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The Study on Bacterial Quality Of Some Ready To Eat Vegetable Salads Served by Street Vendors In Aurangabad City, (M.S.) India

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Abstract:

The present study aims to determine the potency of raw vegetables to spread food-borne diseases to the consumers, which is served by the street vendors at different areas in Aurangabad City. Collected samples when analyzed with chronological tests in order to determine the presence of any pathogenic (primarily from fecal origin) bacteria, it was found that total 36 samples of vegetables and salads were analyzed and 96 bacterial pathogens were isolated. Percent analysis of the isolates revealed that the *E. coli* is predominant with (36.45%), followed by *E. aerogenes* (20.04%), *Staphylococcus aureus* (17.70%), *Pseudomonas spp* (10.41%), *Salmonella spp* (4.16%). Based on the statistical data and comparing it with standard reference values it is clearly said that, these vegetable sold as salad by street vendors are deadly for the consumers and can cause food-borne diseases among them. People with suppressed immunity are prone to suffer with infection by such opportunistic pathogens. Proper Hygienic practices should be followed by the food handlers and street vendors and monitored by the concerned government authorities in order to avoid the incidences of Food poisoning, Food-borne illnesses and Food intoxication.

Key Words: Salad Vegetables, Food-borne diseases, Food-borne illness, Food Poisoning, Fecal Contaminants, Immunity, Street vendors, etc

Introduction:

In India, the street food trade is a growing sector with its expansion linked with urbanization and the need of urban populations for both employment and food. However, the microbiological status of popularly consumed raw street foods, general hygienic and vending practices are not known [1]. Outbreaks of salmonellosis in humans have been attributed to consumption of contaminated tomatoes, mustard cress, bean sprouts, cantaloupe, and watermelon [3]. Salad vegetables are consumed without any heat treatment, sometimes without heating and peeling and therefore the possibility of food-borne diseases is more. Vegetables can become contaminated with pathogenic microorganisms during harvesting through human harvesting, harvesting equipment, transport containers, wild and domestic animals. The pathogenic microorganism, which reside in the intestine of humans and animals are more likely to contaminate vegetables through faces, sewage, untreated irrigation waste or surface water. Unsafe water used to rinsing the vegetables and sprinkling to keep them fresh is also a source of contamination. Several outbreaks of food-born intoxication have been linked to the consumption of contaminated raw sprouts, vegetables and fruits. In less-developed areas of the world, fresh crops continue to be irrigated with untreated sewage water [2]

Material And Method:

1) **Sample Collection**:

   Total 36 samples of different salad vegetables such as Beet, Cucumber, Fenugreek, Coriander, Radish, Carrot, and Spinach were collected from various local markets and street venders of Aurangabad city. All vegetable samples were brought in sterile container and analyzed within 3 hrs of collection.

2) **Isolation and identification of bacteria**:

   Isolation and identification of the bacteria is done by pour plate method. A 25g sample were weigh and rinsed in a beaker containing 100 ml sterile distilled water. The rinsed water sample are used for dilution of 10^{-2} and 10^{-4} . 0.1ml of each sample was used to

inoculate on MacConkeys agar plate and was incubated at 37^0C for 24hrs. The plates were examined for colony characterization. The isolated colonies were sub-cultured for further tests and maintained on Nutrient agar slants. For 36 vegetable salads 96 cultures were isolated and identified on the basis of their morphological characteristics, and biochemical tests etc.

Result and Discussion:

Vegetables get contaminated with pathogenic microorganisms while growing in fields, during harvesting, post harvesting handling, processing and distribution.

(Table:1.1)

Vegetable	***No of Samples***	***E.coli***	***Enterobacter earogenes***	***Staphylococcus aureus***	***Pseudomonas spp***	***Salmonella spp***
Beet	4	3	4	2	1	-
Cucumber	5	5	3	**4**	**3**	1
Fenugreek	4	**8**	2	3	-	**2**
Coriander	6	5	3	2	1	-
Radish	7	3	4	3	-	-
Carrot	5	5	4	1	**3**	-
Spinach	5	6	**5**	2	2	1
Total	36	35	25	17	10	4
= %		**36.45**	**26.04**	**17.70**	**10.41**	**4.16**

Total 36 samples of vegetables salads were analysed and 96 bacterial pathogens were isolated. Percent analysis of the isolates revealed that the *E. coli* is predominant with (36.45%), followed by *E. aerogenes* (20.04%), *Staphylococcus aureus (*17.70%), *Pseudomonas spp* (10.41%), *Salmonella spp* (4.16%). The presence of *E.coli*, *E. aerogense* and *Staphylococcus aureus* is observed on all samples of salad vegetables. In which *E. coli* is found predominant on Fenugreek, followed by Spinach, Cucumber, Coriander, Carrot, Beet and Radish. *Enterobacter aerogense* is found predominant on Spinach where as *Staphylococcus aureus* predominant on

Cucumber. Pseudomonas spp present on Cucumber and Carrot and not found on Fenugreek and Radish. *Salmonella spp* is found on only Cucumber Fenugreek and Spinach.

Presence of coliforms in salad vegetables indicates potential hazard of ready to eat vegetable salads to cause food born intoxication and illness. The contamination may occur during post harvesting handling of salad vegetables. In salad samples presence of *Enterobacter aerogense* indicates contamination with sewage, fecal matter and soil because it is normal habitat of the bacteria and the consumer is on high risk as they consume it raw. Not only this but another type of organism found in most of the vegetable salad sample is *Pseudomonas spp* which can also cause food-borne illness and found in sewage and fecal matter. *S. aureus* Contamination in salad vegetable is due to its presence on skin and nasal secretion may be transmitted by food handlers at any stage during preparation. Salmonella spp contamination also found in some salad vegetable samples and which may be because of use of sewage water for washing the vegetables in order to keep them fresh for long time in the market place. These organisms are also spread through infected persons during post harvesting handling by the vendors and sometimes consumers too.

The present study revealed the potential hazard of some ready to eat vegetable salads sold in the Aurangabad city by street vendors. Consumers of such vegetable salads may suffer from different food-borne illnesses. In order to reduce the risk of food-borne illness and intoxication, the salad vegetables should be washed properly with clean water before chopping. The chopped vegetables sometimes are kept open for decoration purposes by the street vendors, which is also a major source of contamination and hence the consumers should avoid to eat at such places or guide them to cover the vegetables to avoid such type of contamination. Proper knowledge and awareness regarding food safety amongst food handlers and consumers may minimize the risk of food-borne illness caused by vegetable salads and other types of foods too.

Based on the statistical data and comparing it with standard reference values it is clearly said that, these vegetable sold as ready to eat salads by street vendors are deadly for the consumers and can cause food-borne diseases among them. People with suppressed immunity are susceptible to suffer with infection by such opportunistic pathoges. Proper Hygienic practices should be followed by the food handlers and street vendors and monitored by the concerned

government authorities in order to avoid the incidences of Food poisoning, Food-borne illnesses and Food intoxication.

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