ANTIBIOGRAM OF *BACILLUS CEREUS* ISOLATED FROM STREET VENDED FOODS IN SRINAGAR AREA OF KASHMIR VALLEY

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ABSTRACT

Bacteriological analysis was carried out on one hundred samples comprising of 60 mutton tikka and 40 chutney samples of five zones of Srinagar city of Jammu and Kashmir State. Food samples were collected from different vendors. Mannitol egg-yolk polymyxin-B sulfate agar (MEYPA) was used for isolation of *Bacillus cereus*. Out of 40 (40.00%) positive food samples 27 were of the mutton tikka and 13 of the chutney samples resulting in prevalence of 45% and 32.5%, respectively. The mean bacterial count of 60 mutton tikka and 40 chutney samples was 4.6817 and 5.6575 $\log_{10}$ cfu/g. The strains of *Bacillus cereus* were higly resistant to penicillin G (92.50%), an intermediatte resistance was noted against tetracycline (40.00%), linezolid (35.00%), erythromycin (32.5%), ampicillin (30.00%), and amoxycillin (25.00%). The most effective antibiotics against *B. cereus* included gentamicin (100%), ciprofloxacin (100%), chloramphenicol (90%) followed by streptomycin (80%).

KEY WORDS: *Bacillus cereus*, Street vended food, Antibiotic resistant

INTRODUCTION

Street vended food types differ greatly between countries and cultures. Industry plays an important role in meeting the food requirements of urban dwellers in many cities and towns of developing countries (Muinde and Kuria, 2005). However, food borne diseases of microbial origin pose a major health problem with street vended foods (WHO, 2002). *Bacillus cereus* is an important cause of foodborne disease in man and is frequently involved in a number of foodborne outbreaks worldwide (Lund et al., 2000).

Kashmir is famous for its non-vegetarian cuisines and most of these preparations are also sold in the market as street vended foods. Although there is a growing demand for street vended food products, but no information is available regarding the antibiotic resistance of *Bacillus cereus* strains of street vended foods . Hence the present study was undertaken to evaluate the antibiotic susceptibility from the Street vended Mutton Tikka in Srinagar City of Kashmir, India.

MATERIALS AND METHODS

A total of 100 street vended food samples comprising 60 Mutton tikka samples and 40 chutney samples collected randomly from vendors of five different zones of Srinagar city . For this purpose, 6 samples of mutton tikka and 4 samples of chutney per zone per season were brought to veterinary public health laboratory in ice and processed within 2-3hr for estimation of total viable counts and isolation and identification of *Bacillus cereus* using standard bacteriological techniques. Mannitol egg-yolk polymyxin-B sulfate agar (MEYPA) was used for isolation of *Bacillus cereus*. The samples were processed as per the method of Shinagawa (1990) with slight modifications. Colonies showing light pink colour with serrated margins and having a zone of turbidity around were considered as presumptive *Bacillus cereus* colonies.

Antibiotic sensitivity of the *Bacillus cereus* isolates

All the *Bacillus cereus* isolates were examined for their antibiotic susceptibility/resistance pattern by disc diffusion technique as described by Bauer et al. (1966) against a panel of 10 antibiotics

viz ampicilin (10 μg), amoxicillin (30 μg), ciprofloxacin (5 μg) erythromycin (15 μg), penicillin G (10 μg), gentamycin (10 μg), chloramphenicol (30 μg), tetracycline (30) , streptomycin (10) and linezolid (30 μg)

Isolates were grown in nutrient broth at 37°C for 16 hrs. Individual broth cultures were smeared on the Mueller-Hinton (MH) agar plates with the help of a sterile cotton swabs. Plates were allowed to dry for few minutes, antibiotic discs (Hi-Media) were placed on the agar surface within 15 minutes of inoculation of plates and were incubated overnight at 37°C. The sensitivity or resistance of an isolate for a particular antibiotic was determined by measuring the diameter of the zone of inhibition of growth. The results were interpreted as sensitive or resistant based on the guidelines provided by National Committee for Clinical Laboratory Standards (2004).

RESULTS AND DISCUSSION

Sensitivity of all the *Bacillus cereus* isolates against a panel of ten commonly used antibiotics was carried out by disc diffusion method. Based on NCCLS interpretive standards for gram positive and/ or aerobic bacteria, the antibiotics to which most of isolates were susceptible included gentamicin, ciprofloxacin, chloramphenicol followed by streptomycin. On the contrary most of isolates turned out to be resistant against *penicillin G.* Less than 50 per cent resistance could be recorded for tetracycline (40.00%), linezolid (35.00%), erythromycin (32.5%), ampicillin (30.00%), and amoxycillin (25.00%). The results are depicted in Table.

Table : Antibiogram of *Bacillus cereus* isolates against some commonly used antibiotics

Antibiotic	No. of isolates susceptible/No. tested	No. of isolates with intermediate resistance/ No. tested	No. of isolates resistant/ No. tested
Gentamicin	40/40 (100)	-	-
Ciprofloxacin	40/40 (100)	-	-
Chloramphenicol	36/40 (90)	1/40 (2.5)	3/40 (7.5)
Streptomycin	32/40 (80)	2/40 (5)	6/40 (15)
Tetracycline	21/40 (52.5)	3/40 (7.5)	16/40 (40)
Linezolid	23/40 (57.5)	3/40 (7.5)	14/40 (35)
Erythromycin	23/40 (57.5)	4/40 (10)	13/40 (32.5)
Ampicillin	26/40 (65)	2/40 (5)	12/40 (30)
Amoxycillin	27/40 (67.5)	3/40 (7.5)	10/40 (25)
Pencillin G	1/40 (2.5)	2/40 (5)	37/40 (92.50)

(Figure in parenthesis indicates the percentage)

Bacterial antibiotic resistance which was observed soon after antibiotic introduction has been studied extensively. The resilience of the prokaryote ecosystems to antibiotic stress has been realized in the recent past. While demographic changes and drug access issues are important reasons in the developed and developing worlds, respectively, "relentless and dizzying rise of antimicrobial resistance" has contributed in a large measure to the persistence of infections as a major cause of morbidity and mortality.

Bacillus cereus isolated from various foods, clinical and environmental sources were highly susceptible to gentamicin, ciprofloxacin, chloramphenicol, streptomycin, dehydrostreptomycin, and

terramycin (Johnson, 1984; Weber, 1988 and Turnbull et al., 2004), These studies corroborate the present findings as gentamicin, ciprofloxacin; chloramphenicol and streptomycin were found to be the most effective antibiotics in order (Table). Whong and Kwaga (2007) and Luna et al. (2007) reported a resistance of 82.00% and 95.00%, respectively in *Bacillus cereus* against penicillin-G, which supports the present findings (92.50%). A varying resistance of *Bacillus cereus* to antibiotics has been reported by various authors, Whong and Kwaga (2007), Luna et al. (2007) , Weber et al. (1988) and Wong et al. (1988) reported higher susceptibility of *Bacillus cereus* to linezolid, erythromycin and tetracycline contrary to the findings of the present study. The variations could be due to difference in use of antibiotics in clinical cases in different geographical regions. The antibiotic resistance/susceptibility pattern was almost similar among the isolates from different sources.

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