Microbiological Safety of Retail Food

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Platform  : CEO Dialogue with Food Services Associations
Purpose   : For Information
Outline

1. Introduction to SFA’s food safety monitoring programme
   • Overall trend
   • Analysis by food categories and premises types
   • Occurrence of foodborne pathogens
3. Summary and key control measures
4. Common hygiene observations at food caterers, central/retail kitchens
5. Knowledge sharing on Norovirus for awareness
1. Introduction to SFA’s food safety monitoring programme
Food Safety Monitoring Programme

**FOOD BASKET**
11 Staple food categories, 3 priority groups, 6 major premises types

**SAMPLING STRATEGY**
Mystery-shopping with risk-based approach

**DATA INTO INSIGHTS**
Statistical analysis for yearly trend to inform SFA’s strategies for ensuring and securing a supply of safe food

**LAB PARAMETERS**
Food hygiene and safety indicators
11 staple food categories

- Beverages
- Breads/confectionery
- Desserts
- Fast food
- Fruits
- Meat
- Noodles
- Others
- Rice
- Seafood
- Snacks
Standard plate count as a food safety indicator

Standard plate count (SPC)
• Represents the **total bacterial count** in food
• Is a **good proxy representing the risk of pathogen contamination** in food
  • When food samples are detected with SPC>100,000 colony forming unit per gram (CFU/g) [defined as unsatisfactory], they are three times more likely to be detected with a foodborne pathogen

One colony forming unit (CFU) = millions of bacteria
### Risk-based approach for resource prioritisation

<table>
<thead>
<tr>
<th>Low Priority (LP)</th>
<th>Medium Priority (MP)</th>
<th>High Priority (HP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Well-cooked</td>
<td>• Well-cooked</td>
<td>• Raw</td>
</tr>
<tr>
<td>• Minimal manipulation and/or prolonged storage under ambient conditions</td>
<td>• Post-cooking manipulation and/or prolonged storage under ambient conditions</td>
<td>• Undercooked</td>
</tr>
<tr>
<td>• <em>E.g. soups and porridges</em></td>
<td>• <em>E.g. mee siam, fried beehoon and noodles</em></td>
<td>• Manipulation and/or prolonged storage under ambient conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <em>E.g. chicken rice, sushi, sashimi, fruit juice</em></td>
</tr>
</tbody>
</table>

- **Low Priority (LP)***: Foods that are well-cooked, require minimal manipulation, and have minimal risk of microbiological contamination.
- **Medium Priority (MP)***: Foods that are well-cooked after cooking, may require additional manipulation, and have a moderate risk of contamination.
- **High Priority (HP)***: Foods that are raw, undercooked, or require prolonged storage under ambient conditions, and have the highest risk of contamination.

Risk of microbiological contamination: **Lower** to **Higher**
Microbiological safety of retail food generally improves over the years

Overall unsatisfactory rate of retail food decreased from 32% in 2008 to 24% in 2018

Unsatisfactory rate: percentages of food samples with SPC>10⁵ CFU/g; SPC: Standard plate count
Analysis by priority groups highlights High-Priority food for further investigation and measures

Unsatisfactory rate of High-Priority food increased in 2017 and 2018

Unsatisfactory rate: percentages of food samples with $SPC > 10^5$ CFU/g; $SPC$: Standard plate count

HP: High Priority, MP: Medium Priority, LP: Low Priority
Analysis by food categories highlights Rice Dishes as a priority

Unsatisfactory rate of Rice Dishes (especially Medium and High Priority groups) increased in 2017 and 2018

Unsatisfactory rate: percentages of food samples with SPC>10^5 CFU/g; SPC: Standard plate count
HP: High Priority, MP: Medium Priority, LP: Low Priority
# Rice Dishes – Medium and High Priority

<table>
<thead>
<tr>
<th>RICE DISHES (MEDIUM PRIORITY)</th>
<th>BENTO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FRIED RICE</td>
</tr>
<tr>
<td></td>
<td>NASI BRIYANI</td>
</tr>
<tr>
<td></td>
<td>RICE AND ASSORTED DISHES</td>
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<tr>
<td></td>
<td>ROASTED MEAT RICE</td>
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<td></td>
<td>VEGETARIAN RICE</td>
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<tr>
<td>RICE DISHES (HIGH PRIORITY)</td>
<td>CHAR SIEW RICE</td>
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<tr>
<td></td>
<td>CHICKEN RICE</td>
</tr>
<tr>
<td></td>
<td>DUCK RICE</td>
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<tr>
<td></td>
<td>JAPANESE RICE</td>
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<tr>
<td></td>
<td>LONTONG</td>
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<tr>
<td></td>
<td>MIXED VEGETABLE RICE</td>
</tr>
<tr>
<td></td>
<td>NASI LEMAK</td>
</tr>
<tr>
<td></td>
<td>NASI PADANG</td>
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<tr>
<td></td>
<td>SUSHI</td>
</tr>
</tbody>
</table>
Analysis by premises types

Unsatisfactory rate: percentages of food samples with SPC>10^5 CFU/g; SPC: Standard plate count
Occurrence of foodborne pathogens in retail food

Top 4 foodborne pathogens detected (2008-2018)

- Bacillus cereus
- Staphylococcus aureus
- Clostridium perfringens
- Salmonella spp.
## Top 4 foodborne pathogens detected

<table>
<thead>
<tr>
<th>Bacillus cereus</th>
<th>Staphylococcus aureus</th>
<th>Clostridium perfringens</th>
<th>Salmonella</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top 5 food detected with the respective pathogens in the past</strong></td>
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<table>
<thead>
<tr>
<th>Literature facts</th>
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</tr>
</thead>
<tbody>
<tr>
<td>• Toxin-producing bacteria</td>
<td>• Toxin-producing bacteria</td>
<td>• Can be found in meat and meat products</td>
<td>• Can be found in poultry, eggs, meat and meat products</td>
</tr>
<tr>
<td>• Can be found in starchy food and in the environment (soil)</td>
<td>• Can be found on human skin and mucous membranes</td>
<td>• Contamination often associates with bulk-cooking and prolonged storage under ambient conditions</td>
<td>• Is a notifiable foodborne disease with an increasing incidence in human (Ministry of Health, Singapore)</td>
</tr>
</tbody>
</table>
3. Summary and key control measures
Summary

Food safety monitoring data highlights

**Microbiological safety of retail food generally improves** over the past decade highlighting the joint efforts of all stakeholders.

**A recent increasing trend of unsatisfactory rate in High-Priority food especially Rice Dishes in 2017 and 2018 for targeted measures**

High-Priority food are those that are consumed raw or undercooked, subjected to post-cooking handling and stored under ambient conditions for prolonged period.

Some of the High-Priority Rice Dishes highlighted by the data are as follow:

- Char siew rice
- Chicken rice
- Duck rice
- Japanese rice
- Lontong
- Mixed vegetable rice
- Nasi lemak
- Nasi padang
- Sushi
Key control measures for foodborne pathogens

Cook and reheat thoroughly
- Ensure internal temperature of food should reach at least 75°C
- Check internal temperature of cooked food using probe thermometers

Avoid cross-contamination
- Use different utensils for raw and RTE or cooked food
- Wash hands after touching raw food and before handling RTE food
- Do not handle RTE food with bare hands
- Store covered raw meat, poultry, fish and shellfish on the bottom shelf of fridge

Time-Temperature control
- Do not keep cooked or ready-to-eat food at ambient temperatures for >4 hours, as bacteria can multiply to dangerous levels after 4 hours
- Keep food out of temperature danger zone (≤5°C or ≥60°C) for prolonged storage
4. Common hygiene observations at food caterers, central/retail kitchens
Common Hygiene Observations (1)

Inaccurate time-stamping
- Commonly observe to begin the time-stamping at the time of delivery
  - Delivery to locations far from production premises
  - Multiple drop-off points
- Correct practice: Time-stamping for ready-to-eat food should begin when the first dish enters the temperature danger zone (5°C - 60°C)

Poor adherence to Food Safety Management System (e.g. documentation, temperature checks)
- Temperature records are pre-recorded or not recorded at assigned time
- Core temperature of cooked food are not checked
- Expired products are found in storeroom
Common Hygiene Observations (2)

Stacking of cutting boards that are used for different purposes (i.e. cooked food versus raw food) after washing and/or during storage

Placement of knives that are used for different purpose together without segregation after washing and/or during storage
Common Hygiene Observations (3)

Food are not properly covered

Food are not stored at appropriate temperature (e.g. Mayonnaise/Tartar sauce are not kept refrigerated after opening)
Common Hygiene Observations (4)

Poor adherence to proper thawing practices
5. Knowledge sharing on Norovirus for awareness
Norovirus

Virus

• Highly infectious (<10 viral particles)
• Alcohol based disinfectants do not work against norovirus
  o Disinfect the contaminated area using bleach

Susceptible population

• Anyone especially those with weaker immunity (children, elderly)
• Symptoms: vomiting (predominant), diarrhoea

Environment and Food

• Norovirus can be transmitted from person to person or via contaminated environment
  o During outbreak investigations in Singapore, Norovirus was detected in environmental swab samples of common areas
  o Food can also be a vehicle of Norovirus transmission
  o Overseas data show ready-to-eat food prepared by infected person and oysters grown in contaminated areas are often implicated food types
Thank you