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A growing menu of ethnic foods in Canada: Overview of food safety issues

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Overview

- Background
- Purpose & Methods
- Findings
- Ethnic food items
  - Balut
  - Pork dinakdakan
  - Ceviche
  - Chiles rellenos

Why focus on specialty ethnic foods?

- NCCEH environmental health needs assessment
- Specialty ethnic foods identified as one of the top priority needs in Canada, among other food safety issues:

Edible insects

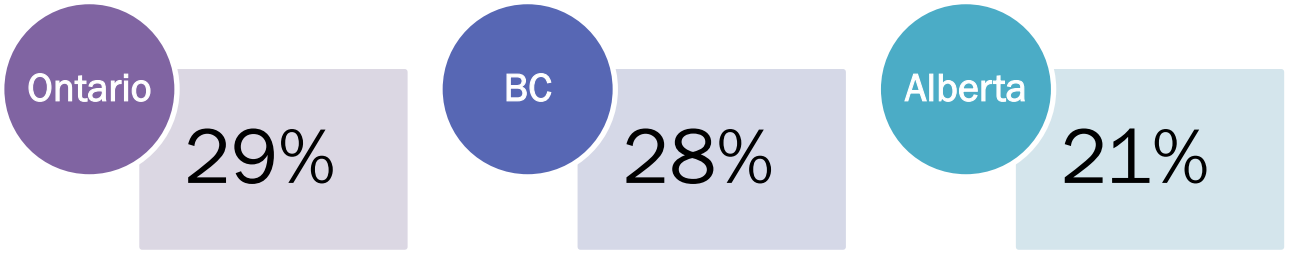
Edible flowers

Wild mushrooms

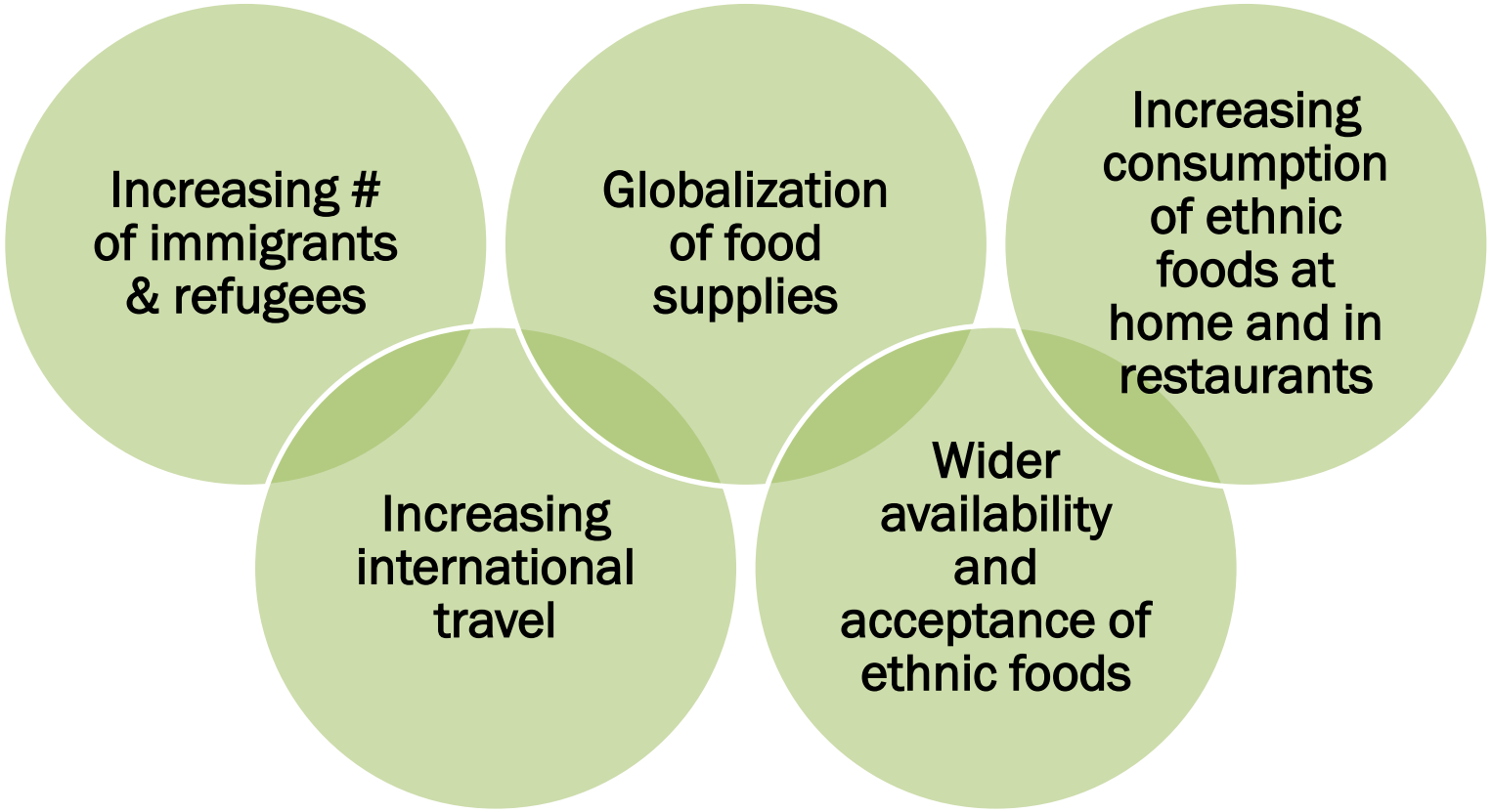
Demographics in Canada

- Foreign-born population in Canada (census data)

- Provinces with largest % of immigrants (2016 census data)



Increasing popularity of ethnic foods



How do public health inspectors and other food safety professionals ensure the safety of these foods and reduce risks of foodborne illnesses?

Risk factors for foodborne illnesses

- Microbiological
  - Prevention and control strategies to assess and mitigate the microbiological risks of ethnic foods
- Ethnic-operated restaurants have higher rates of inspection and critical violations compared to non-ethnic-operated restaurants

Sparse data on foodborne illness attribution to specific dishes/items

- FoodBook study examined foods consumed in the past 7 days by respondents.
- US CDC national outbreak reporting system provides some data on specific dishes/items implicated in outbreaks
- Ethnic dishes are often excluded from surveillance activities
- Surveillance activities tend to focus on the etiologic agents implicated in outbreaks rather than the specific dishes/items

Project Purpose

Which ethnic cuisines are most commonly consumed by Canadians

Which ethnic foods are most frequently implicated in foodborne illness outbreaks

Emerging ethnic foods encountered in the field by PHIs

Develop informational resources on emerging ethnic foods to assist with food safety assessments

Project Methods

Literature search:

- Canada FoodBook study
- US CDC National Outbreak Reporting System foodborne illness outbreak data
- U of Guelph Centre for Public Health & Zoonoses
- Georgia Department of Public Health

Expert Consultations:

- PHAC Centre for Food-borne, Environmental and Zoonotic Infectious Diseases
- BCCDC food safety working group members across Canada

Results

Most commonly consumed ethnic cuisines are:

Selected the following ethnic foods based on outbreak data and available literature

- Balut
- Pork dinakdakan
- Ceviche
- Chile relleno
- Dosa
- Fermented tofu
- Salted duck eggs
- Flauta
- Tamale
- Tempeh

Results

Most commonly consumed ethnic cuisines are:

We will focus on the following 4 foods

Balut
Pork dinakdakan
Ceviche
Chile relleno

Balut

What is it?

- Popular snack food in Southeast Asian countries such as Philippines & Vietnam
- Fertilized duck egg incubated for 18 days
- Partially developed embryo visible in shell
- Consumed directly from the shell

Balut

How is it prepared

Duck eggs

Chicken eggs

Boiled or steamed for 20-30 minutes before being consumed with herbs, spices, and other seasonings

Balut

Potential food safety risks

- Duck and chicken eggs are susceptible to *Salmonella* contamination
  - In the interior of the egg through the oviduct of an infected hen
  - Fecal contamination on the exterior shell during the laying process
- Incubation conditions are conducive to the potential growth of *Salmonella* within and outside the shell
- Important to ensure that uncooked baluts are refrigerated and cooked to the required temperatures

Balut

Associated outbreaks

- No known documented foodborne illness outbreaks from balut consumption

Pork dinakdakan

What is it?

- Popular appetizer dish originating from the Philippines

https://lasangrecipes.blogspot.com/2011/11/dinakdakan-grilled-pork-w-mayo-and.html

- Typically consists of pig organs such as ears, liver, face, stomach, and/or intestines
- Pig brain is typically used as thickener and binder; mayonnaise commonly substituted

Pork dinakdakan

How is it prepared

Pig organs (and pig brain if being used) are boiled until tender, then grilled until crispy.

Chopped into bite-size pieces and combined with mayonnaise and vinegar (if no pig brain is used), or with pig brain and vinegar.

Pork dinakdakan

Potential food safety risks

- *Salmonella* and *Campylobacter* commonly reside in swine intestinal tracts
- Many opportunities for contamination in farms, slaughterhouses, retail stores, and during transport
- Mayonnaise contains raw eggs and is considered to be potentially hazardous
- Vinegar may have bactericidal effect on *Salmonella* but without appropriate tests, shelf stability cannot be ascertained
- Organ meats must be cooked to required temperature
- Time and temperature abuse must be prevented

Pork dinakdakan

Associated outbreaks

- Data on ethnic foods implicated in outbreaks is limited
- No known outbreaks linked specifically to consumption of this dish
- *E.coli* O157:H7 outbreak involving 37 lab-confirmed cases in Alberta in early 2018 associated with raw and ready-to-eat pork products

Ceviche

What is it?

- Popular dish in Central and South America
- Rapidly gaining popularity in Canada and the US
- Typically, raw fish or shellfish such as shrimp or scallops are marinated with lime juice until opaque.

Ceviche

How is it prepared

Cut or ground up raw fish or shellfish are marinated in lime juice or other citrus juices for a minimum of two hours

Fish/shellfish turn opaque and appear to be “cooked”

Can be used in a variety of recipes that vary across regions and countries

Typically mixed with ingredients such as olive oil, vegetables, herbs, and spices.

Ceviche

Potential food safety risks

- *Salmonella*, *Vibrio parahaemolyticus, Vibrio cholerae*, and nematode infections from the *Anisakidae* and *Gnathostoma* families
- Citrus juices contain citric acid which has antimicrobial properties
- Difficult to ascertain the effectiveness of citrus juices against foodborne pathogens in seafood without proper laboratory tests

Ceviche

- Mathur et al. 2013
  - Lime juice was able to achieve an average of minimum 5-log reduction in *V. parahaemolyticus* levels under all experimental conditions after 30 minutes
  - Lime juice had little impact on *Salmonella* levels in fish samples; however lime juice produced 5-log reduction in *Salmonella* within 15 mins in samples without fish
- Mata et al. 1994
  - *V. cholerae* levels were reduced by more than 99.9% within 5 mins in lime juice
  - After two hours in lime juice, *V. cholerae* were undetectable in the samples
- Herrera et al. 2010
  - Lime juice was ineffective in reducing bacterial load in fish samples inoculated with *Aeromonas hydrophila,* enterotoxigenic *E.coli,* and *Vibrio parahaemolyticus* marinated for 10 and 30 mins

Ceviche – potential food safety risks

- *Anisakidae* and *Gnathostoma* nematodes are emerging health risks in raw or undercooked fish
- The following prevention and control measures can be used to kill or remove parasites
  - Cooking adequately to an internal temperature of at least 63°C
  - Freezing:
    - At -20°C or below for 7 days
    - At -35°C until solid, then for 15 hours at -35°C or below
    - At -35°C until solid, then for 24 hours at -20°C or below
  - Candling, which involves visual examination of fish filets over an illuminated surface for physical removal of larvae

Ceviche – Associated outbreak

Minnesota *Vibrio cholerae* outbreak in 2016

- Consumption of ceviche made with raw shrimp and raw oysters
- Six cases fell ill with watery diarrhea, vomiting, abdominal cramps, and headache
- Operator was advised to marinate raw food items in lime juice before being served instead of serving them immediately after adding lime juice

Chiles Relleno

What is it?

- Popular Mexican dish typically made with poblano, Hatch chile, Anaheim, pasilla, or jalapeno peppers
- Traditionally, queso fresco cheese is used but asadero, asiago, monterey jack, or cheddar cheese are also common
- Often fried and served with tomato sauce, rice, and/or beans

Chiles Relleno

How is it prepared

Chiles are grilled then placed into a tightly sealed bowl to complete the cooking process and to cool

The skin and the seeds are removed before the chiles are stuffed with shredded cheese.

Egg whites are beaten first before egg yolks are added.

The stuffed peppers are subsequently rolled in flour, dipped in the egg mixture, and fried.

The chiles are often served with tomato sauce, rice, and/or beans. Other sauces may also be used.

Chiles Relleno

Potential food safety risks

- Ingredients used in chile rellenos, including raw egg and soft cheeses such as queso fresco, have been implicated in *Salmonella* and *Listeria* outbreaks in the past
- *Salmonella* are mostly found in the intestines of animals and birds
- Consequently, consuming foods containing raw eggs or unpasteurized cheeses increases the risk of salmonellosis

While Pregnant, Be Careful with Queso Fresco

Know the facts

Listeria is one of the main causes of death from food poisoning in the United States. Almost all of the people who get really sick or die from *Listeria* infections are newborns, older adults, and people with weakened immune systems.

Many outbreaks of *Listeria* in the United States were linked to soft cheeses, like queso fresco, made from unpasteurized milk. Pasteurization kills the germs in milk. But if cheese is made in an unclean place, it can still get contaminated with *Listeria*.

Pasteurization is the process of heating milk to a high enough temperature for a long enough time to kill harmful bacteria, like *Listeria*, contained in milk.

Listeria infection in pregnant women can lead to miscarriage, stillbirth, or death of the newborn. Pregnant women are about 10 times more likely than the general public to get *Listeria* infection. But if you are pregnant and Hispanic, your risk is even greater!

Pregnant Hispanic women are about **24 times** more likely than the general population to get *Listeria* infection.

Reduce your risk during pregnancy to protect your baby.

- Do not eat soft cheeses, such as queso fresco, while pregnant, unless they are made with pasteurized milk, to lower the risk of getting infection from *Listeria* or other foodborne germs.

Queso fresco made with pasteurized milk

Chiles Relleno

- If the chiles rellenos are premade and precooked, they must be properly cooled and stored until ready to cook or reheat to the required minimum internal temperature.
- If they are made to order, the ingredients must be stored at required temperatures with appropriate time and temperature control.
- The cooked or partially cooked product must be cooked to the required minimum internal temperature prior to being served.

Chiles Relleno – Associated Outbreaks

- According to US data, 27% of egg-associated outbreaks implicated traditional egg dishes such as chiles rellenos

Salmonella enteritidis outbreak in 1998 in Arizona

- Pre-cooked commercial product
- 22 lab-confirmed cases
- Internal temperature of the chiles rellenos were not checked prior to serving

Chiles Relleno – Associated Outbreaks

Salmonella enteritidis outbreak in 1996 in Mexico at an international scientific conference

- 83 questionnaire respondents had illnesses that met case definition; *S. enteritidis* found in stool samples
- Chiles rellenos were found to be associated with illness
- Samples of a locally produced cheese used to stuff the chiles yielded *Salmonella*
- Cheese production facility inspection revealed poor hygiene practices and contamination opportunities

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Suggestions for emerging specialty ethnic foods?

Have you come across any new and unfamiliar specialty ethnic foods? Please include them in the evaluation forms on your tables!

THANK YOU!

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