Fresh Produce as a Vehicle for the Transmission of Bacterial Pathogens to Humans



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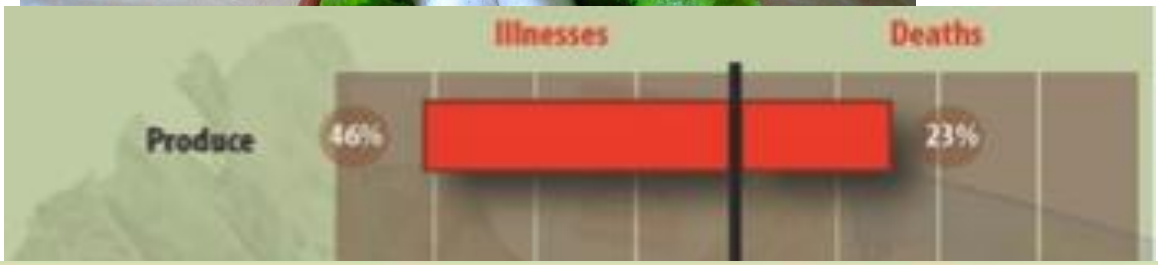
7th Indo-Global Summit and Expo on
Food & Beverages

- ✓ **Fresh fruits and vegetables, often eaten without cooking or minimal further processing, are important component of a healthy diet**

- ✓ **The consumption of fresh fruits and vegetables is encouraged to protect against a wide range of diseases including cancer and cardiovascular diseases**









Examples of large teria.

Bacterial strain	Produce type	Year	Number of cases	Reference	Country
Escherichia coli O157:H7	Spinach	2012	33	http://www.cdc.gov/ecoli/2012/O157H7-11-12/	USA
E. coli O26	Clover sprouts	2012	29	http://www.cdc.gov/ecoli/2012/O26-02-12/	USA
E. coli O157:H7	Romaine Lettuce	2011	60	(84)	USA
E. coli O104	Fenugreek seeds	2011	4,075	(18, 22, 45)	Germany, France, USA
Salmonella enterica sv. Enteritidis	Alfalfa sprouts	2011	25	http://www.cdc.gov/salmonella/sprouts-enteritidis0611/070611/index.html	USA

***Microbes Environ.*, 2014**

CDC, 2013

California (USA)			al. (2001)
Michigan (USA)			
Multistate outbreak USA	*E. coli* O157:H7	Packaged spinach	Wendel et al. (2009)
Hamburg (Germany)	*E. coli* O104:H4	Fenugreek sprouts	Bielaszewska et al. (2011)

***Front. Microbiol.*, 2014**

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'Vegetables full of river toxins'

TNN | May 15, 2014, 12.28 AM IST

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Plates loaded with pesticides: Survey shows fruit, vegetables are high on chemical content

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Factory waste adds to toxic levels of vegetables

TNN | Jul 12, 2010, 04.30 AM IST



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Short Communication

Outbreak investigation: *Salmonella* food poisoning

Col R. Kunwar [a,*], *Maj Harpreet Singh* [b], *Maj Vipra Mangla* [c], *Maj R. Hiremath* [d]

[a] *Col Health, HQ ATNK & K Area, Island Grounds, Chennai 600009, India*
[b] *DADH, HQ 25 Inf Div, C/O 56 APO, India*

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Postgrad Med J 2002;**78**:124–126

PostScript

Watermelon poisoning

Food borne diseases are a result of ingestion of foods contaminated by either infectious or toxic agents. Infection of six members of a family is described here.

The head of a family (61 years), his wife (59 years), their son (38 years), daughter in law (35 years), and two male grandchildren (14 and 11 years respectively) were admitted to hospital with gastroenteritis. About four hours earlier they had consumed pieces of freshly cut watermelon.

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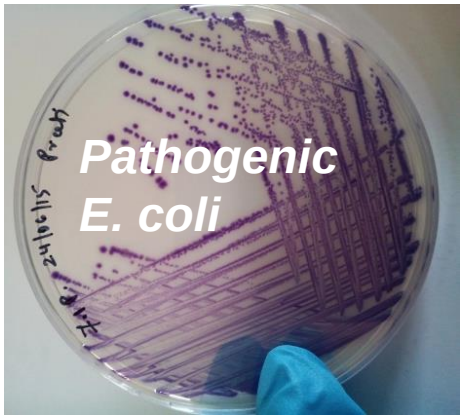
Human Enteric Pathogens on Fresh Vegetables and Fruits

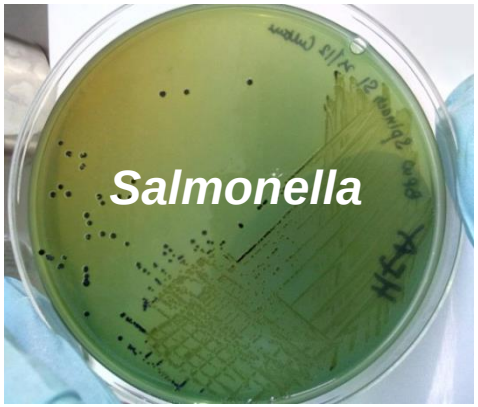














urinary tract infection



Meningitis



Diarrhea

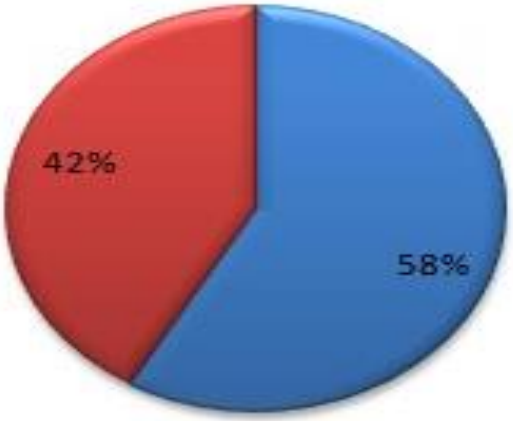


Typhoid



Food Poisoning

Human enteric pathogens load in Fresh Produce

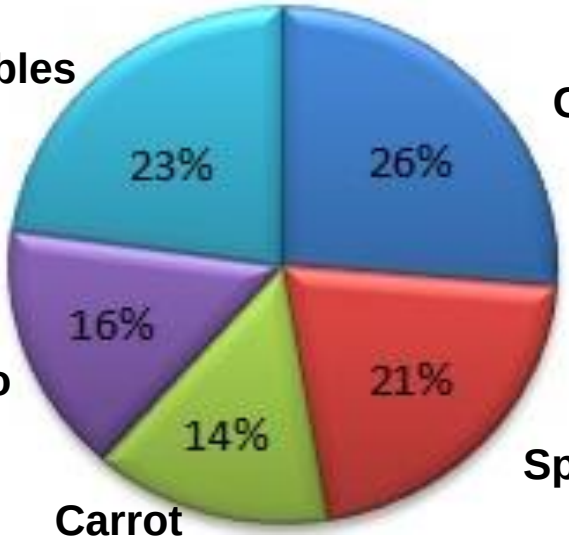


Total no. of sample:90

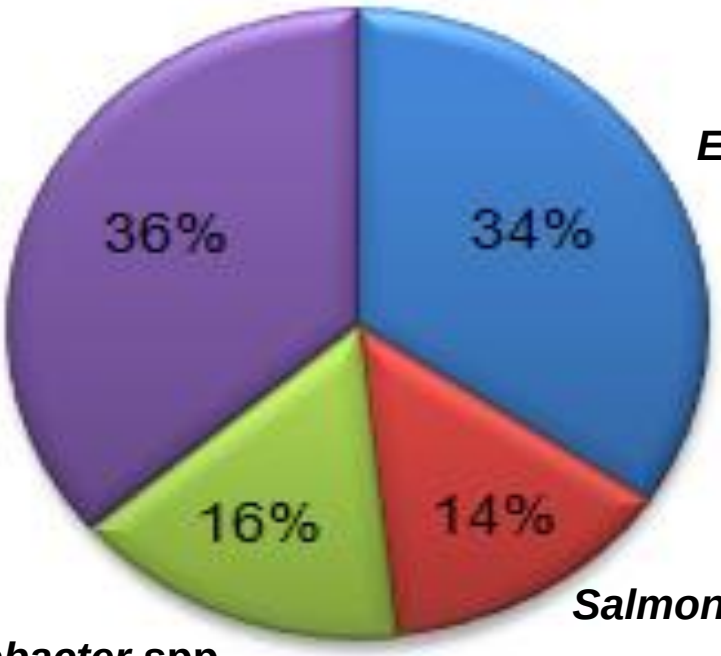
Contaminated samples

Uncontaminated samples

Distribution of human enteric pathogens in different vegetables



Human enteric pathogens most frequently isolated from vegetables



Other enteric bacteria

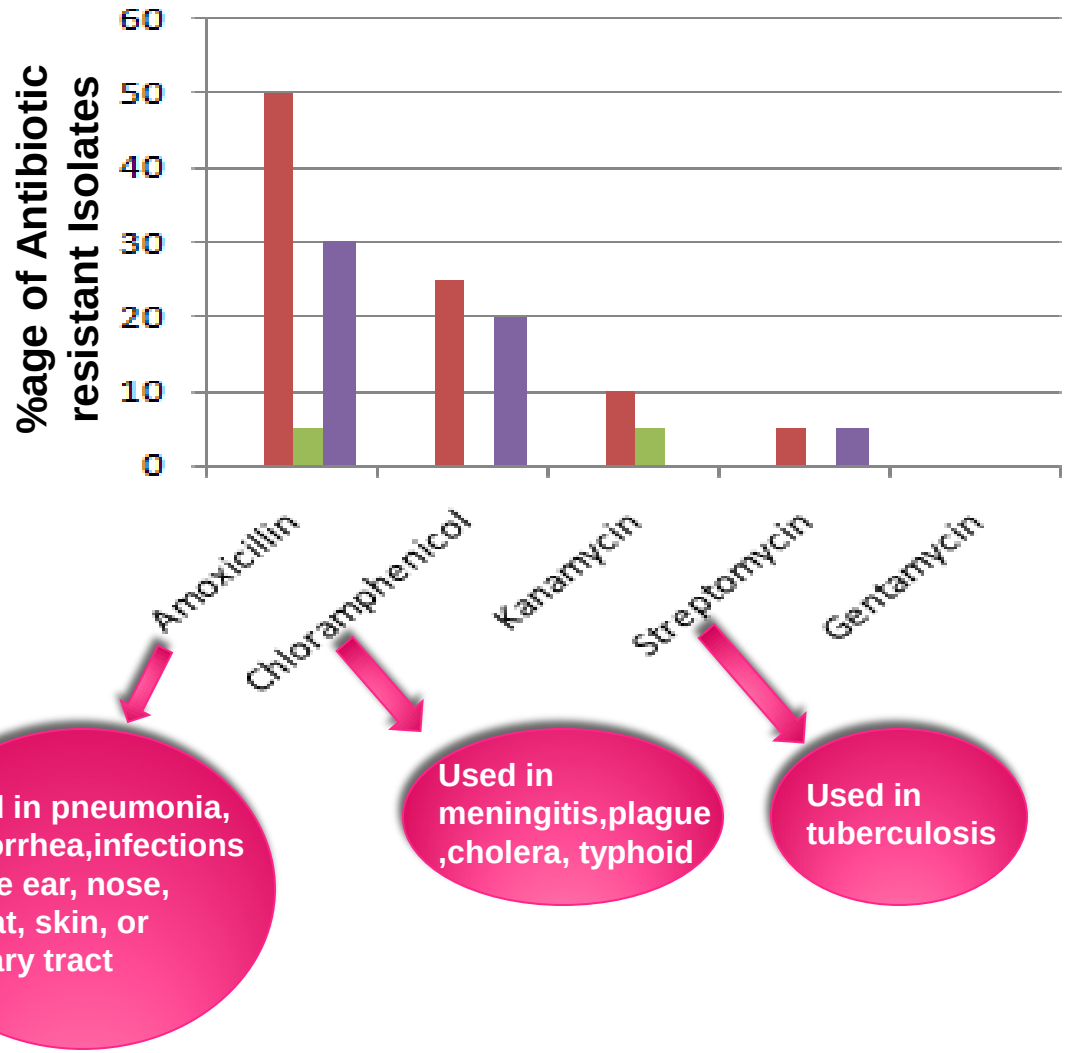
E. coli

***Salmonella* spp.**

***Enterobacter* spp.**


COMBAT
DRUG
RESISTANCE
NO COMMITMENT
WEAK SURVEILLANCE
POOR DRUG QUALITY
IRRATIONAL DRUG USE
NO INFECTION CONTROL
LACK OF RESEARCH
DRUG RESISTANCE
No action today,
no cure tomorrow
7 APRIL 2011 WORLD HEALTH DAY
World Health Organization

Incidence of Antibiotic Resistance in Human Enteric Pathogens Recovered From Vegetables and Fruits



Summary

- The present study provide evidences that human enteric pathogens such as *Salmonella* spp. *and pathogenic E.coli may* colonize and persist in non-animal hosts

- In addition, the present study shows that antibiotic resistant bacteria recovered from fresh produce can act as source for the spread of antibiotic resistance and may also contribute to the spread of antibiotic resistance in the microbes colonized in human gut

- Moreover, occurrence and distribution of human pathogens including antibiotic resistant pathogens could be hazardous from public health point of view

Acknowledgement

Dr. Arvind Pratap Singh, Central University of Rajasthan

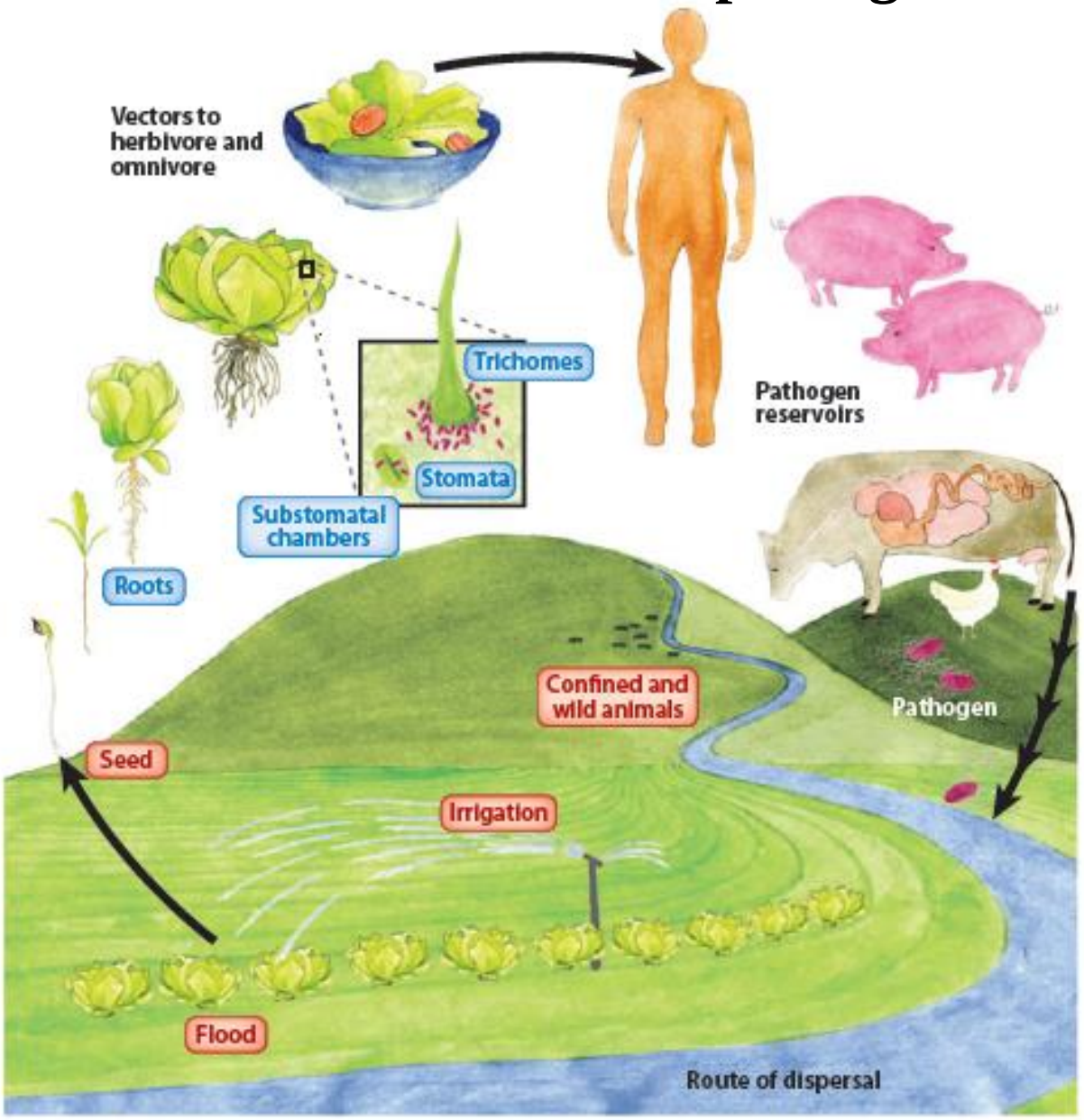
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Mr. Vijay V Saharan, Central University of Rajasthan

All members of the Department of Microbiology, Central University of Rajasthan


Thank you

Infection routes of human enteric pathogens in ecosystem



Annu. Rev. Phytopathol., 2012