

Study the Contamination of Raw Fennel Seeds by Coliform Bacteria Served in the Hotels and Restaurants

Jayant Deshmukh¹, Shantanu Sonawane², D. Nagaraju³

¹Professor, ³Assistant Professor, Department of Microbiology, ²Undergraduate II MBBS Student, Dr. Vithalrao Vikhe Patil Foundation's Medical College & Hospital, Ahmednagar. 414111 State: Maharashtra, INDIA

Corresponding Author: Jayant Deshmukh

ABSTRACT

Fennel seeds served in small hotels and restaurant that eat everyone from child to adults may transmit the infection of feco-oral route. Fennel is traditionally used for medicinal and culinary purposes but most of the peoples it is use to served as herb at home, hotels and restaurant. It kept open at most of the small hotels may get chances of contamination. In this short term descriptive cross sectional observational research study 94 samples of fennel seeds were collected commonly from small hotels and restaurants to check the contaminant bacterial pathogens. One spoonful Fennel seeds sample inoculated on culture media and isolated growth was identified by using standard bacteriological methods. 64 samples (68.1%) out of 94 was found contamination and in 10 samples *Escherichia coli* was grown that indicate recent contamination by fecal flora may associated with infection occurred by feco-oral transmission. Needs health education of workers in hotels to take care of cleanliness and maintain the good hygiene.

Key Words: Fennel seeds, herb, Contamination, *E. coli*, Transmission of infection

INTRODUCTION

Many traditional medicines and medicinal plants have been used as a therapeutic agent for the maintenance of the health of the people. Fennel is traditionally used for medicinal and culinary purposes. Most of the peoples at home it is use to serve as herb to guest and added in many types of sweet dishes. It is commonly known in English as Fennel and in Hindi Saunf. [1] It served as herb at every small hotels to star level restaurant. Most of the hotels it kept open and it may get contaminated with human gut flora by housefly. If hygiene not properly maintained to take care of fennel seeds it may get contaminated by uneducated servants working in the hotels may lead with transmission of infection. Coliform bacteria specially *Escherichia coli* present in fennel seeds indicates recent contamination with gut flora. [1,2]



Image 1: Fennel seeds served at Hotels & Restaurant

MATERIAL AND METHODS

Descriptive cross sectional observational study which was carried out for 5 months from September 2019 to January 2020. Study was conducted only after the permission of Institutional Ethical Committee.

94 samples were collected commonly from crowded and small hotels and restaurants (feasible). After taking written consent from shopkeeper one spoon sample of fennel seeds from different hotels and small restaurants was collected in a sterile small plastic vials. Specimen was inoculated in nutrient broth and mixed vigorously. Then after 15 minutes one loopful of nutrient broth with the help of sterilized inoculation loop inoculated on MacConkey agar and incubated at 37°C for overnight for the growth of coliform bacteria. Next day, after overnight incubation only pink colonies on MacConkey agar were processed to identify *Escherichia coli* by using standard bacteriological methods. [3]



Image2: Fennel seeds were inoculated in Nutrient broth

RESULTS

Out of Ninety Four (94) fennel seeds specimen, growth was observed in 64 specimens (68.1%) with 122 bacterial isolates and in 30 specimens (31.9%) no growth. *Escherichia coli* were isolate in 10 specimens and in 6 specimens it was observed as mixed growth with *Klebsiella* species. Other contaminated bacteria grown on MacConkey agar were identified on microscopic observation and didn't process further for identification as species level.

Maximum contamination (81.3%) and mixed growth (85.2%) was observed in small hotels where fennel seeds were serving in open pot. All isolated *Escherichia coli* from fennel seed samples those was serving in open pot and not from closed pot.

Graph: Showing comparison between *E. coli* and other bacterial isolates.

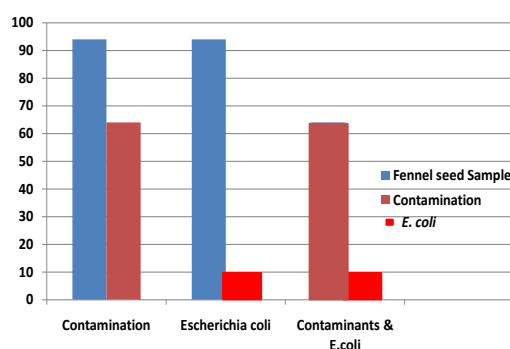


Table 1: Showing the bacteria isolated from fennel seeds specimen

Bacterial Isolate	Number of Isolate	% (Total Number of Specimen = 94)
<i>Escherichia coli</i>	10	10.6
<i>Klebsiella</i> spp.	18	19.1
Gram Positive Bacilli	42	44.7
Gram Positive Cocci	28	29.8
Gram Negative Bacilli (other than Lactose fermenting)	24	25.5
Total number of isolate	122	129.8

Mixed growth (2 or >2 bacterial isolate) was occur in 54 (57.4%) samples.

DISCUSSION

In this short term research study *Escherichia coli* was grown in 10 specimens (10.6%) of fennel seeds indicate contaminated by human and animal fecal flora. It may be due to the possibility of not properly maintaining the hygiene by hotel workers or housefly which also act as a mechanical vector and transmit the fecal material from outside waste. [4,5] Poor sanitation, cross contamination, no ideal maintenance, poor quality equipment and lack of proper, ideal control point systems guidelines and manufacturing plans can contribute to the contamination of spices and dried herbs. [6]

A number of pathogens, including *Salmonella* spp., *Bacillus cereus* and

Bacillus spp., have been identified in spices and dried herbs at point-of-sale. There have been a number of reports of food borne illness outbreaks associated with contaminated spices, dried herbs and other low-moisture foods. [7]

E. coli is the commensal flora of gastrointestinal tract and an ideal indicator of recent fecal contamination. It doesn't multiply outside the host and survive 7 days in fresh water. Mild diarrhea and dysentery to severe form of infection like enteric fever, viral hepatitis are transmitted by fecal contamination. [8]

CONCLUSION

Fennel seeds served in small hotels and restaurant that eat everyone from child to adults may transmit the infection of feco-oral route. Needs health education of workers in hotels to take care of cleanliness and maintain the good hygiene.

REFERENCES

1. Malhotra S. Fennel and Fennel seeds. Handbook of herbs and spices. 2012; Chapter 14:275-302
2. Shaker GA. Isolation and identification of fungi infected seeds of some medicinal plants. *Journal of Genetic and Environmental Resources Conservation*. 2016;4(1):21-25.

3. Mackie & MaCartney. Practical Medical Microbiology. 14th Edition, Elsevier, a division of Reed Elsevier India Private Limited, 2007. Chapter 7:131-151
4. Ilic S, Duric P, Grego E. Salmonella Senftenberg Infections and Fennel Seed Tea, Serbia. *Emerging Infectious Diseases*. 2010;(16)5:893-895
5. Van Doren JM, Neil KP, Parish M, Gieraltowski L, Gould LH, Gombas KL. Foodborne illness outbreaks from microbial contaminants in spices, 1973-2010. *Food Microbiol*. 2013;36(2):456-64.
6. Abraham CM, Thomas TM. Emerging fungal contaminants isolated and identified from raw fennel seeds. *International Journal of Scientific Research in Biological Sciences*. 2018;5(3):32-35.
7. Podolak R, Enache E, Stone W, Black DG, Elliott PH. Sources and Risk Factors for Contamination, Survival, Persistence, and Heat Resistance of Salmonella in Low-Moisture Foods. *J Food Prot*. 2010;73(10): 1919-36.
8. Ananthanarayan & Paniker's. Textbook of Medical Microbiology. 10th Edition, Universities Press (INDIA) Private Limited, 2017. Chapter 29: 279-290

How to cite this article: Deshmukh J, Sonawane S, Nagaraju D. Study the contamination of raw fennel seeds by coliform bacteria served in the hotels and restaurants. *Gal Int J Health Sci Res*. 2020; 5(1): 77-79.
