



# Tracking Foodborne Pathogens from the Ground to the Dinner Plate



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## ABSTRACT

The U.S. Public Health Service estimated approximately 76 million cases of diarrheal diseases with approximately 5,000 – 9,000 deaths in the U.S. each year due to pathogenic bacteria. Pathogenic bacteria such as; *Salmonella* spp., *L. monocytogenes*, *Campylobacter jejuni*, *Staphylococcus aureus*, *Shigella* species, *Clostridium botulinum*, *Vibrio vulnificus*, *V. parahaemolyticus* and *V. cholera* are the most pathogenic bacteria of concern in the U.S. Shrimps, jalapenos, and tomatoes are popular foods among Americans. Much of these products are imported from other parts of the world with less intense food regulation enforcement. Residents of the Mississippi Gulf Coast continue to consume local and imported food products. The purpose of this project was to determine whether or not such food items were contaminated with the mentioned pathogens above.

## MATERIALS

Three products from local markets were chosen (shrimp, jalapenos, and tomatoes) with the intent of determining the prevailing pathogens (if any), carried.

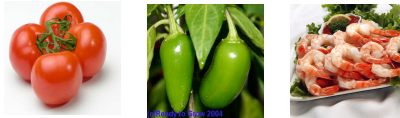


Figure 1. Food Items (tomatoes, jalapenos, and shrimp).

## METHOD

**Isolation and identification of shrimp, tomatoes, and jalapenos bacteria:** Total counts of aerobic bacteria were determined from shrimp, tomatoes, and jalapenos. Under aseptic conditions, samples of 25 g were taken by sterile knife and homogenized for 2 min in 225 ml of sterilized 0.1% peptone water at room temperature, by using a Lab-blender 400 stomacher (Seawerd, London, UK).

## METHOD

Serial dilutions ( $10^{-1}$  to  $10^{-5}$ ) were prepared from the homogenate with 0.1% peptone water. Total aerobic counts were determined; 100  $\mu$ l of each dilution were plated onto Tryptone Soy Agar (TSA) and incubated at 37°C for 48 h. Thirty colonies were randomly picked (to pick many different phenotypes) from every sample and re-streaked on TSA three times to obtain pure cultures. Isolated microorganisms were identified using biochemical identification rapid method (API diagnostic strips; BioMerieux, Durham, NC).

## RESULTS

|             | Shrimp            | Tomatoes          | Jalapenos         |
|-------------|-------------------|-------------------|-------------------|
| Total Count | $1.5 \times 10^4$ | $3.9 \times 10^3$ | $1.7 \times 10^3$ |

Table 1. Bacterial counts (log CFU g<sup>-1</sup>) of Shrimp, Tomatoes, and Jalapenos.

## RESULTS



Figure 2. API Identification Strips.

| Bacteria                            | Tomatoes | Shrimp | Jalapenos |
|-------------------------------------|----------|--------|-----------|
| <i>Aeromonas salmonicida</i>        | +        | +      | +         |
| <i>Chromobacterium violaceum</i>    | -        | -      | +         |
| <i>Chryseobacterium indologenes</i> | -        | -      | +         |
| <i>Ewingella americana</i>          | -        | +      | -         |
| <i>Ochrobactrum anthropi</i>        | -        | -      | +         |
| <i>Pasteurella pneumotropica</i>    | -        | +      | +         |
| <i>Pseudomonas aeruginosa</i>       | -        | -      | +         |
| <i>Pseudomonas fluorescens</i>      | +        | -      | -         |
| <i>Pseudomonas</i> spp.             | -        | -      | +         |
| <i>Serratia marcescens</i>          | +        | -      | -         |
| <i>Stenotrophomonas maltophilia</i> | +        | +      | -         |
| <i>Yersinia enterocolitica</i>      | -        | -      | +         |

Table 2. Isolated bacteria from tomatoes, shrimp, and jalapenos.

## CONCLUSIONS

None of these food items were contaminated with the most pathogenic bacteria of concern in the U.S. However, consumers are encouraged to wash/cook these imported food items sufficiently to destroy any bacterial contaminants before consumption.