

Original Research Article

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Assessing the Microbial Quality (*Listeria monocytogenes*) of Chicken Meat by Polymerase Chain Reaction in Different Areas of Chennai

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ABSTRACT

Keywords

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Listeria monocytogenes is widely distributed and found in many food commodities. Post processing contamination is the major source and cross contamination may also occur at the retail shop and also in products due to improper hygienic practices. A study was conducted to identify the presence of *L. monocytogenes* in chicken meat by polymerase chain reaction. 40 samples were collected from different areas of Chennai and were tested for the presence of *L. monocytogenes* by targeting *prfA* gene with 290bp by PCR. None of the samples were shown to be positive for *L. monocytogenes*. The test reveals that the processing can be performed hygienically.

Introduction

Meat can be contaminated at various stages of production by most of the microorganisms. Microbial quality of meat is an important aspect for industries engaged in production, processing and distribution. It is very persistent microorganism that survives on surfaces and equipment of food processing units in conditions of insufficient cleaning. Post processing contamination is the major source and cross contamination may also occur at the retail shop and also in products due to improper hygienic practices. Ingestion of uncooked meat contaminated during processing can produce infection. *L. monocytogenes* was found prevalently high in poultry meat (24.5%), intermediate in beef

meat (24.4%) and less prevalent in pork meat (21.4%). *Listeria monocytogenes* has also been found in raw or processed foods like meat and seafood (Gugnani, 1999; Meng and Doyle, 1997). Listeriosis is a food borne infection with flu-like symptoms in healthy people and severe complications in immune-compromised children, pregnant women and elderly person (Pesavento *et al.*, 2009). Hence a study is planned to conduct a screening of chicken meat for the presence of *L. monocytogenes* in different zones of Chennai with PCR.

Materials and Methods

Chicken meat samples of around 40 numbers were collected from different retail outlets of Chennai city. The samples placed in sterile

polythene bags and transported hygienically to the Department of Meat Science and Technology, Madras Veterinary College, Chennai – 7 in clean insulated box with ice packs. Before screening, 25 gram of meat sample was homogenized in 225 ml of BPW and incubated at 37°C for 18 hours.

The meat homogenate obtained was then subjected to DNA extraction using Bacterial DNA extraction kit and PCR analysis for the presence of *L. monocytogenes* by targeting *prfA* gene with 290bp. A 20 µl of reaction mixture was set up in 0.2 ml PCR tube with following components such as master mix - 10µl, forward primer-1 µl, reverse primer-1 µl, template DNA-1 µl and nuclease free water-7 µl. The PCR amplification was carried out in Master Cycler Gradient Thermo cycler (M/s. Eppendorf, Germany) with the following cycling conditions of initial denaturation at 94°C for 5 minutes, followed by 30 cycles of denaturation (94°C for 30 seconds), annealing (52°C for 30 seconds) and extension (72°C for 30 seconds) and

subsequently a final extension at 72°C for 7 minutes. The PCR product obtained was subjected to electrophoresis in 2% Agarose gel. Ethidium bromide with concentration of 10mg/ml was added at the rate of 5µl / 100 ml of Agarose. Electrophoresis is carried out using 1X TAE buffer at 100 volts for 30 minutes. The gel was viewed under UV illuminator and documented using gel documentation system.

Results and Discussion

Around 40 chicken meat samples were collected from different retail outlets of Chennai. The meat homogenate obtained was subjected to DNA extraction using Bacterial DNA extraction kit and the developed PCR was used to detect *Listeria monocytogenes*. None of the sample showed positive for the presence of *Listeria monocytogenes* in the retail chicken meat by PCR (Figure 1 and 2). Screening of chicken meat from different zone wise details were given below (Table 1).

Fig.1

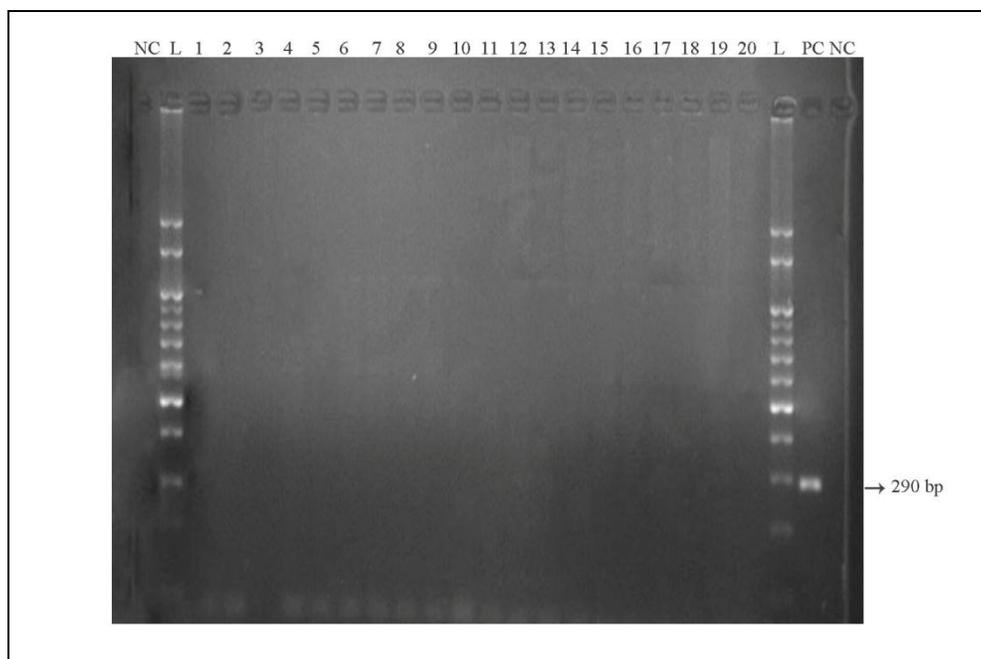
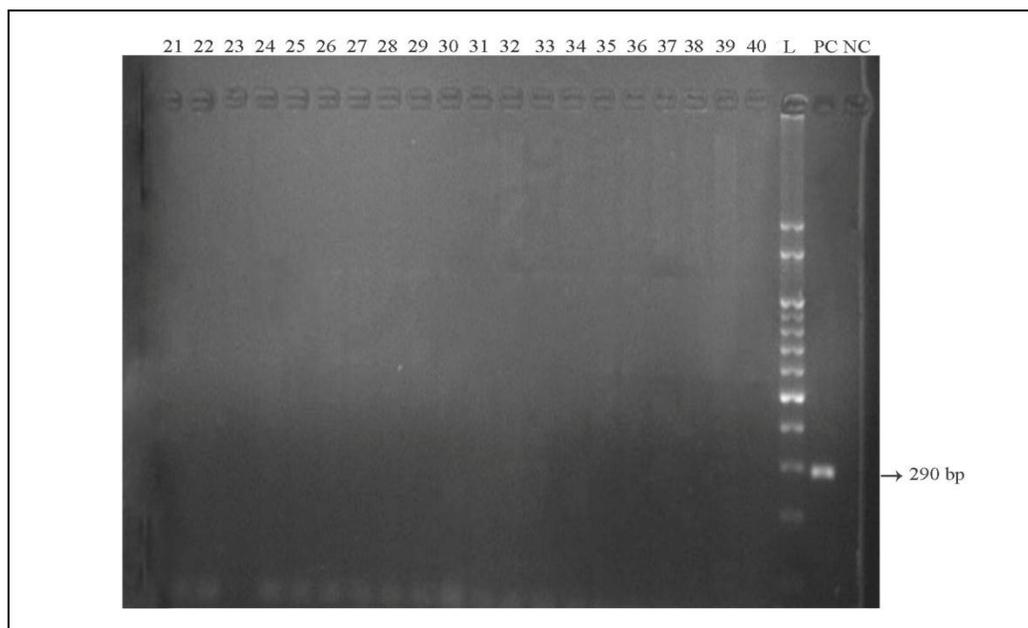


Fig.2



Note: L: 100 bp DNA Ladder, 1-20, 20-40: Sample result showing absence of *L. monocytogenes* in chicken meat, PC: Positive control of *L. monocytogenes* with 290bp, NC: Negative control

Table.1 Screening of chicken meat samples collected from different retail outlets of Chennai

Zone	Name	No. of samples	No. of positive samples by m-PCR
			<i>Listeria monocytogenes</i>
1	Manali	6	-
2	Tondiarpet	6	-
3	Thiru-vi-ka nagar	6	-
4	Valasaravakkam	6	-
5	Alandur	6	-
6	Perungudi	5	-
7	Adyar	5	-
Total		40	0

This study states that screening of chicken meat samples from retail outlets were carried out to assess the usefulness of the PCR technique and the level of processing of retail chicken meat. The 40 chicken meat samples collected from different areas of Chennai city were not positive for *Listeria monocytogenes*. The existence and control of *Listeria* species and *Listeria monocytogenes* in broiler's ceca, meat and skin at the retail outlets of Ismailia city were studied in Egypt. The results of the study revealed that 92, 42 and 70 percent of broiler's ceca, meat and

skin respectively were contaminated with *Listeria spp.* From the *Listeria spp.* positive samples, *L. monocytogenes* were highest in ceca (60%, 30 of 50 samples), followed by skin (34%, 17 of 50 samples), and meat (16%, 8 of 50 samples) (Ahmed and Nashwa, 2010). Screening of food samples like ground meat, beef and pork revealed the presence of 10 copies / μ l of *Listeria monocytogenes* (Zhang *et al.*, 2009). He detected 10^5 CFU/ml of *Listeria monocytogenes* in 500 μ l of pre-enrichment broth without incubation and 3×10^1 CFU/ml

after incubation (Barocci *et al.*, 2008). *Listeria monocytogenes* was detected in pork sausage and mozzarella cheese at a contamination level of 1 CFU/g before culture enrichment (Amagliani *et al.*, 2007). This study reveals that PCR is one of the effective and time saving methods to detect microorganism. Hence the process is carried out in a hygienic manner or there may be some other reason for the absence of microorganism in chicken meat. Similarly He (Kozacinski *et al.*, 2006) conducted a study to assess the microbial quality of chicken meat in Croatian market and reported *L.monocytogenes* in chicken breast and skin (4.76%). A study was conducted to detect the prevalence of *Listeria* spp. in raw chicken and ready-to-eat (RTE) chicken products in Amman, Jordan and they found that *L. monocytogenes* was present in 9.4% of fresh dressed broiler chickens, 13.3% of RTE chicken-shawirma, 76.7% of RTE chickenburger, and 30% of RTE chicken-sausages whereas mortadella samples were free of *L. monocytogenes*. (Osaili *et al.*, 2011).

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