Tracking Foodborne Pathogens from the Ground to the Dinner Plate

Erwin W. Morales[a] and Barakat S. M. Mahmoud[b]

[a] Cooperative Intern Program Mississippi Gulf Coast Community College – Jackson County Campus Biological Science Students, Gautier, MS 39553
[b] Experimental Seafood Processing Laboratory, Mississippi State University, 3411 Frederic Street, Pascagoula , MS 39567

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 (Seaward, 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 µl of each dilution were plated onto Tryptone Soy Agar (TSA) and incubated at 37ºC 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 x10^4	3.9 x 10^3	1.7 x 10^3

Table 1. Bacterial counts (log CFU g^{-1}) of Shrimp, Tomatoes, and Jalapenos.

RESULTS

Figure 2. API Identification Strips.

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

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.