The Indian Journal of Veterinary Sciences & Biotechnology ***(2017) Volume 12, Issue 3, 62-64***

ISSN (Print) : 2394-0247 : ISSN (Print and online) : 2395-1176, abbreviated as IJVSBT

http://dx.doi.org/10.21887/ijvsbt.v12i3.7093

Submitted : 08-01-2017 ***Accepted : 12-01-2017*** ***Published : 15-02-2017***

Study on Virulence Factors of *Escherichia Coli* Isolates of Buffalo Meat Origin

S. Kaskhedikar, Daljeet Chhabra and R. Sharda

Department of Veterinary Microbiology

College of Veterinary Sc. and A.H., Mhow-453446 (M.P.)

Corresponding Author: drdaljeet@gmail.com

Abstract

The global increase in food-borne diseases poses major challenges to health delivery and consequently economic well being of all nations, particularly the developing countries. 29 *E. coli* strains isolated from total 50 buffalo meat samples were tested for colonization factors (HA, Salt aggregation test and Congo red dye binding assay). Out of total 29 *E. coli* strains isolated from buffalo meat, 24 (82.75%) strains exhibited MSHA and 18 (62.06%) strains exhibited MRHA, 14 (48.27%) were positive for congo red dye binding and 11 (37.93%) isolates were positive for salt aggregation test.

Key Words: Buffalo meat, *E. coli*, Virulence factors

Introduction

Now a days in the world market, quality and safety of foods are the cornerstones for producers and consumers. Meat is one of the major commodities with which food hygiene will always be concerned, since it comprises of an invaluable protein source of prime importance throughout the world. Microbes of meat, especially those causing food-borne diseases is a matter of great concern from the public health point of view. Meat-borne infections caused by *Escherichia coli* and *Salmonella* occur in all parts of the world (Rahimi *et al*., 2012). They are known to cause several dreadful intestinal and extra-intestinal diseases in both man and animals. These are zoonotic enteropathogens and are one of the leading causes of food-borne illness (Dutta *et al*., 2008).

Domestic and wild animals are sources of Enterohemorrhagic *Escherichia coli (EHEC*), but the major animal carriers are healthy domesticated ruminants, primarily cattle and, to a lesser extent, sheep, and possibly goats. Contamination of meat with fecal material in the slaughtering process is the main transmission route of *E. coli* (Rahimi *et al*., 2012). Therefore, the present study was undertaken to evaluate the virulence factors of *E.coli* isolates of buffalo meat origin.

Materials and Methods

To determine the pathogenicity of 29 *E. coli* strains isolated from total 50 buffalo meat samples, test for some of the virulence factors, *viz*. colonization factors (HA, Salt aggregation test and Congo red dye binding assay) were undertaken following standard methods in use (Old ,1985 ; Rozgonyi *et al*., 1985 and Ishiguro *et al.* ,1985, respectively). In Congo red dye binding assay a positive

reaction was indicated by appearance of intense orange or brick red colonies while negative result was evidenced by pale or white colonies. In HA and Salt aggregation test a positive reaction was indicated by appearance of a clumped mass (bacterial aggregation).

Results and Discussion

In this study, the presence of fimbrial haemagglutinins in *E. coli* strains isolates were assayed by haemagglutination test. Characterization of haemagglutinins was done by mannose resistant haemagglutination (MRHA) and mannose sensitive haemagglutination (MSHA) tests using chicken, buffalo, sheep, human and horse erythrocytes. Out of total 29 *E. coli* strains isolated from buffalo meat, 24 (82.75%) strains exhibited MSHA and 18 (62.06%) strains exhibited MRHA. The strains exhibited MRHA with chicken, buffalo, sheep, human and horse erythrocytes and exhibited MSHA with chicken, sheep, human and horse erythrocytes. However, none of the strain showed MSHA with buffalo erythrocytes. But Dubey (1999) and Yadav and Sharda (2008) did not recorded *E. coli* strains to show MRHA with bovine erythrocytes.

Of the total 29 strains of buffalo meat origin, 14 (48.27%) were positive for congo red dye binding. Congo red (CR) binding test is performed to confirm the invasiveness of *E. coli* serogroups. The ability to bind CR dye has been proposed as a marker for the invasive property of several enteropathogens viz. Aeromonas, Shigella, *E. coli*, etc. The isolation of CR^+ strains of *E. coli* from diseased birds and animals have been reported by Kalorey *et al*. (2002) and Roy *et al*. (2006). Al-Arfaz *et al*. (2016) reported 31 (44.29%) avian *E. coli* isolates showing congo red binding activities.

Salt aggregation test is carried out to determine the cell surface hydrophobicity of *E. coli* strains. Eleven (37.93%) out of 29 strains isolated from buffalo meat were positive for salt aggregation test. Contrary to our findings, Sharma *et al.* (2007) and Suman *et al.* (2007) reported only 27.6% and 22% *E. coli* strains, respectively to be positive for SAT.

This study demonstrated that buffalo meat can be potential vehicle for transmitting meat-borne illnesses and the presence of virulent *E. coli* is alarming and of public health concern in the Mhow region.

Conflict of Interest: All authors declare no conflict of interest.

References :

Al-Arfaj, A.A., Ali, M.S., Hessain, A.M., Zakri, A.M., Dawoud. T.M., Al-Maary. K.S. and Moussa, I.M.(2016). Phenotypic and genotypic analysis of pathogenic Escherichia coli virulence genes recovered from Riyadh, Saudi Arabia. *Saudi. J. Biol. Sci*., **23**(6):713-717.

Dubey, S. (1999). Studies on the incidence and serotypes of enteric colibacillosis in goats. M.V.Sc. & A.H. Thesis, J.N.K.V.V., Jabalpur (M.P.).

Dutta, P.R., A. Phukan, G.C. Hazarika, P. Borah and S. Rajkhowa (2008). Pathogenecity and sensitivity of *E. coli*. *Indian Vet. J.,* **85**: 1015-1016.

Ishiguro, E.E., T. Ainsworth, T.J. Trust and W.W. Kay (1985). Congo red agar, a differential medium for *Aeromonas salmonicida*, detects the presence of the cell surface protein array involved in virulence. *J. Bact*., **164**: 1233-1237.

Kalorey, D.R., N.V. Kurkure, S.D. Harne, V.C. Ingle, A.A. Patil, P.S. Sakhare and S.R. Warke (2002). Congo red binding ability of *Escherichia coli*. *Indian J. Comp. Microbiol. Immunol. Infect. Dis*., **23**: 79-80.

Old, D.C. (1985). Haemagglutination methods in the study of *Escherichia coli*. *In:* Sussman, M. (ed.). The Virulence Factors of *Escherichia coli*: Reviews and Methods. 1st edn., Academic Press, London. pp 287-313.

Rahimi, E., Kazemeini, H.R. and Salajegheh, M. (2012). *Escherichia coli* O157:H7/NM prevalence in raw beef, camel, sheep, goat, and water buffalo meat in Fars and Khuzestan provinces, Iran. *Vet. Res. Forum*, **3**(1):15-17.

Roy P., V. Purushothaman, A. Koteeswaran and A.S. Dhillon (2006). Isolation, characterization and antimicrobial drug resistance pattern of *Escherichia coli* isolated from Japanese quail and their environment. *J. Appl. Poult. Res.*, **15**: 442-446.

Rozgonyi, F., K.R. Szitha, A. Ljungh, S.B. Baloda, S. Hjerten and D. Wadstrom (1985). Improvement of the salt aggregation test to study bacterial cell hydrophobicity. *F.E.M.S. Microbiol. Lett. ,* **30**: 131-138.

Sharma, S., G.K. Bhat and S. Shenoy (2007). Virulence factors and drug resistance in *E. coli* isolated from extra intestinal infections. *Indian J. Med. Microbiol.*, **25**: 369-373.

Suman E., J. Ose, S. Varghese and M.S. Kotian (2007). Study of biofilm production in *E. coli* causing urinary tract infection. *Indian J. Med. Microbiol.*, **25**: 305-306.

Yadav, M. and R. Sharda (2008). Mannose sensitive and mannose resistant haemagglutination by *E. coli* strains from mutton. *Indian J. Field Vet.,* **4**: 1-3.

❑