Detection of Salmonella spp. in fresh vegetables purchased from wet markets and supermarkets using real-time PCR

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INTRODUCTION

• second HIGHLY consumed food by Filipino community
• vehicle for TRANSMISSION of human pathogens
• HIGHEST PRIORITY = commodities of concern in terms of microbiological hazards

Salmonella spp.

➢ major pathogen causing foodborne outbreaks (food safety & security)
➢ causative agent of SALMONELLOSIS (Gastroenteritis) & TYPHOID FEVER
➢ Salmonella related infection cases in the Philippines = less documentation and mostly UNREPORTED

OBJECTIVES

A Detection of Salmonella spp. in fresh leafy vegetables from various sampling sites (Wet markets & Supermarkets) using a validated real-time PCR method

B Comparison of incidence rates of Salmonella spp. between the two sampling categories.

MATERIALS AND METHODS

SAMPLE COLLECTION

WET MARKET

SUPERMARKET

SAMPLE PREPARATION

ENRICHMENT

DNA EXTRACTION

REAL-TIME PCR ANALYSIS

CONFIRMATION OF POSITIVE RESULTS

FRESH VEGETABLES

• second HIGHLY consumed food by Filipino community
• vehicle for TRANSMISSION of human pathogens
• HIGHEST PRIORITY = commodities of concern in terms of microbiological hazards

Green leafy & yellow vegetables: 2nd HIGHLY CONSUMED

Mean one-day per capita food intake by food groups, Philippines, 2008

... detection of microbes causing foodborne maladies is an important approach to identify its root cause and to mitigate future outbreaks...

Reagent Preparation + Template Addition

Real-Time PCR Run

Chromogenic Medium RAPID® Salmonella

Data Analysis
RESULTS

SAMPLE COLLECTION

WET MARKET

SUPERMARKET

Individual Vegetables

n = 123 vegetable samples

PREVALENCE OF SALMONELLA SPP. CONTAMINATION IN LEAFY VEGETABLES

<table>
<thead>
<tr>
<th>Plant Family</th>
<th>Common Name</th>
<th>n</th>
<th>No. of positive samples</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asteraceae</td>
<td>Iceberg Lettuce</td>
<td>5</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>Green Ice Lettuce</td>
<td>7</td>
<td>1</td>
<td>14%</td>
</tr>
<tr>
<td>Brassicaceae</td>
<td>Pechay Native</td>
<td>11</td>
<td>1</td>
<td>9%</td>
</tr>
<tr>
<td>Cucurbitaceae</td>
<td>Squash Leaves (Kalabasa)</td>
<td>4</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>Convolvulaceae</td>
<td>Sweet Potato Tops (Camote)</td>
<td>11</td>
<td>2</td>
<td>18%</td>
</tr>
<tr>
<td>Basellaceae</td>
<td>Malabar Spinach</td>
<td>10</td>
<td>4</td>
<td>40%</td>
</tr>
</tbody>
</table>

Out of 123 samples:
- 89% NEGATIVE (n=110)
- 11% POSITIVE (n=13)

Occurrence of Salmonella contamination due to:
- Environmental
- Human activities

During pre- & post-harvest

Presence of Salmonella in various leafy vegetables (usually eaten raw or blanched)

Alarming & pose significant threat in acquiring food-borne diseases

CONCLUSION & RECOMMENDATION

Findings in this study proffered evidence that Salmonella contamination can be observed in all sampling categories. Likewise, results show that Salmonella incidence rates among wet markets and supermarkets are likely similar despite the differences of the two sampling categories. This suggests that there is a need to devise strategies that may mitigate any microbial contamination and to increase awareness of the consumers regarding food safety and security. Moreover, utilization of a validated Real-Time PCR method can rapidly and effectively detect Salmonella spp. due to its high sensitivity and specificity rates.