ISSN: 0976-3031

*Available Online at http://www.recentscientific.com*

**CODEN: IJRSFP (USA)**

*International Journal of Recent Scientific Research*
*Vol. 8, Issue, 6, pp. 17580-17582, June, 2017*

**International Journal of Recent Scientific Research**

**DOI: 10.24327/IJRSR**

**Research Article**

# STUDIES ON CAMPYLOBACTERS OF KUMAUN OF UTTARAKHAND

**Upadhyay A K* and Ipshita**

College of Veterinary & Animal Sciences G. B. Pant University of Agri. & Tech. Pantnagar

**DOI: http://dx.doi.org/10.24327/ijrsr.2017.0806.0384**

**ARTICLE INFO**

***Article History:***

Received 15th March, 2017
Received in revised form 25th April, 2017
Accepted 23rd May, 2017
Published online 28th June, 2017

***Key Words:***

Campylobacter, Prevalence, Antibiotic resistance

**ABSTRACT**

730 samples comprising poultry caeca (210), chicken meat (111) and poultry droppings (180) along with faecal contents from goat (26), sheep (23), pigs (78), calves (20) and human (82) were collected from different places of Kumaun. Of these 39 (5.34%) were found positive for *Campylobacter*. The highest prevalence was in poultry caeca (7.62%) followed by poultry droppings (7.22%), calves faeces (5%), humans stools (3.66%), chicken meat (3.60%) and pigs faeces (2.56%). Any *Campylobacter* could not be recovered in samples collected from goat and sheep. Out of 39 pure cultures isolated, 19 were identified as *C. jejuni* and 17 as *C. coli*, whereas, 3 *C. jejuni* cultures negative for hippurate hydrolysis test. All the *C. jejuni* isolates (100%) were found to be sensitive to Amoxiclav, while 93.75% showed resistance towards Penicillin G. Among 7 *Campylobacter coli* isolates, 5 (71.43%) were sensitivity to Amoxyclav and Ampicillin. Only Penicillin G was found to be resistant in 5 (71.43%) of the *C. coli* isolates.



## INTRODUCTION

Campylobacter cause serious complications related to acute bacterial enteric diseases in humans and animals of entire globe. The most significant Campylobacter species associated with human as well as food animals are *campylobacter jejuni* and *Campylobacter coli* (Wesley *et al.,* 2000). Worries regarding the prevalence of campylobacteriosis have increased many folds because of the frequent isolation of antimicrobial-resistant strains from humans and their foods. High prevalence and increasing resistance to antimicrobial drugs has been documented in human and animal strains of Campylobacter (Padungton and Kaneene, 2003). This is particularly annoying with fluoroquinolone and macrolide because these molecules are being used for treatment of human campylobacteriosis (Skirrow and Blaser, 2000). Therefore, present investigation was intended to know the latest disease and antimicrobial resistance status of bacteria.

## MATERIALS & METHODS

From various parts of Kumaun region of Uttarakhand 730 samples comprising poultry caeca (210), chicken meat (111) and poultry droppings (180) along with faecal contents from goat (26), sheep (23), pigs (78), calves (20) and human (82) were collected for the isolation of Campylobacter spp. The isolation and identification of Campylobacter spp. was carried out as per the procedures outlined by OIE terrestrial manual (2008) with necessary modification. Morphological, biochemical, serological and molecular characterization of the Campylobacter genus was done (Upadhyay *et al*., 2016). All the samples were screened for the presence of different species of thermophilic *Campylobacter*. Out of isolated, 23 isolates could be revived to study the antibiotic sensitivity as described by Upadhyay *et al.* (2016).

## RESULTS AND DISCUSSION

In the present study, the overall prevalence of *Campylobacter* was recorded as 5.34% with highest in poultry caeca (7.62%) followed by poultry droppings (7.22%), calves faeces (5%), humans stools (3.66%), chicken meat (3.60%) and pigs faeces (2.56%) (Table 1) disagreeing Rajkumar *et al*., (2010)

**Table 1** Prevalence of *Campylobacter* in different species

| Sl. No. | Sample source | Total no. of samples | Positive samples |
|---|---|---|---|
| 1 | Poultry caeca | 210 | 16 (7.62%) |
| 2 | Chicken meat | 111 | 4 (3.60%) |
| 3 | Poultry droppings | 180 | 13 (7.22%) |
| 4 | Pigs faeces | 78 | 2 (2.56%) |
| 5 | Sheep and goats | 49 | 0 (0%) |
| 6 | Calves faeces | 20 | 1 (5%) |
| 7 | Human stools | 82 | 3 (3.66%) |
| | Total | 730 | 39 (5.34%) |

* Figures in parenthesis are respective percentage prevalence

**Corresponding author:* **Upadhyay A K**
College of Veterinary & Animal Sciences G. B. Pant University of Agri. & Tech. Pantnagar

observation of 18% from unorganized and 12% from organized observation farms in Uttar Pradesh. However, *Campylobacter* could not be recovered in any of the sample collected from goat and sheep in accordance with Wieczorek *et al*., (2012).

### *Species wise prevalence of Campylobacter isolates*

Two species were identified namely *Campylobacter jejuni* and *Campylobacter coli*. The occurrence of *Campylobacter jejuni* was recorded higher than that of *Campylobacter coli* (Joshi, 2014). Out of 39 *Campylobacter* recovered from various sources, the poultry caeca had the highest number of recoveries followed by poultry droppings, and chicken meat (Table 2).

**Table 2** Species distribution of *Campylobacter* in different host species

| Sl. No. | Sample source | No. of positive samples | *C. jejuni* | *C. coli* |
|---|---|---|---|---|
| 1 | Poultry caeca | 16 (7.62%) | 7(43.75%) | 9(56.25%) |
| 2 | Chicken meat | 4 (3.60%) | 3 (75%) | 1(25%) |
| 3 | Poultry droppings | 13 (7.22%) | 7(53.85%) | 6(46.13%) |
| 4 | Pigs faeces | 2 (2.56%) | 2 (100%) | 0 (0%) |
| 5 | Sheep and goats | 0 (0%) | 0 (0%) | 0 (0%) |
| 6 | Calves faeces | 1 (5%) | 0 (0%) | 1 (100%) |
| 7 | Human stools | 3 (3.66%) | 2(66.67%) | 1(33.33%) |
| | Total | 39 (5.34%) | 21(53.85%) | 18(46.15%) |

### *Detection and distribution of virulent genes*

Virulence gene PCRs confirmed presence of *wlaN* (672bp), *iam* (518bp), *ciaB* (986bp) and *dnaJ* (720bp) genes in 7 (17.95%), 18 (46.15%), 21 (53.84%) and 29 (74.36%) isolates, respectively. Isolates from poultry caeca and droppings showed the presence of all four genes, while isolates of chicken meat harboured *iam* and *cia*B genes. Moreover, *dna*J gene which was most prominent in isolates of poultry caeca and droppings was absent in the isolates recovered from chicken meat. Virulent gene *wla*N was detected in poultry caeca, poultry droppings and human stool. All isolates from pig feces revealed only *dna*J gene. The *iam* gene was detected in only one isolate of calf faeces. Out of 3 isolates from humans, *wla*N and *dna*J could be observed only in two samples. The third isolate did not reveal any virulent gene. Virulent genes *iam* and *cia*B were absent in all isolates (Table 3, Figure 1 to 4).

**Table 3** Distribution of virulent genes among the *Campylobacter* isolates

| Source | Species | Total No. of isolates | Virulent genes detected in *Campylobacter* species | | | |
|---|---|---|---|---|---|---|
| | | | *wlaN* | *iam* | *ciaB* | *dnaJ* |
| Poultry caeca | *C. jejuni* | 7 | 3 | 2 | 5 | 7 |
| | *C. coli* | 9 | 1 | 9 | 6 | 8 |
| Chicken meat | *C. jejuni* | 3 | - | 1 | 2 | - |
| | *C. coli* | 1 | - | 1 | - | - |
| Poultry droppings | *C. jejuni* | 7 | 2 | 1 | 5 | 5 |
| | *C. coli* | 6 | - | 3 | 3 | 6 |
| Pig faeces | *C. jejuni* | 2 | - | - | - | 2 |
| Calves faeces | *C. coli* | 1 | - | 1 | - | - |
| Human stools | *C. jejuni* | 2 | 1 | - | - | 1 |
| | *C. coli* | 1 | - | - | - | - |

### *Antibiotic sensitivity pattern of Campylobacter isolates*

Out of 39 thermophilic *Campylobacter* species, only 23 isolates could be revived to study the antibiotic sensitivity pattern. All the *C. jejuni* isolates (100%) were found to be sensitive to Amoxiclav, while 93.75% of them showed resistance towards Penicillin G agreeing with our findings of Rajagunalan (2010).

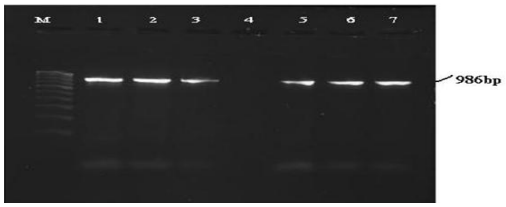


**Figure 1** PCR for the detection of *cia*B gene (986bp) in *Campylobacter* isolates.

Lane M: 100bp DNA ladder; Lane 1-3 and 5-7: *ciaB* positive isolates; Lane 4: negative control.

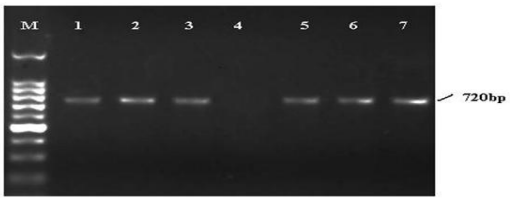


**Figure 2** PCR for the detection of *dnaJ* (720bp) gene in *Campylobacter* isolates.

Lane M: 100 bp DNA ladder; Lane 1-3 and 5-7: *dnaJ* positive isolates; Lane 4: negative control.

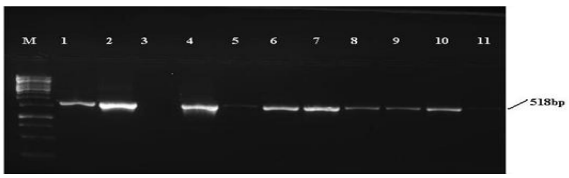


**Figure 3** PCR for the detection of *iam* (518bp) gene in *Campylobacter* isolates.

Lane M: 100 bp DNA ladder; Lane 1-2 and 4-11: *iam* positive isolates; Lane 3: negative control.

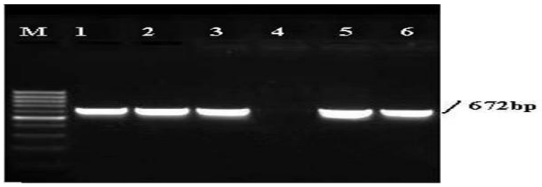


**Figure 4** PCR for the detection of *wlaN* (672bp) gene in *Campylobacter* isolates

Lane M: 100 bp DNA ladder; Lane 1-3 and 5-6: *wlaN* positive isolates; Lane 4: Negative control

**Table 4** Antibiotic sensitivity pattern of *Campylobacter* isolates

| S. No | Antibiotics | *Campylobacters* pp. | No. of Isolates | | |
|---|---|---|---|---|---|
| | | | Resistant | Intermediate | Sensitive |
| 1. | Chloramphenicol | *C. jejuni* | 0 | 11 (68.75%) | 5 (31.25%) |
| | | *C. coli* | 2 (28.57%) | 5 (71.43%) | 0 |
| 2. | Ciprofloxacin | *C. jejuni* | 2 (12.5%) | 10 (62.5%) | 4 (25%) |
| | | *C. coli* | 3 (42.86%) | 4 (57.14%) | 0 |
| 3. | Gentamicin | *C. jejuni* | 0 | 2 (12.5%) | 14 (87.5%) |
| | | *C. coli* | 0 | 5 (71.43%) | 2 (28.57%) |
| 4. | Amoxacillin | *C. jejuni* | 0 | 14 (87.5%) | 2 (12.5%) |
| | | *C. coli* | 0 | 4 (57.14%) | 3 (42.86%) |
| 5. | Cephalexin | *C. jejuni* | 1 (6.25%) | 12 (75%) | 3 (18.75%) |
| | | *C. coli* | 2 (28.57%) | 5 (71.43%) | 0 |
| 6. | Levofloxacin | *C. jejuni* | 1 (6.25%) | 2 (12.5%) | 13 (81.25%) |
| | | *C. coli* | 0 | 3 (42.86%) | 4 (57.14%) |
| 7. | Kanamycin | *C. jejuni* | 1 (6.25%) | 1 (6.25%) | 14 (87.5%) |
| | | *C. coli* | 0 | 3 (42.86%) | 4 (57.14%) |
| 8. | Penicillin G | *C. jejuni* | 15 (93.75%) | 1 (6.25%) | 0 |
| | | *C. coli* | 5 (71.43%) | 2 (28.57%) | 0 |
| 9. | Amoxyclav | *C. jejuni* | 0 | 0 | 16 (100%) |
| | | *C. coli* | 0 | 2 (28.57%) | 5 (71.43%) |
| 10. | Ampicillin | *C. jejuni* | 0 | 5 (31.25%) | 11 (68.75%) |
| | | *C. coli* | 0 | 2 (28.57%) | 5 (71.43%) |

Most of the *C. jejuni* isolates (62-87%) were intermediately sensitive against Ciprofloxacin, Chloramphenicol, Amoxacillin and Cephalexin. Among the 7 *Campylobacter coli* isolates, 5 (71.43%) of them showed sensitivity towards Amoxyclav and Ampicillin in alliance with the finding by Rahimi *et al*., (2011). Most of the isolates were intermediately sensitive to all the antibiotics. Only Penicillin G was found to be resistant in 5 (71.43%) of the *C. coli* isolates (Table 4). In the present study *C. coli* were found to be more resistant than *C. jejuni* to most of the drugs in conformity with the findings of Adzitey *et al*., (2012).

## CONCLUSION

Out of 730 samples collected, overall prevalence of *Campylobacter* estimeted to be 5.34% with highest in poultry caeca (7.62%) trailing poultry droppings (7.22%), calves faeces (5%), humans stools (3.66%), chicken meat (3.60%) and pigs faeces (2.56%). Samples collected from goat and sheep exhibited absence of bacteria. Out of 39 isolated Campylobacters, 19 were identified as *C. jejuni* and 17 as *C. coli*, while, 3 *C. jejuni* cultures could not respond to hippurate hydrolysis test. *C. jejuni* isolates were found to be 100% sensitive to Amoxiclav, while 93.75% of them showed resistance towards Penicillin G and of 7 *Campylobacter coli* isolates, 5 (71.43%) showed sensitivity towards Amoxyclav and Ampicillin.

**Acknowledgement**

We are thankful to ICAR for grant of Outreach programme on zoonotic diseases, in which the research was carried out.

## References

1. Adzitey, F., Rusul, G., Huda, N., Cogan, T. and Corry, J. Prevalence, antibiotic resistance and RAPD typing of Campylobacter species isolated from ducks, their rearing and processing environments in Penang, *Malaysia. Int. J. Food Microbiol*. 2012; 154: 197 -205.
2. Joshi, M. (2014). Isolation, epidemiology, molecular characterization and antibiogram of Campylobactor from meat. M.V.Sc. thesis submitted to G.B.P.U.A.T, Pantnagar.
3. OIE Terrestrial Manual. Campylobacter jejuni and Campylobacter coli. 2008; pp. 1185-1191.
4. Padungton, P. and Kaneene, J.B. Campylobacter spp. in human, chickens, pigs and their antimicrobial resistance. *J. Vet. Med. Sci.* 2003; 65: 161-170.
5. Rahimi, E.. Occurrence and resistance to antibiotics of Campylobacter spp. in retail raw sheep and goat meat in Shahr-e-Kord, *Iran. Global Vet*. 2011; 4 (5): 504-509.
6. Rajagunalan.. Isolation, PCR based identification and fla typing of of thermophylic campylobacters, M.V.Sc. thesis submitted to G.B.P.U.A.T, Pantnagar. 2010.
7. Rajkumar, R. S., Yadav, A. S., Rathore, R. S., Mohan, H. V. and Singh, R. P.. Prevalence of Campylobacter jejuni and Campylobacter coli from unorganized and organized small scale poultry dressing units of Northern *India. J. Vet. Pub. Hlth*. 2010; 8: 1-5.
8. Skirrow, M.B. and Blaser, M.J. Clinical aspects of Campylobacter infection. In: Nachamkin, I. and Blaser, M.J. eds. Campylobacter. American Society for Microbiology, Washington, DC, 2000; pp. 69-88.
9. Upadhyay, A. K., Monika, Maansi, Singh, Ipshita, Singh, P. K., and Kumar, A. Epidemiology and antimicrobial resistance in campylobacter. *Jour. of Agri. & Vety. Sci*. 2016; 9 (2). 06-08.
10. Wesley, I.V., Wells, S.J., Harmon, K.M., Tucker, L.S., Glover, M. and Siddique, I. Fecal shedding of Campylobacter and Arcobacter spp. in dairy cattle. *Appl. Environ. Microbiol*. 2000; 66: 1994-2000.
11. Wieczorek, K., Szewczyk, R. and Osek, J. Prevalence, antimicrobial resistance, and molecular characterization of Campylobacter jejuni and C. coli isolated from retail raw meat in Poland. *Veterinarni Medicina*. 2012; 57 (6): 293-299.

**How to cite this article:**

Upadhyay A K and Ipshita.2017, Studies on Campylobacters of Kumaun of Uttarakhand. *Int J Recent Sci Res.* 8(6), pp. 17580-17582. DOI: http://dx.doi.org/10.24327/ijrsr.2017.0806.0384

*******