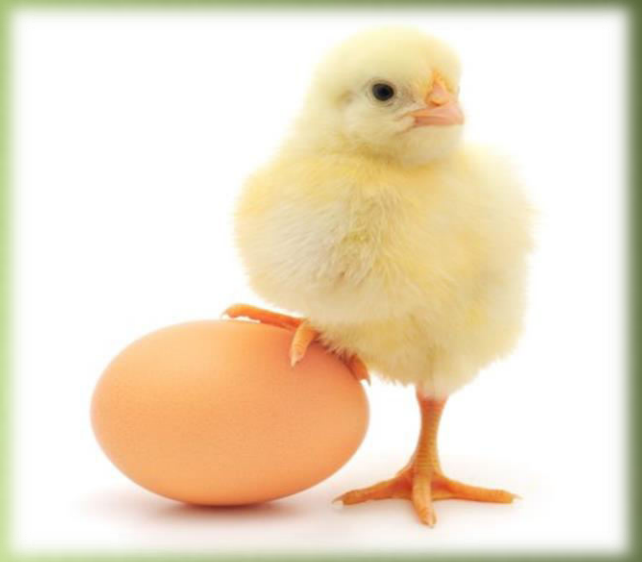
Prevention of Microbial Contamination in Poultry Supply Chain



Sukumar Saha, PhD

Professor

Department of Microbiology and Hygiene

Bangladesh Agricultural University, Mymensingh-2202

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INTRODUCTION

Poultry industry is growing very rapidly in Bangladesh

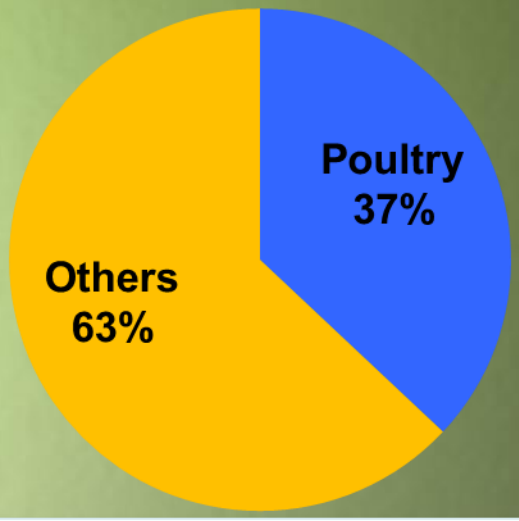
Play significant role in

- **Creating employment opportunities**
- **Reducing poverty level**
- **Contributing country's economic growth**
- **Ensuring the sufficient protein supply**
- **Improving the status of food security**

Total poultry farm in Bangladesh	
Govt. farm	33
Registered private farm	77880

Production data of meat and egg :

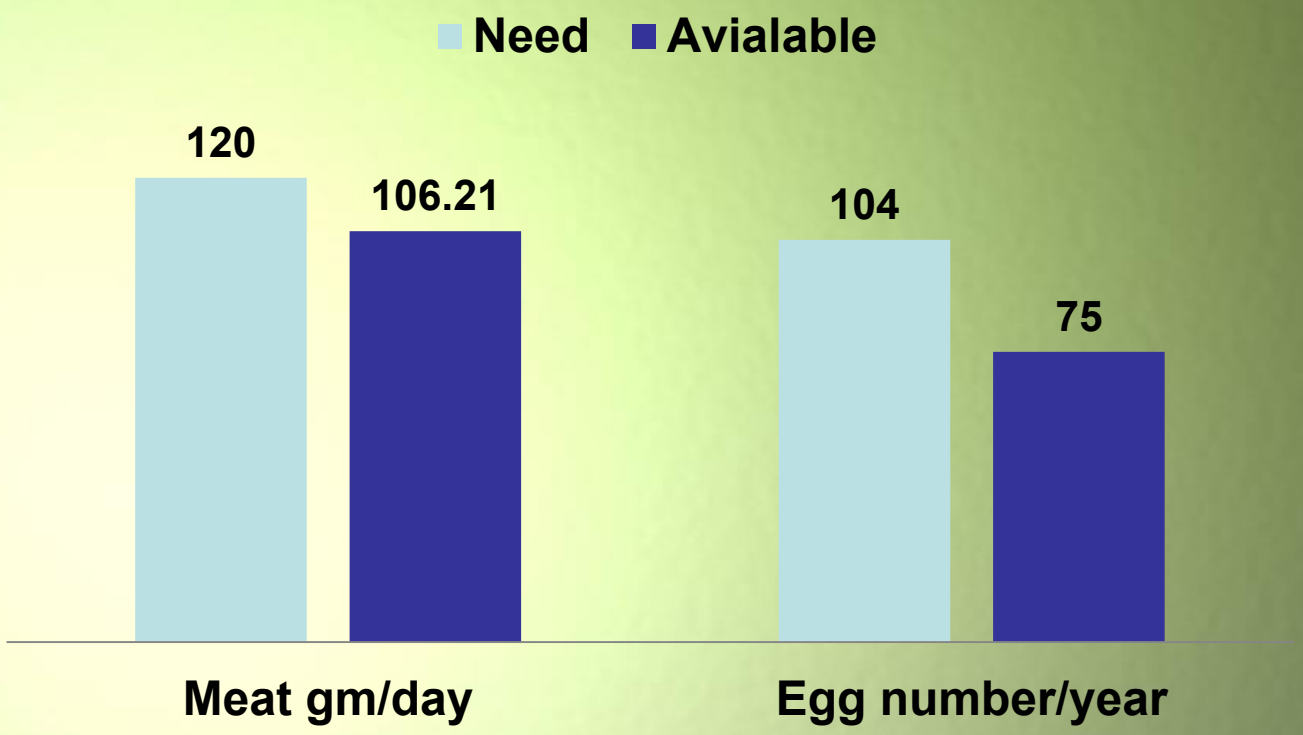
Product	Unit	Fiscal year	
		2005-2006	2015-2016
Meat	MMT	1.13	6.53
Egg	Million Number	5422	11912.4



Total Meat Production in Bangladesh

**** Source : DLS 2015-16**

- According to national health strategy an adult need 120 gm meat/day and 104 egg /year
- But present availability 106.21 gm/day/head meat and 75.06 numbers egg/year/head (DLS,2015-16)



Food Safety Concern in Bangladesh

- The food contamination in Bangladesh is a serious public health concern
- WHO estimates, globally 2.2 million death, of them 1.9 million children due to food and water borne diarrheal diseases
- Dependable assessment of public health impact due to food contamination is not available due to absence of regular monitoring system

Common microorganisms causing food-borne diseases through poultry chain are

- ***Campylobacter***
- ***Salmonella***
- ***Listeria***
- **Pathogenic *E. coli O157:H7***
- ***Yersinia***
- ***Staphylococcus***
- ***Clostridium***
- ***Bacillus***
- **Some pathogenic fungi**

Significantly causing

Food borne disease outbreak

- **Direct cost**
  - Consultation
  - Laboratory diagnosis
  - Medical cares
  - Hospitalization
- **Indirect cost**
  - Work inefficacy
  - Days lost work etc.

So, it is important to detect the source of microbial contamination and route of transmission to the supply chain of poultry for protecting human health

Supply Chain of Poultry and Poultry Product

FEED

Production:

- Pesticides
- Environmental Contamination

Processing:

- Heat handling
- Gamma irradiation

Storage:

- Pathogens
- Toxins
- Pests
- Antibiotic Growth Promoter
- Other antibiotics

BREEDING STOCKS

Hatcheries

- Vertical Transmission
- Disinfection
- Environment

Production

- Flies
- Rodents
- Storage of feed
- Water
- Veterinary Services

Processing

- Workers
- Cross Contamination
- Waste Management
- Water surfaces
- Disinfection

Market

- Storage
- Cold Chain
- Labeling

End Consumer

- Kitchen Hygiene
- Personal Hygiene

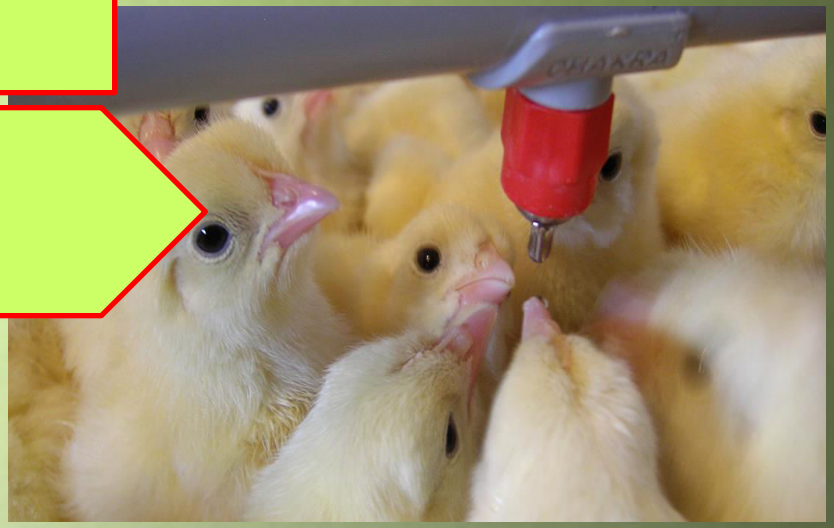
IDENTIFICATION AND TRACING SYSTEM

Prevention of Microbial contamination in Parent Stock

Procurement of clean pathogen-free breeder stock at the foundation hatchery

Requires strict biosecurity, vaccination and regular surveillance

Provide clean environment, water and feed to prevent both vertical and horizontal transmission of *Salmonella*



Use “closed” nipple drinker system to minimize fecal contamination

Control of all types of vermin such as rats, mice, insects and wild birds

Prevention of Microbial contamination in Hatchery

The hatcher is the main source of contamination for the entire hatchery

Debris, dead chicks and chick fluff are ideal replication site for bacteria and virus

Keeping places free from-

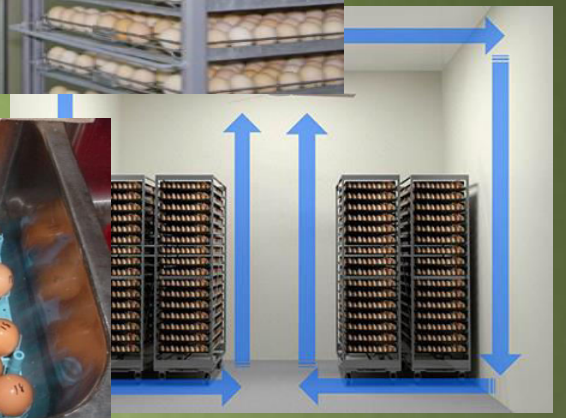
- Dirt
- Infection
- Removable wastes

By …

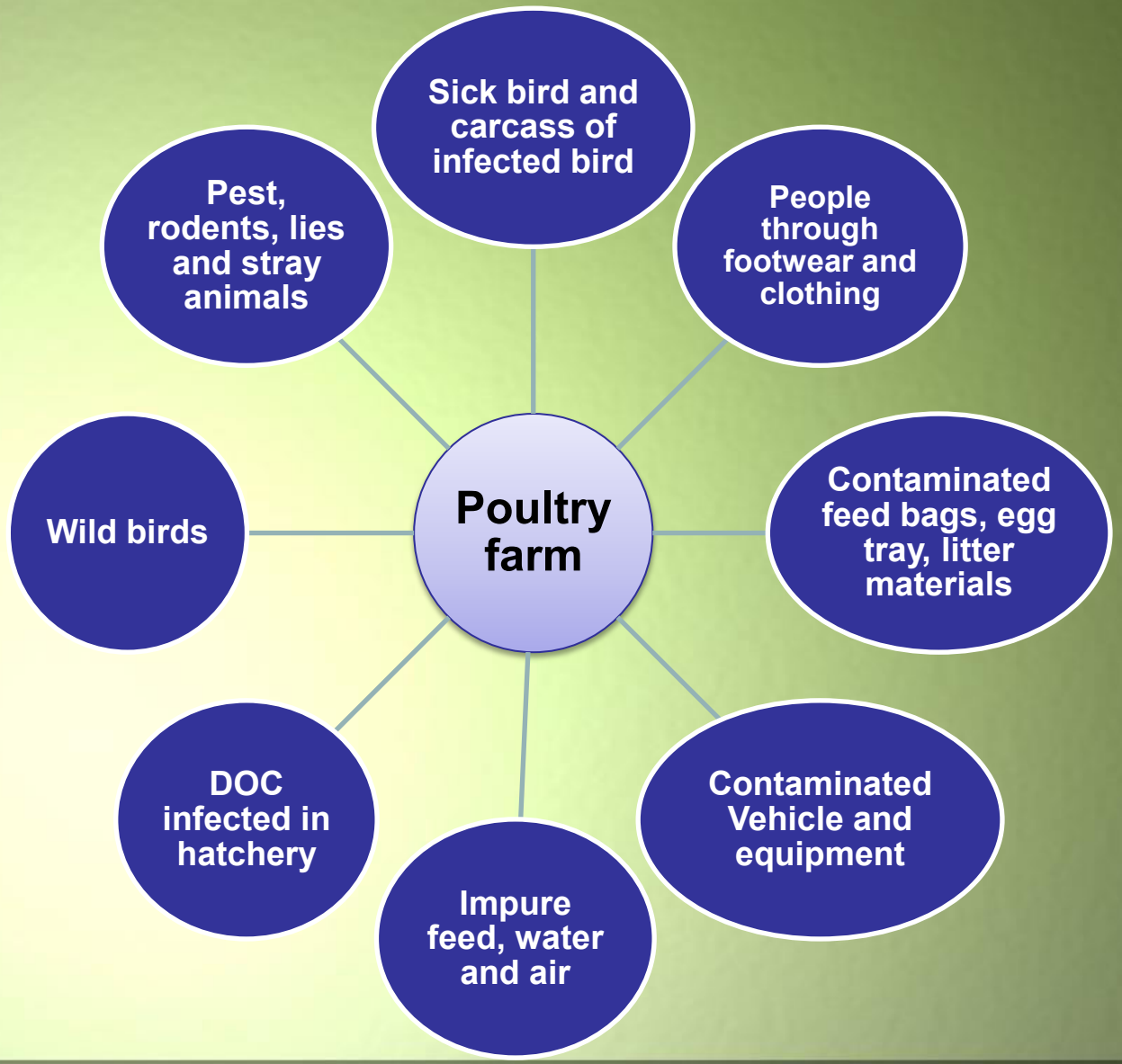
Using hatchery disinfectant and sanitizer

Prevention of Microbial contamination in Hatchery

- Egg collection from reliable breeder farm ensuring egg quality and *Salmonella* free status
- Fumigation of eggs in setter and sanitization before incubating
- Sorting out of the chick just after hatching
- Stringent microbial monitoring and sampling of the hatchery environment and equipment
- Evaluation of first-day mortality
- Immunization and **Maintaining strict biosecurity**



How Disease Might Enter Into Poultry Farms ??



Prevention of Microbial contamination in Commercial Farming

How we can prevent and control diseases in decreased order of efficacy ???

1. Implementing Biosecurity
2. Management
3. Vaccination program
4. Medication

Often we use these four in various combination

Remember! - Prevention is always cheaper than cure

To avoid introduction of pathogens from adult bird placing strict biosecurity through … …

Keeping minimum visitors and Changing clothes during entering and exiting poultry farm

Disposal of contaminated feed bags, regular cleaning of egg trays and changing litter materials

Limited vehicle access and exchange of equipment, supplies between farms and minimizing visits of workers to other farms

Ensuring clean or chlorinated water and *Salmonella* free feed supply

Purchasing *Salmonella* free DOC

Avoiding contact with wild bird and nearby backward chicken

Implementing arthropods, rodents and stray animal control program

Rapid disposal of sick bird and carcass of infected bird

Improved house ventilation

- Vaccination followed by monitoring flock health regularly
- Disease free healthy worker practicing personal hygiene
- Review biosecurity plan and flock health program
- Wash eggs with detergent to remove soil and use sanitizer to reduce number microbes on the shell
- Dry eggs thoroughly before placing them in cartons
- Industrially produced eggs after washing and sanitizing should be kept in constant refrigeration from farm to consumer

***Strictly maintain All-In-All-Out system

Prevention of Microbial contamination in Poultry Feed

- Feed and feed ingredients should be purchased from authorized company
- Feed must be dry as wet feed introduce fungus
- True heat treatment, irradiation as well as pelleting should be ensured for the production of pathogens free feed
- Use of Probiotics, prebiotics, competitive exclusion, mold inhibitors etc.
- Acidification of feed and water for preventing *Campylobacter*

Prevention of Microbial contamination during Transportation

- Minimizing stress during transportation
- Feed withdrawal prior to transport to slaughter house minimize gut rupture and microbial contamination
- Avoid commingling, crowding and high temperature during transportation to prevent dissemination of *Campylobacter and Salmonella*
- Disinfecting the vehicle before loading and unloading
- Washing egg-carrier before and after loading

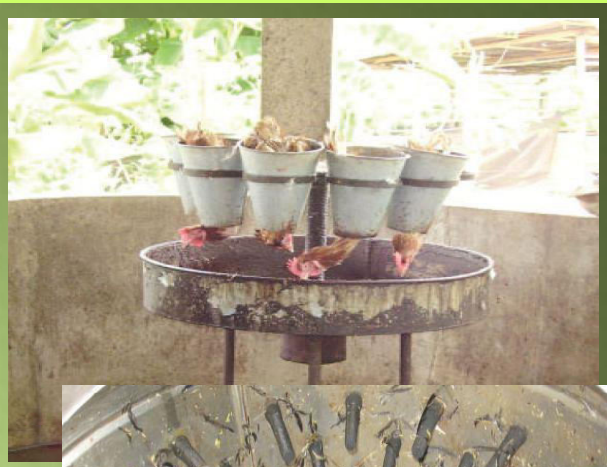
Prevention of Microbial contamination at Processing Plant

Main possible source of contamination during processing are-

- Intestinal bacteria from offal
- Feather
- Handlers
- Improper storage

Ways of reducing contamination at market …

Hygienic condition and personal safety should be maintained in slaughter house

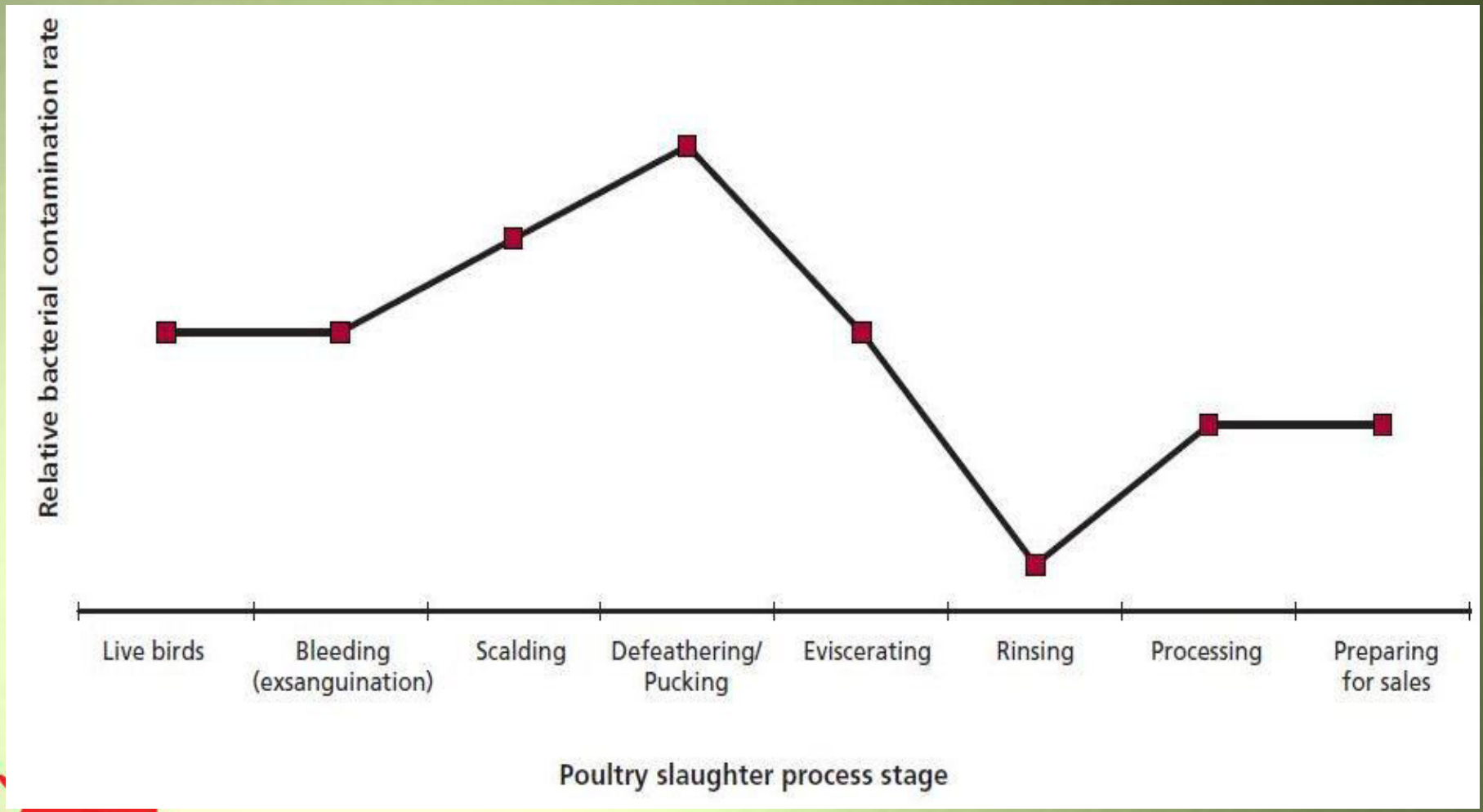


Fixation in funnels during bleeding

Scalding and defeathering mechanically

Hanging of carcasses for preventing contamination during evisceration

Bacterial Contamination Rate Per Slaughter Process Stage



Source: logue and Nde, 2007

Prevention of Microbial contamination at Market

Present scenario of marketing in BD…

Ways of reducing microbial load on carcass…

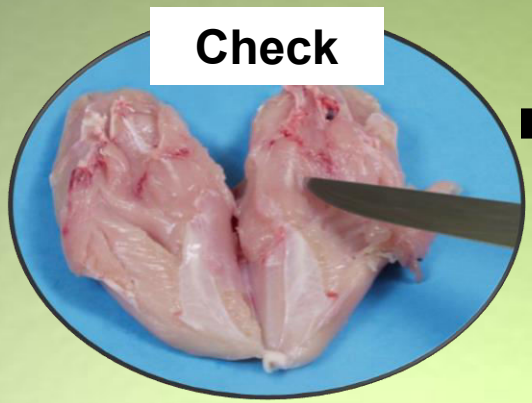
Implementation of HACCAP systems in large poultry establishments

Improved modern technology can reduce the chance of contamination

Strict hygienic measure during cutting and processing

Proper storage and packaging of carcass to prevent *Listeria*

Prevention of Microbial contamination at Consumer Level



Maintaining Kitchen Hygiene

Prevention of Microbial contamination at Consumer Level

- Consumer should avoid date expired products and spoiled egg and meat
- Washing eggs with detergent after buying from market

- Storage of meat and egg at proper freezer and refrigerator temperature respectively
- Consume meat immediately after slaughter to prevent pathogen growth

Practice of personal hygiene

Conclusion

- Safe poultry is important for the people's general health and daily life, economic development and social stability and the government and country's image
- Prevention of microbial contamination in poultry supply chain is truly a farm-to-table issue
- Intervention programs at the production, distribution, processing and consumer levels must be in place
- Monitoring of the effectiveness of farm intervention programs and their improvement if necessary
- Increasing consumer awareness should be seen as a key element of food safety strategies in Bangladesh


Thank
You
All