. coli 0157:H7) (Science Daily, 2010).

## V. CONCLUSION

This study revealed that the hygiene of hands is unsatisfactory and proper care have to be taken while handling the meat and at the same time it also supports the use of antibacterial soap too for maintaining the hygiene. It is of utmost importance that high standards of sanitation, cleanliness and good housekeeping be maintained at all times and any laxness in this regard may result in a serious epidemic or infection (Marriott NG, 1999). Employees should be trained on how to handle food as well as on sanitation and hand washing techniques, as bacteria from cuts, infections, boils or other communicable diseases may cause food poisoning (Richard K, 2008). People involved with food production, from farm to fork must take responsibility to prevent infections and destroy the disease causing microorganism.

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