Challenges in food safety

[Philippines]

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Outline

- A.) Food safety
- B.) Challenges in food safety
- C.) Sources and solution
- D.) Role of research and academe in food safety
- E.) Role of government in food safety
- F.) Take away message(s)



A. Food safety





Food Safety

 The handling, preparing and storage of food products the best way possible to reduce the risk of contracting foodborne illnesses.

 A joint effort starting from the handler, preparer, and consumer to ensure the implementation of practices for food safety.





Key facts

Food safety, nutrition and food security are inextricably linked (WHO, 2022).

An estimated 600 million – almost 1 in 10 people in the world – fall ill after eating contaminated food.

US\$ 110 billion is lost each year in productivity and medical expenses resulting from unsafe food in lowand middle-income countries.

Children under 5 years of age carry 40% of the foodborne disease burden.

Foodborne
diseases impede
socioeconomic
development by
straining health
care systems and
harming national
economies, tourism
and trade.



DRIVING FORCES SHAPING FUTURE FOOD SYSTEMS

SEVERAL EXTERNAL FACTORS ARE DRIVING STRUCTURAL CHANGES IN THE FOOD SYSTEM, PRESENTING OPPORTUNITIES & CHALLENGES FOR FOOD SAFETY, AS WELL AS OTHER INTER-RELATED ASPECTS, SUCH AS SUSTAINABILITY, AFFORABILITY, NUTRITION & INCLUSIVENESS.





FoodSafeR future-oriented Food Safety Hazard Management based on multi-criteria risk assessment for safer food: Co-benefits: consumer health and wellbeing, climate (mitigation and adaptation), environmental sustainability & circularity, dietary shift, sustainable healthy nutrition, food poverty reduction & empowerment of communities, and thriving businesses.

5 SUSI SA HIGIT NA LIGTAS (WALANG PANGANIB) NA PAGKAIN



PANATILIHING MALINIS

- Maghugas ng mga kumay bago humawak ng pagkain at palagiang gawin ito kapag naghahanda ng pagkain
- Maghagas ng mga kamay pagkatapos gumamit ng palikuran Hugasan at linising mabuti ang mesa at lahat ng mga kagamitan sa
- Tryaking ligtas ang kusina at pagkain sa mga insekto, peste at iba bang



Bagama't halos lahat ng mikrobyo bagamat halos lahat ng maxonyol ay hindi nagiging sanhi ng sakit, ang mga mapanganib na mikrohyo ay karaniwang matatagpuan sa lupa,



IHIWALAY ANG HILAW SA LUTO

- thisothay any hilaw na kartie, manok at pagkaing-dagat so ibang pagkain Gumannit ng, ibang kagamitang panlano, halad ng kutsilyo at sangkalan, para sa pankaing hilaw at iba rang kagamitan para sa lairong pagkain.
- Hagay sa magkahiwalay na lalagyan ang mga pagkaing hilaw at luto.



5°C

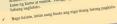
LUTUING MABUTI

- Lattuing mabuti and pagkain, latting lalo na ang karne, manok, itlog at
- Sa pagluluto ng mga pagkaing may sahaw o sarsa, pakuluin at riyaking umabot sa 70°C ang temperanza. Tyaking malimaw at limih kalay pink ang katas ng karne at manéh. Hanggaing manari, guruamit ng termensero luplauru melabilut.

BAKIT?

BAKIT?

Mabilis dumami ang mga mikrobyo kung ang pagkain ay nasa karaniwang temperatura ng silid. Kapag ang



ITAGO ANG PAGKAIN SA TAMANG TEMPERATURA

- tenged sa refrigerator ang lutong pagkain at mga negkning ur hasira (high na mabuti kung ang lamig ng temperatura ay kayas 5C). Parasthibiting mainti (high sa temperaturung 60°C) ang luteng pagkain bago ihan
- Howag iimbak nang matagai ang pagkain, maging sa refrigerator

Hawag runawin ang pagkaing "frozen" sa pangkaraniwang temperatura ng silid

GUMAMIT NG LIGTAS/MALINIS NA TUBIG AT SARIWANG PAGKAIN Gommitt ng ligtas or malinis na tubig o kaya ay lagyan ng gamot upang maging ligtas

- Pumili ng sariwa at kaaya-ayang pagkain
- Pumili ng mga pagkaing pinawang ligtas, mlad ng pasteurtzed na gatas.
- Hugasan meng maheiti ang mga prutas at gulay, lahu na kung kakainin ng sarwa o hindi tulutain Huwag kainin ang pagkain kapag lampas na sa petsang ligtas ito o "respiry due"
 - Kaalaman = Iwas Panganib





Five keys to safer food

Keep clean

- Wash your hands before handling food and often during food preparation
- ✓ Wash and sanitize all surfaces and equipment used for food preparation.
- Protect kinchen areas and food from insects, plests and other artimals



Separate raw and cooked

- Separate raw meat, positry and seafood from other foods We separate equipment and utenals such as knives and cutting boards for
- nationing raw route:

 Store food in containers to avoid contact between raw and prepared foods:



saw tood, expeciate mean, poultry and seriood, and their juless, can contain desperous microorganisms which may be transferred onto other foods during



Cook thoroughly

- Cook food thoroughly, especially mear, positry, eggs and seafood Bring foods like Soups and stoos to boling to make sure that they have nestred 70°C. For most and poultry, make sure that pakes are clear, not prik.
- ideally, use a thermometer Reheat cooked food thoroughly

cooking food to a temperature of 70°C



Keep food at safe temperatures

- Do not leave cooked food at room temperature for more than 2 hours Refrigerate promptly all cooked and perchable food (preferably below 5°C)
- Keep cooked food piping hot Imore than 60°C) prior to serving
- Do not store food too long even in the refrigerator
- Do not thaw frozen food at room temperature

Microerganisms can multiply very quickly if food is stored at room temperature. By holding at tempera-tures below 5% or shore for C, the



Use safe water and raw materials

- Use safe water or treat it to make it safe.
- Select fresh and wholesome foods Choose foods processed for safety, such as pasteurized milk.
- Wash fruits and vegetables, especially if eaten raw Do not use food beyond its expiry date







Knowledge = Prevention

World Food Safety Day

 Yearly event that started 2019 and celebrated every June 7

 WHO uses this event to promote food safety to the public and reduce the number of illnesses that is caused by foodborne illnesses globally







Unsafe food affects us all, particularly vulnerable populations





Did you know an estimated 600 million people around the world – almost 1 in 10 – fall it after exting contaminated food and 420 000 die every year? 40% of the foodborne disease builden is or onlidren under 5 years of age

During a time of crisis, access to safe and healthy food is more at risk than at any other time. While food is not known to transmit GOVID-19, food purchasing can be made sater with the following tips:





keep a physical distance (of at least 1m) between you and others while shopping

make sure your local lood sellers are washing and san tizing all surfaces used for food preparation and practicing good hand hypiche





crisure your hands are clean and when you get frome weak your hands with soep and water before handling food.

wash fruits and vegetables with water particularly if you are eating them raw

Together we can team up for food safety!

#WorldFuodSeletyDey



RA 10611 or the Food Safety Act of 2013

An Act To Strengthen The Food Safety Regulatory System In the Country To Protect Consumer Health And Facilitate Market Access Of Local Foods And Food Products, And For Other Purposes.



B. Challenges in food safety





Aquatic and Agricultural Resources

- Fish
- Shellfish
- Seaweeds
- Crops
- Produce









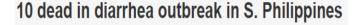
Food and water-borne diarrhea



Challenges in Food Safety







Source:Xinhua Published: 2018/2/20 10:52:31



Health Research and Development Information Network

Herdin Record #: PCHRDPC951028

Salmonella food poisoning in Benguet.

Researchers

Name	Role
Janice B. Zabala	Author
David A. Mendoza	Author
Florence Caput	Author
Ma. Concepcion Roces	Author
Mark E. White	Author
Manuel M. Dayrit	Author

The Broader Look

Salmonella summons PHL farm sector's strength



Contaminants

- Something that makes a place or a substance (such as water, air, or food) no longer suitable for use or for consumption.
- Microbiological contamination refers to the non-intended or accidental introduction of infectious material or pathogens.



Pathogens

- an organism causing disease to its host
 - the severity of the disease symptoms referred to as "virulence"
- comprised of viruses and bacteria as well as unicellular and multicellular eukaryotes.



Sources of microbial contamination in agriculture and aquaculture





Hazards vs. Risk

HAZARD

Any agent in (biological, chemical, or physical) or condition of food having the potential to cause adverse health effects

RISK

A function of the probability of an adverse effect and the severity of that effect consequential to a hazard in food



Commodities of Concern

Fish and other Aquatic Resources Fresh Produce and other Crops

- > Fish and shellfish, being live organisms, can become hosts and vector to parasites and pathogens
- Uncooked fresh produce can harbor pathogens
- Contamination occurs during pre-harvest, post harvest, processing, distribution, and preparation in food service or at home
- Improper handling and storage results to spoilage and contamination after harvest



Pathogen Sources

- Animal and Human Wastes
- Cross contamination





Common Pathogens

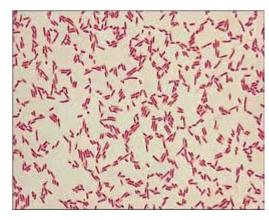
- Bacteria
- Protozoa
- Viruses
- Algae
- Fungi



Common Food Pathogens

Escherichia coli

One of the most common causative agents of foodborne outbreaks around the world



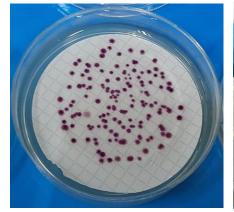
Gram stain slide showing E. coli



Common Food Pathogens

Escherichia coli

Most E. coli strains do not cause severe illness, but some strains, such as the O157:H7 which causes severe complications (bloody diarrhea, kidney failure, death)





E. coli grown on agar plates



Mode of transmission

Lower intestine of warm-blooded organisms

Undercooked meat

Fecal contamination of vegetables

Serious food poisoning

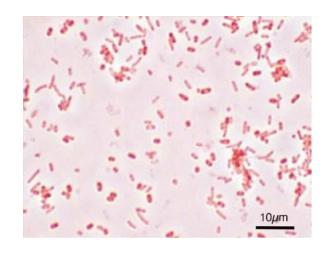
Escherichia coli



Common Food Pathogens

Salmonella

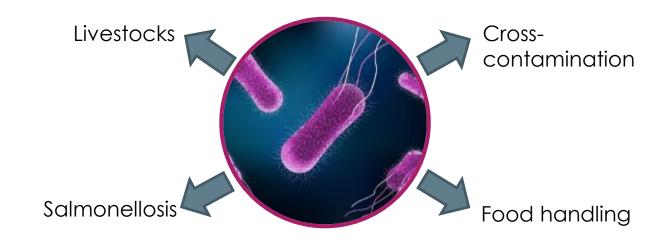
- > 550 million people fall ill each year due to Salmonella*
- > Causes:
 - Salmonellosis
 - Enteric fever



Microscopic View of Salmonella



Mode of transmission







Common Food Pathogens

Vibrio spp.

- are abundant in aquatic environments, both in fresh and marine sources.
- These bacteria were also observed on the skin, gills, and the intestinal tracts of fish or shellfish.



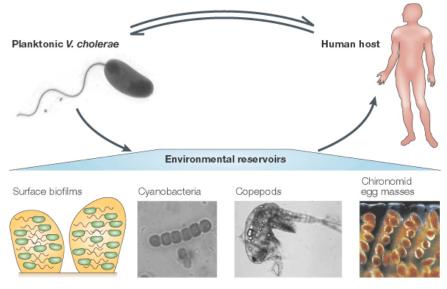
Gram stain slide showing Vibrio cholerae



Common Food Pathogens

Vibrio spp.

Can contaminate fish and fish products during improper handling, longtime transport, evisceration, and also cross-contamination from raw materials.



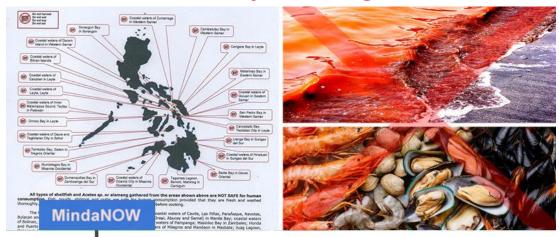




Foodborne Intoxications

NEWS

Caused by consumption of food contaminated with metabolites excreted by microorganisms





Shellfish Samples From Ozamiz City, Camiguin, & More Positive With "Red Tide Toxin"

Foodborne Intoxications

Harmful Algal Bloom (HAB)

Red tides refer to toxic blooms of microscopic algae that occur worldwide

Toxins can target multiple organ systems, including the nervous system, the liver, the skin, and the respiratory tract.



Antimicrobial Resistance

- Antibiotics have been used in different fields, in agriculture it is used on plants and animals to combat diseases.
- However, long term use promotes antimicrobial resistance (AMR) of bacteria in the environment.
- As antibiotics are completely absorbed, they settle in excrement and are used as fertilizer in the soil.







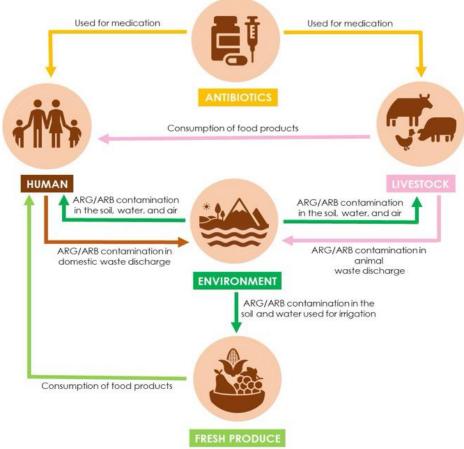


Figure 1: Transmission dynamics of antibiotic-resistant genes and bacteria among humans, livestock, environment, and fresh produce (Vital and Rivera, 2023).



Chemicals

- Naturally occurring toxins
- Persistent organic pollutants (POPs)
- Heavy metals
- Other chemical hazards



Food safety during pandemic

Meal kits and delivery

Handling packaged food

Handling and cleaning

Food donations

Spread of pathogens and AMR



MOST VULNERABLE TO FOODBORNE ILLNESSES









Elders

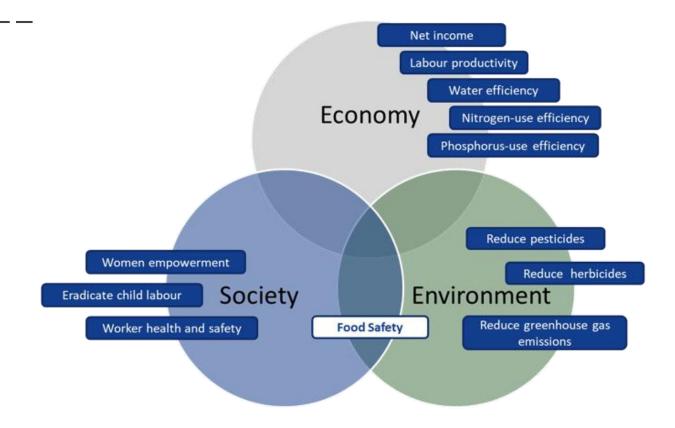
Children

Pregnant Women

People with weak Immune System



Food safety, security and sustainability





C. Sources and solutions

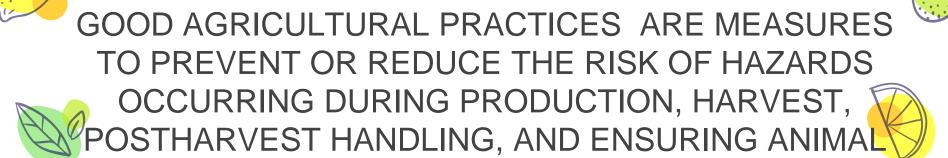












AND HUMAN HEALTH AND WELFARE









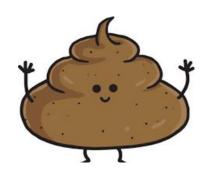


SOURCES OF CONTAMINATION IN FARMS



WORKERS





ANIMAL WASTE





SOIL





WATER

ANIMALS

SEWERAGE

Pre-Harvest Practices to Reduce Microbial Contamination

- Assess if the fish pond is free from chemical or biological hazards before production.
- Avoid entrance of farm animals to the pond sites at least 3 months before or during production.
- Ensure that good water source is available and no overcrowding of fish is permitted.
- Use only sterile fry as starting materials.



Pre-Harvest Practices to Reduce Microbial Contamination

- ➤ If outbreaks occur, report immediately to government agencies. Limit cross contamination to other ponds.
- ➤ If red tide is observed, notify BFAR and avoid catching shellfish.



Pre-Harvest Practices to Reduce Microbial Contamination

- Ensure human sewage is treated before releasing to aquatic resources.
- ➤ If water testing is available, tests should be done to identify possible contamination in water sources.
- > Provide a safe alternative water source.



Harvest Practices to Reduce Microbial Contamination

- Equipment used should be washed before and after use.
- Harvest containers are checked and cleaned before use.
- After packing, containers should not be placed in direct contact with soil and water.
- Farm animals are banned where produce is handled, packed, and stored.



Post-Harvest Practices to Reduce Microbial Contamination

- Packed container are not placed in direct contact with soil.
- > Transport vehicles are checked before use.
- Produce are stored and transported separate from goods that may potentially cause contamination.



WHO response

- WHO aims to strengthen national food control systems to facilitate global prevention, detection and response to public health threats associated with unsafe food.
 - Assess the safety of new technologies used in food production, such as genetic modification, cultivated food products and nanotechnology
 - Help implement adequate infrastructure to manage food safety risks and respond to food safety emergencies through the International Food Safety Authorities Network
 - Promote safe food handling through systematic disease prevention and awareness programmes, through the WHO Five keys to safer food message and training materials



WHO response

- Advocate for food safety as an important component of health security and for integrating food safety into national policies and programmes in line with the International Health Regulations
- Monitor regularly the global burden of foodborne and zoonotic diseases at national, regional and international levels, and supporting countries to estimate the national burden of foodborne diseases
- Update the WHO Global Strategy for Food Safety (2022-2030) to support Member States to strengthen their national food control systems and reduce the burden of foodborne diseases.
- WHO works closely with Food and Agriculture Organization (FAO), the World Organization for Animal Health (OIE), The UN Environment Programme (UNEP) and other international organizations to ensure food safety along the entire food chain from production to consumption.



D. Role of research and academe in food safety





Food Safety in Microbiology



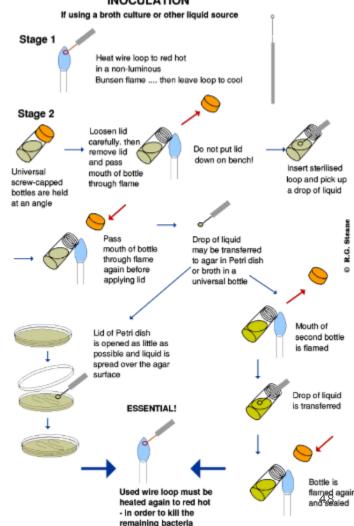


Techniques in Microbiology

"Pouring a Plate" Sterilised molten agar is poured in and left to set. Neck of agar bottle is passed through flame Petri dish lid is opened as little as possible, angled and kept over the base.

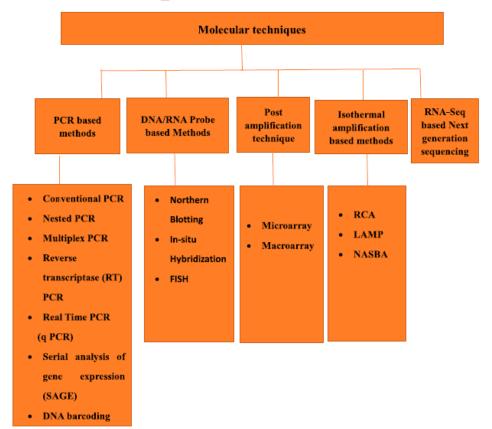
Each Petri dish holds about 20 ml, so 200ml will do for 10.







Molecular Techniques





Aslam et al., 2017

E. Role of government in food safety





- Effective regulations are needed to address food safety issues
- Food safety is a shared responsibility of government agencies

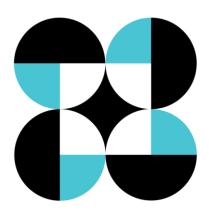














PHILIPPINE NATIONAL STANDARD

PNS/BAFS 372:2023 ICS 67.040

Primary and Postharvest Food and Feed — Product Standard — Microbiological Criteria



BUREAU OF AGRICULTURE AND FISHERIES STANDARDS BPI Compound, Visavas Avenue, Diliman, Quezon City, 1101 Philippines Trunkline: (632) 8928-8741 to 64 loc 3301-3319 E-mail: info.dabafs@gmail.com Website: www.bafs.da.gov.ph

Department of Agriculture (DA) Bureau of Agriculture and Fisheries Standards (BAFS)

Technical Working Group (TWG) for the Development of the Philippine National Standards (PNS) on Microbiological Criteria for Primary and Postharvest Food and Feed — Product Standard

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Vice-Chairperson

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PHILIPPINE NATIONAL STANDARD	PNS/BAFS 352:2022
Microbiological Risk Management (MRM) — Guidelines	ICS 67.020

PHILIPPINE NATIONAL

PNS/BAFS 307:2020 ICS 67.05

STANDARD

Establishment and Application of Microbiological Criteria related to Food



F. Take away message(s)













GMO toxins mycotoxins hormones bacteria allergens Biological Hazards

Physical Hazards Salmonella Pesticides Pesti















Summary



There are many opportunities for food contamination to take place



Contaminated food can cause long-term health problems



Food contamination also affects the economy and society as a whole



Summary



Some harmful bacteria are becoming resistant to drug treatments



Consumers must be well informed on food safety practices



Everybody has a role to play in keeping food safe



(WHO, 2016)

New challenges to food safety will continue to emerge, largely because of:

- Changes in our food production and supply, including more imported foods.
- Changes in the environment leading to food contamination.
- New and emerging bacteria, toxins, and antimicrobial resistance.
- Changes in consumer preferences and habits.
- Changes in the tests that diagnose foodborne illness.



Take away messages















Biological Research and Services Laboratory

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FRESHEST THANKS

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