Detection of *Salmonella* spp. from chevon, mutton and its environment in retail meat shops in Anand city (Gujarat), India

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**Abstract**

**Aim:** The aim of this study was (i) To attempt isolation and identification of *Salmonella* species from samples. (ii) Serotyping of *Salmonella* isolates. (iii) Detection of virulence factor associated genes by polymerase chain reaction (PCR).

**Materials and Methods:** A total of 284 samples comprised of chevon and mutton (112 samples each) as well as 60 samples (20 each of retail meat shops environment samples viz. Butchers’ hands, knives and log swabs) were collected from the retail meat shops in and around Anand City under aseptic precautions. Rappaport-vassiliadis soy bean meal broth and tetrathionate broth was used for the enrichment of all the samples and inoculation was done on brilliant green agar and xylose lysine deoxycholate agar. This was followed by the confirmation of isolates using biochemical tests. For the serotyping, isolates were sent to the National Salmonella and Escherichia Centre, Central Research Institute, Kasauli, Himachal Pradesh. Detection of virulence genes was performed by PCR technique using previously reported primer.

**Result:** Of 284 meats and retail meat shops environment samples, 13 (4.58%) samples were found positive for *Salmonella*. It was interesting to know that incidence of *Salmonella* was more in mutton (6.25%) than chevon (3.57%). In case of meat shop environmental samples 1 (5.00%) sample observed positive for *Salmonella* separately among the butchers’ hands and knives swabs (Each of 20 samples) examined. Out of 13, eleven isolates detected as *Salmonella* Typhimurium, whereas only two isolates were detected as *Salmonella* Enteritidis. All *Salmonella* isolates possess invA and stn genes, whereas nine isolates had a presence of spvR gene while only five of the isolates revealed the presence of spvC gene as shown by *in vitro* detection of virulence genes by PCR.

**Conclusion:** Therefore, might be suggested that the good hygiene practices and effective control measures should be taken to encourage clean meat production with prolonged shelf-life.

**Keywords:** food safety, meat, prevalence, *Salmonella* spp, serotype.

**Introduction**

Population growth has increased the requirements for an expanded food industry production [1]. In these industry production, *Salmonella* remains in first place of world’s leading causes of bacterial food borne illness [2]. The first outbreak of salmonellosis reported during the late 1800’s in which 57 people affected that ate beef. Due to *Salmonella* infections 93.8 million cases of gastroenteritis reported in year worldwide, with 155,000 deaths. Milder infections of *Salmonella* are mostly under-diagnosed; therefore the actual cases of infections may be very high [3]. The financial losses occurred due to *Salmonella* infections have drawn increasing attention in developed countries in recent years.

Animals are exposed to *Salmonella* in many ways (i.e. water, feed, feces, soil, and insects) and can become infected or asymptomatic carriers of the *Salmonella* organism [3]. People become infected with *Salmonella* by contaminated food and water. *Salmonella* infection primarily spread from contaminated areas by human and Animals activities to other animals and areas.

Chevon and mutton are valuable source of protein and it is frequently consumed by many communities in India, specifically at religious event celebration. Goats and sheep are mostly slaughtered at small abattoirs having not so much hygienic conditions in most parts of India [4]. The poor hygienic conditions in the slaughterhouses and meat shops encourage microbial contamination, survival and growth [5].

Thus, the aim of this study was to detection of *Salmonella* spp. from chevon, mutton and its environment in retail meat shops.

**Materials and Methods**

**Ethical approval**

All the procedures have been carried out in accordance with the guidelines laid down by the Institutional Ethics Committee and in accordance with local laws and regulations.

**Sample collection**

From July 2013 to March 2014, a total of 284 samples comprised of chevon and mutton (112 samples...
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Salmonella Typhimurium strains 4.54% positive for spvR by PCR assay. While only five isolates of Salmonella yielded 571 bp product specific for spvC gene (Figure-5) which correlate well with Das et al. [21] who reported that 42.85% isolates yielded spvC gene from 35 S. enterica isolates by PCR assay.

**Conclusion**

Different serotypes isolated from these environmental sources, majority of these serotypes were of zoonotic significance and thus, these places require appropriate hygiene to avoid cross contamination of the meat. A thorough sanitation procedure not only prevents potential hazard to human health but also creates the clean surroundings.

Data profiles of this study also use for establish direction and help to evaluate control strategy of meatborne disease related to Salmonella bacteria.

**Authors’ Contributions**

PPM supervised the overall research work. PPM and JHC participated in analysis of samples and made available relevant literatures. JBN and
MNB participated in draft and revision of the manuscript. All authors read and approved the final manuscript.

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Competing Interests

The authors declare that they have no competing interests.

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