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Isolation of Escherichia coli *O157:H7 from Costa Rican food.*

Brief Communication

Alejandra Reuben, Hellen Treminio, María L. Arias, Laura Villalobos.

Facultad de Microbiología, Universidad de Costa Rica, San José, Costa Rica.

SUMMARY.

Five *Escherichia coli* O157:H7 strains were isolated from food samples in Costa Rica. Three of them were isolated from chicken giblets (3/150), and two from raw milk (2/150). Chicken giblet samples were purchased in markets in San José, milk samples were obtained from milk producers from the Metropolitan Area of San José, Costa Rica. This is the first report of isolation of this bacteria from food samples in Costa Rica and the Mesoamerican region. ***(Rev Biomed 2002; 13:273-276)***

Key words: *Escherichia coli* O157:H7, bacterial contamination of food.

RESUMEN.

Aislamiento de *Escheríchia coli* O157:H7 a partir de alimentos costarricenses.

Cinco cepas de *Escheríchia coli* O157:H7 fueron aisladas a partir de muestras de alimentos en Costa Rica. Tres de ellas fueron aisladas a partir de visceras de pollo (3/150) y dos de leche cruda (2/150). Las muestras de visceras de pollo fueron adquiridas en supermercados detallistas ubicados en San José, y las muestras de leche cruda se obtuvieron de productores de leche del área Metropolitana de San José, Costa Rica. Este el es primer reporte del aislamiento de esta bacteria a partir de muestras de alimentos de Costa Rica y la región Mesoamericana. ***(Rev Biomed 2002; 13:273-276)***

Palabras clave: *Escheríchia coli* O157:H7, contaminación bacteriana de alimentos.

INTRODUCTION.

E. coli O157:H7 has emerged as a new pathogen and is found worldwide. This bacterium was first recognized as a food bom pathogen in 1982 and can cause haemorrhagic colitis and other diseases such as hemolytic uremic syndrome and thrombotic thrombocytopenic purpura (1-3) in the consumption of contaminated food, water or by human to human transmission (4).

Ruminant's intestinal tract is the prime reservoir of the bacterium, so food of animal origin has been identified as a vehicle of transmission, although it is not the only one described (5).

Recovery frequency of this bacterium from food is low. The contamination levels of food associated

Corresponding address: Dra. María L. Arias. Facultad de Microbiología, Universidad de Costa Rica, 2060 San José Costa Rica. Fax (506) 207-5440, E-mail: mlarias@cariari.ucr.ac.cr
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with outbreaks (10-6200 CFU/g) (6) and the infecting dose described (as low as 2 cells/25g) is also low.

Infection by *E. coli* O157:H7 has become a very important food-borne disease in developed countries. There have been reports on the isolation of this organism in different parts of the world. Nevertheless, there are almost no reports of the isolation of *E. coli* O157:H7 in tropical countries. In Costa Rica, at least seven clinical cases in children, two of them fatal, have been reported (7), although there are no studies evaluating its presence in risky food. Therefore, in this study we describe the first isolations of *E. coli* O157:H7 from Costa Rican food samples.

MATERIAL AND METHODS.

Between July 2000 and April 2001, 450 different food samples, including 150 samples of minced meat, 150 samples of chicken giblets, randomly purchased from retail grocery stores in San José, Costa Rica, and 150 samples of non-pasteurized milk acquired directly from milk producers were analyzed for the presence of *E. coli* O157:H7. All samples were kept at 2-5°C during transportation to the laboratory, which never exceeded 4 h.

25 g (or mL) were taken from the samples were combined with 225 mL of EC-novobiocin medium (Oxoid) in a sterile poiyethyiene bag, pummeled with a Stomacher for 2 min and incubated at 35°C for 24 h. 0,1 mL of this enrichment media were surface plated on duplicate sorbitol McConkey agar (SMA) (Oxoid). The SMA plates were incubated at 35°C for 20 to 22 h. Sorbitol negative colonies were streaked on sorbitol McConkey agar supplemented with 4-methyl umbelliferyl β D glucoronide (MUG) 0,2 g/L (Oxoid) in order to facilitate the detection of the bacteria. *E. coli* O157:H7 colonies were confirmed by standard biochemical tests for the identification of *E. coli*, including TSI reaction, oxidase, urease, indole-methyl red-Voges Proskauer citrate and lysine descarboxilase tests and examination with API 20E test strips (Biomerieux Vitek, Inc, Hazelzood, Mo).

Serological confirmation included the use of *E. coli* O157:H7 latex agglutination assay (Unipath, Oxoid, US) and the Bacto *E. coli* H antiserum H7 assay (Difco) according to the manufacturers' specifications.

RESULTS AND DISCUSSION.

E. coli O157:H7 has been isolated from dairy cattie, calves, chickens, swine and even sheep and from their meat; although its incidence and prevalence are highly variable (8-10).

Chicken and hen eggs have been considered as vehicles of transmission of this pathogen, since chicks can be colonized by small populations of *E. coli* O157:H7 and continue to be long-term shedders (11). Nevertheless, diverse results have been obtained from the isolation of *E. coli* O157:H7 from chickens. Griffin and Tauxe (4) did not recover this bacterium from raw chicken, contrasting with research carried out by Samedpour *et al*. (12) in Seattle, where 12 of 33 chicken samples were positive; to the study of Beey *et al* (13) where they report the colonization of chicken by this bacterium.

Our results show isolation of *E. coli* O157:H7 in 2% of the samples from chicken giblets. This result is worrying, because it has been reported (14) that this bacterium in chicken giblets is capable of surviving and multiplying even stored between 0, 6º and 12°C.

Since chicken giblets are consumed well cooked, the importance of this finding relies in the potential cross contamination focus they represent during processing, handiing and marketing of the product.

Milk has also been associated with outbreaks due to *E. coli* O157:H7, such as the reported in Canada from non-pasteurized milk, that affected several children (15) or one reported in Montana from contaminated post-pasteurized milk (16,17). The survival of this microorganism in low pH milk derivales has also been documented, so non pasteurized fermented products can represent a transmission vehicle of the bacterium (18).

Our results show *E. coli* O157:H7 in 1,3% (2/

150) in non-pasteurized milk, highlighting the importance of consuming heat processed milk in order to reduce the risk this product may represent for the transmission of diverse pathogens.

Meat and meat products have been described as the principal transmission vehicles of this bacterium, hamburgers being the most common food involved (18). The isolation percentages of the bacterium in this product are low, ranging from nuil to 3,7%. We did not isolate this bacterium from the minced meat samples evaluated, but this does not indicate the absence of the bacteria in these food samples. Meat continues to be a very important transmission vehicle of this bacterium. This negative result may be explained by on the methodology used for isolating this bacterium, which greatly influences the isolation rates. The sensitivity and specificity of the methods used to isolate *E. coli* O157:H7 are continually improving, this the isolation rates of this bacteria will increase in the future.

It is important to highlight that food in Costa Rica may harbor this pathogen, so the use of Good Manufacturing Practices and the introduction of Hazard Analysis and Critical Control Points (HACCP) programs in food industry and services will reduce the potential risk for public health that this pathogen represents.

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