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Isolation of Microorganisms from Different College Canteens of Bhilai

Bhawana Pandey

Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai, Distt. Durg, Chhattisgarh.

*Corresponding author e-mail addresses: bhawanapandey15@gmail.com

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Abstract: A food borne diseases are caused by the consumption of contaminated foods. It would seem that a food borne microbial pathogens, microbial toxic product, poisonous chemical causes food borne illness. Many microorganisms present, spoil and contaminate food in home, restaurants, canteens etc. in the present study bacterial and fungal strains were collected from different college canteens of Bhilai and isolated by various morphological characteristics, biochemical identification etc. Disc diffusion method was used to study antibiotic resistant capability against infectious microorganisms. *S. aureus* has shown resistance against Amoxicillin, Oxacillin, Ciprofloxin but sensitive to Doxycycline, Erythromycin. *Bacillus subtilis* has shown resistant against Oxacilli and Penicilin and *Pseudomonas aeruginosa* has shown resistant against Gentamycin . Some fungus isolates were also isolated and identified which are harmful to human health. Present study emphasizes presence of microorganism at different sites of college canteens, due to which the society is suffering with serious health hazards. There is need to study more sites of the city in a future to decrease food contamination, food spoilage and food illness of human being.

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INTRODUCTION

Major public health problems worldwide are caused by contaminated food. It is due to pathogenic bacteria, viruses, and toxins produced by microorganisms that contaminate the food products (Kumar *et.al.*, 2011)

Food microbiology focuses on the biology of the microorganisms including contamination of food and causing food spoilage (Saranraj *et.al.*, 2012). There is potential for a wide range of vegetables and fruits products to become contaminated with microorganisms. Some microorganisms are essential for the production of foods such as cheese, yogurt other fermented foods, bread, and wine (Saranraj *et.al.*, 2012). Bakery products are easily subjected to include physical, chemical and microbial spoilage problems. Contaminated water is mainly responsible for food spoilage by microorganisms. (Georgsson *et.al.*, 2006). Fermentation is one way that has a common effect of changing microorganisms in edible form and extending the food's shelf-life (Jones *et.al.*, 2006).

Food borne illness is a common health problem. Many different disease-causing microbes, or pathogens, can contaminate foods, so there are many different food borne infections (Georgsson *et.al.*, 2006). In addition, poisonous chemicals, or other harmful substances can cause food borne diseases. The growth and production of toxins in foods is due to enter of toxin producing microbes (David *et.al.*, 1996). Infectious microbes like: *Salmonella*, *Escherichia coli*, *Staphylococcus aureus*, *Bacillus cereus*, *Clostridium botulinum*, *Pseudomonas aeruginosa*, *Mucor*, *Aspergillus*, *Rhizopus* and *Candida* .

Diseases that are caused by eating food are usually referred to as food poisoning or food borne illnesses (Block *et.al.*, 2002). The present study is the effect of various antimicrobial drugs on the bacterial and fungal strains present in spoiled food (Vanderzant *et.al.*, 1992).

MATERIALS AND METHODS:

Sample collection: The samples were collected from raw vegetables, different cooked food, packed food products from the six different college canteens, utensil washing area and near by areas of canteens. The sample collection was according APHA. The site names were coded for simplicity as C_1, C_2, C_3, C_4, C_5 and C_6.

Isolation of Microbes: The samples were collected and isolated on nutrient agar medium, Mueller-Hinton medium and Potato Dextrose agar medium for bacteria and fungus.

Morphological identification: The isolated microbes were characterized on the basis of staining. Bacterial cultures were identified by Gram staining and fungus strains by lactophenol cotton blue staining.

Biochemical identification: The isolates were characterized by biochemical tests like indole test, Methyl Red test, Voges Proskauer test, Citrate utilization test, Nitrate Reduction test, Lactose, Sucrose, Dextrose fermentation, Catalase test, Gelatin hydrolysis, Starch hydrolysis, Oxidase test, Casein hydrolysis. All tests were performed by standard method given by Holt, 1994 .

Antibiotic Assay: The antibacterial susceptibility testing of the isolates were done by Kirby-Bauer disk diffusion method. A small inoculum of each bacterial isolate was inoculated on Mueller-Hinton plates and antibiotic discs of the following drug contents- Doxycycline Hydrochloride, Erythromycin, Amoxicillin, Oxacillin, Ciprofloxacin, Gentamycin, Nitrofurantoin, Nalidixic acid and Cefotaxine, Ofloxacin were placed on the plates, spacing them well to prevent the overlapping of inhibition zones. The plates were incubated at 37^{o}C for 24 hours, and the diameters were recorded to determine susceptibility or resistance of the isolated microorganism towards each selected antibiotics (Naveen et al., 2016)**.**

RESULTS

Bacteria and fungus can make fruits and vegetables to mushy or slimy. In the present study, different samples were collected from six different college canteen sites. Three bacterial and three fungal isolates were observed from the samples.

Table 1 shown the antibiotic resistant and sensitivity of *S. aureus* and *B. subtilis* isolates against Erythromycin, Amoxicillin and Oxacillin is mentioned and table 2 shown antibiotic resistant and sensitivity of *P. aeruginosa* against Gentamycin, Nitrofurantoin and Cefotaxine.

Table 1: Antimicrobial Susceptibility tests of *S. aureus* and *B. subtilis*

S. N	Antibiotics	Strains of bacteria	
		Staphylococcus aureus	*Bacillus subtilis*
1	Erythromycin	Sensitive	Sensitive
2	Amoxycillin	Resistant	Sensitive
3	Oxacillin	Resistant	Resistant

Table 1: Antimicrobial Susceptibility tests of *P. aeruginosa*

S. N	**Antibiotics used**	**Strains of bacteria**
1	Gentamycin	Resistant
2	Nitrofurantoin	Sensitive
3	Amikacin	Sensitive

DISCUSSION

People are at higher risk for developing food borne illness. These include pregnant women and their unborn babies, new borne, young children, older adults and people with weakened immune system. There are two kinds of food borne bacteria: one that spoils your food, one that makes you sick and it's good to be familiar with both.

It would seem rather obvious that a food borne microbial pathogens, or a microbial toxic product contaminated the food and beverages leads to one of the many different food borne illness. There is no one "syndrome" that is representative of food borne illness /disease. Different diseases have many different symptoms.

However, the microbes or toxin enters the body through the gastrointestinal tract and often causes nausea, vomiting, abdominal cramps and diarrhea, which are common symptoms in many foods borne diseases (David, 1996).

The spectrum of food borne diseases is constantly changing. A century ago, typhoid fever, tuberculosis and pasteurization of milk, safe canning clean kitchen and disinfection of water supplies have conquered those diseases. Newly recognized microbes are emerging as public health problems for several reasons. They are easily spreading throughout the environment and new microbes are getting evolved changing the ecology (Erickson *et.al.*, 2003).

The aim of our present study was to emphasize on the harmful effect of such microorganisms from different areas/sites of College canteens. We isolated different types of microorganism which include *S. aureus, P. aeruginosa, B. subtilis, A. niger, Mucor, Rhizopus*. These isolates were identified by biochemical characterization and we also observed the antibiotic susceptibility test against isolates of different strains of *S. aureus, B. subtilis,* and *P. aeruginosa*. In the antibiotic disk diffusion test on the Mueller- Hilton medium, *S. aureus* displayed inhibition zone against some antibiotic and they were resistant against Amoxicillin, Oxacillin, but sensitive to Doxycycline, Erythromycin. We also tested *B. subtilis* and *Pseudomonas* by antibiotic disc diffusion method and observed that only few antibiotics showed resistant against isolates (Qaralleh et al., 2010; Majali et al., 2015; Althunibat et al., 2016).

B. subtilis was resistant against Amoxycillin and Oxacillin but were sensitive to Erythromycin. Positive results was observed in case of *P. aeruginosa* was resistant against Gentamycin but sensitive towards Nitrofurantoin, Amikacin. Many microorganisms present are associated with the infection and spoilage, contamination of food in home and canteens and other various sites.

Major food spoilage due to microorganisms like *S.*

aureus, E. coli, Salmonella, Aspergillus, Mucor, Candida and been observed. In last few decades, several important diseases of food borne infections were detected these microorganisms are *Salmonella, E. coli, Campylobacter jejuni, , Rhizopus, Entero colitica* and many other microbes. Proper food handling practices are compulsory for each place to prevent food borne illness (Frenzen *et.al.,* 2005).

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