

KLEBSIELLA SPP. AS AN IMPORTANT CAUSE OF FOOD CONTAMINATION

By

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ABSTRACT

A total of 150 food samples food handlers and utensils swabs were used for the isolation of *Klebsiella* spp as it considered a cause of food contamination and a source of gastrointestinal infection. That, the highest percentage of *klebseilla* spp were isolated from raw food this raw food (50%) which include chicken, meat, and fresh vegetables. while the percentage was (30%) from the utensils then the employers' oral swabs (23.3%) and hand swabs (20%). No isolates were found at cooked food and nasal swabs.

INTRODUCTION

Food-borne infections are common and constitute an important health and economic burden globally. Among the factors responsible for this burden are centralization and globalizations of food supply, increasing microbial resistances to antibiotic and growth of immunosuppressed subpopulations (**Rocourt *et al.*, 2003; Lynch and tauxe, 2009**) A number of reports showed that there was an increase in the number of outbreaks of food-borne diseases associated with consumption of fresh products (**Beuchat, 1995; De Roever, 1998**). In most of the reported outbreaks of gastrointestinal disease, fresh produce was found to be responsible for bacterial contamination (especially with members of *Enterobacteriaceae* family). In 1998, a case of *K. pneumoniae* infection was reported in Houston, Texas. The patient suffered from symptoms of gastroenteritis rapidly lead to multiorgan failure (**Sabota *et al.*, 1998**). **Mpuchane and Gashe, 1996**, reported presence of *K. pneumoniae* in African spider herb (*Cleome gynandra*) and dried bush okra (*Corchorus olitorius*) in Botswana. Another report from Libya showed presence of *K. pneumoniae* in fruit juices (**Ghenghesh *et al.*, 2004**). *Klebsiella pneumoniae* (*K. pneumoniae*) is a rod shaped non-motile, Gram negative, lactose fermenting and facultative anaerobic bacterium which is usually found in the normal flora of skin, mouth, and intestines.

K. pneumoniae is one of the most important members of *Klebsiella* genus in Enterobacteriaceae family, which is responsible for pneumonia (the destructive lung inflammation disease). Besides *Klebsiella* is found to cause infections in the urinary and lower biliary tract (Lopes *et al.*, 2005; Ryan and Ray, 2004). *Klebsiella* is opportunistic pathogens that primarily attack immunocompromised individuals and hospitalized patients (Podschun and Ullmann, 1998). Raw vegetables can be contaminated with harmful enteric bacteria in farm, pre-harvest, harvest and post-harvest activities and even in transportation and processing line. Untreated wastewater and animal/human faeces are considered as usual sources of contamination (Beuchat, 2002; Gupta *et al.*, 2009). *K. pneumoniae* was also recognized as an important food-borne pathogen in fresh products (Hamilton *et al.*, 2006). Due to the high contamination rate of vegetables with food pathogens, it is essential to control the hygienic level associated with these products to reduce or minimize risk of food-borne disease (Nguyen and Carlin, 1994; Willocx *et al.*, 1994; Francis *et al.*, 1999).

MATERIAL AND METHODS

Sampling:

150 food, food handlers utensils swab samples were used for the isolation of *Klebsiella* spp. All the samples were taken from the different stages of food manufacturing or preparation (prior, during and after preparation) to determine the impact of food manufacturing or preparation practices on growth of food poisoning microorganisms, the collected samples included ready to eat (RTE) foods, fresh vegetables, raw foods, improper cooked foods, cooked foods and food contact surfaces and employees swabs (throat, nasal and hand swabs). Each sample was kept in a separated sterile plastic bag and preserved in an ice box then transferred to the laboratory under complete aseptic conditions without undue delay and examined as quickly as possible. The collected samples were subjected to the microbiological examination to evaluate their quality.

Culture and identification of *Klebsiella* spp.(Quinn *et al* 2011):

The collected food samples were homogenized with sterile peptone water and thoroughly mixed using sterile homogenizer for 1-1.5 minutes. The collected swabs were directly cultured onto MacConky agar. The inoculated plates were incubated for 24-48 hours at 37°C. Colonies were identified as lactose fermenting mucoid colonies. the suspected colonies were picked up and tested for Gram's reaction. Colonies of Gram negative bacilli were subjected to TSI

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(Triple sugar iron) test., oxidase test, indole test, citrate test, urease test and subjected to API 20 E system for conformation and species determination

RESULTS

Table (1): Results of klebseilla species isolated from the examined samples.

Sample	Number of sample	Positive	Percentage
Raw food	12	6	50%
Cooked food	38	-	0%
Hand swab	30	6	20%
Nasal swab	30	-	0%
Oral swab	30	7	23.3%
Utensils swab	10	3	30%
Total	150	22	14.6%

Table (1) illustrated that, the highest percentage of klebseilla spp were isolated from raw food with a percentage of (50%) which include chicken, meat, and fresh vegetables. The second percentage was the utensils (30%) then the employers' oral swabs (23.3%) and hand swabs (20%). No klebseilla spp were found at cooked food and nasal swabs.

DISCUSSION

Poor hygienic practices and improper handling are considered as major factors for contamination of food (**Ponniah et al., 2010; Tunung et al., 2010; Usha et al., 2010; Yang et al., 2008 High**) contamination level of klebseilla spp in raw food specially chicken and meat can be considered due to the normal inhabitance of these bacteria in the intestinal tract of animal and poultry so contamination during slaughter and in slaughter houses have a great role in the presence of klebseilla spp in these samples. In other hand the contaminated employers' hands during the preparation of food can transmit these bacteria to the prepared food. The main sources for this contamination are as follows; animal waste fertilizers, contaminated irrigation water and post-harvest washing using contaminated water. (**Duncan and Razzell, 1972; Splittstoesser et al., 1980 Zhao et al., 1997; Soriano et al., 2000**). Corms are associated with both soil and decaying vegetation. The survival of enteric bacteria in soil is particularly one of the main reasons in the contamination of raw vegetables (**Geldreich et al., 1962**). Microbial contamination of fresh vegetables with *K. pneumoniae* is an important food

safety concern. Consumption of contaminated fresh vegetables can represent a potential risk to consumer's health, particularly in immunocompromised individuals. As mentioned before, *K. pneumoniae* is considered opportunistic pathogens, so healthy adults are not considered to be at high risk of developing infections and illness.

CONCLUSION

In conclusion it was found that can *Klebsiella* spp cause gastrointestinal symptoms and can contaminate food especially raw food from contaminated soil, hands and water so well cooking of food and avoid consumption of raw food as well as well washing to vegetables must be done also high hygienic measured for food handlers must be taken.

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