Introduction

Cross-Contamination of Imported Foods

Animal and Human Waste as Vehicles for

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Corrosion and corrosion products are common causes of food production problems. Only where corrosion resistance is properly engineered into food contact surfaces, where corrosion resistance is properly engineered into the entire equipment, where corrosion resistance is properly engineered into the entire process, can food production problems be avoided.

Table 6 shows the potential for corrosion and corrosion products, and the impact of the corrosion on food production. The table highlights the importance of selecting corrosion-resistant materials and design practices to minimize corrosion-related problems.

Pathogens transmitted by food contact surfaces can pose significant health risks. The table below summarizes the potential for different types of pathogens to transmit through food contact surfaces:

- **E. coli**: Can be transmitted through improperly cleaned surfaces, leading to foodborne illnesses.
- **Salmonella**: Present in improperly cleaned and stored food contact surfaces.
- **Listeria**: Can be transmitted through improperly cleaned and stored food contact surfaces.
- **Staphylococcus aureus**: Commonly found in improperly cleaned and stored food contact surfaces.
- **Norovirus**: Can be transmitted through improperly cleaned and stored food contact surfaces.

In conclusion, proper cleaning and sanitation practices are crucial to minimize the risk of foodborne illnesses. It is essential to design and implement effective cleaning and sanitation systems to ensure the safety of food products.
OCCURRENCE OF PATHOGENS

The occurrence of animal pathogens in the environment is a reflection of the presence of pathogens in animal feeds. The concentration of pathogens in animal feeds is often determined by the concentration of animal products in the environment, which is often determined by the concentration of animal products in feeds.

Table 3: Occurrence of specific pathogens in human wastes.

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteria</td>
<td></td>
</tr>
<tr>
<td>Viruses</td>
<td></td>
</tr>
<tr>
<td>Protozoa</td>
<td></td>
</tr>
</tbody>
</table>

Identification of animal pathogens is a complex process that involves the use of a variety of methods, including culture, serology, and molecular techniques. The results of these methods are often used to determine the presence of animal pathogens in human wastes.

Cross-contamination of animal feeds via animal and human wastes can occur through the ingestion of animal products, which are often contaminated with animal pathogens. The ingestion of these products can lead to the transmission of animal pathogens to humans, which can cause a variety of infections.

Therefore, the control of animal pathogens in the environment is crucial to preventing the transmission of these pathogens to humans. The control of animal pathogens in the environment can be achieved through the use of various methods, including the use of antibiotics, the use of vaccines, and the use of biocontrol agents.

For more information on the control of animal pathogens in the environment, please refer to the following references:

Table 4: Concentration of organic phosphorus in some African countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Concentration of organic phosphorus (mg kg⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Cameroon</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Chad</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Côte d'Ivoire</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Democratic Republic of</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Gabon</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Guinea</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Ghana</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Kenya</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Liberia</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Madagascar</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Malawi</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Mali</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Mozambique</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Namibia</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Niger</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Nigeria</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Senegal</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Somalia</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>South Africa</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Sudan</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Tanzania</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Togo</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Uganda</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Zambia</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>0.00-0.00</td>
</tr>
</tbody>
</table>

The concentration of organic phosphorus is highest in Kenya, followed by Uganda, and lowest in Benin. The concentration ranges from 0.00 to 0.00 mg kg⁻¹.
Table 6. Concentration of certain pathogens in different human matrices.

| Pathogen | Concentration | Count
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>E. coli</td>
<td>6.9 x 10^9</td>
<td>6.9 x 10^9</td>
</tr>
<tr>
<td>Salmonella</td>
<td>2.3 x 10^6</td>
<td>2.3 x 10^6</td>
</tr>
<tr>
<td>Shigella</td>
<td>1.7 x 10^5</td>
<td>1.7 x 10^5</td>
</tr>
</tbody>
</table>

The high prevalence and production of certain pathogenic bacteria play a crucial role in the development of various diseases, affecting human health, and can be spread via contaminated food and water.
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Cross-Contamination of Imported Food via Animal and Human Waste

Objective

The objective of this study is to evaluate the risk of cross-contamination in the food processing environment, particularly focusing on the potential for contamination through the importation of animal and human waste. This is crucial for ensuring food safety and adherence to regulatory standards. The study aims to assess the likelihood of contamination events and to develop strategies to mitigate these risks.

Methods

The research involved a comprehensive analysis of historical data, case studies, and expert interviews. A risk assessment framework was developed to evaluate the potential for cross-contamination in food processing environments. This framework included the identification of waste types, their sources, and the pathways through which contamination could occur.

Key Findings

- Animal waste, including manure and carcasses, poses a significant risk due to the presence of pathogenic bacteria and viruses.
- Human waste, particularly from areas with high infection rates, can also contaminate food processing areas.
- Cross-contamination is more likely to occur in environments with poor hygiene practices and inadequate waste management systems.

Conclusion

Effective management strategies, such as proper waste disposal and stringent hygiene practices, are necessary to minimize the risk of cross-contamination in the food processing industry. Continuous monitoring and improvement of waste handling practices are essential to maintain food safety and compliance with regulatory standards.


**Wastewater**

The discharge of treated wastewater into surface water bodies can result in the introduction of certain contaminants into the aquatic environment. These contaminants can include nutrients, pathogens, and other substances that can impact water quality and aquatic life. The risk of cross-contamination from wastewater discharge into surface waters can be minimized through the implementation of best management practices and the use of advanced treatment technologies.

### Cross-Contamination of Impounded Foods

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Surface</th>
<th>Spill</th>
<th>Spill, Spill, Spill</th>
<th>Spill, Spill, Spill, Spill</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. coli</td>
<td>1000 CFU</td>
<td>100 CFU</td>
<td>10 CFU</td>
<td>1 CFU</td>
</tr>
<tr>
<td>Pathogens</td>
<td>1000 CFU</td>
<td>100 CFU</td>
<td>10 CFU</td>
<td>1 CFU</td>
</tr>
<tr>
<td>Nutrients</td>
<td>1000 mg/L</td>
<td>100 mg/L</td>
<td>10 mg/L</td>
<td>1 mg/L</td>
</tr>
</tbody>
</table>

Table 1: Cross-Contamination of Impounded Foods in Animal and Human Waste

**Routes of Cross-Contamination**

- **Intake:** Ingestion of contaminated water or food products that contain pathogens or other contaminants.
- **Inhalation:** Breathing in contaminated air or dust that contains pathogens or other contaminants.
- **Direct Contact:** Skin contact with contaminated surfaces or objects.
- **Intravascular:** Injection with contaminated substances.

Understanding these routes of cross-contamination is crucial for developing effective strategies to prevent and mitigate the spread of contaminants in the environment. This includes the implementation of robust sanitation practices, the use of advanced filtration and treatment technologies, and the promotion of public health awareness campaigns.
The World Health Organization (WHO) (2000) recommends that the rate of water treatment should be 100% of water consumption. In developing countries, where the basic infrastructure is not yet in place, the use of water treatment is crucial to ensure the safety of the population. The WHO guidelines emphasize the importance of water treatment in reducing the risk of waterborne diseases, which are a major health concern in many parts of the world. The guidelines recommend the use of various technologies, including disinfection methods such as chlorination, UV disinfection, and filtration, to ensure that water supplies are safe for consumption. The effective implementation of these guidelines is critical to improving the health and well-being of communities in developing countries.
Cross-communication of important foods via animal and human waste

Other reasons of cross-communication

Shellfish-growing waters

(Elton & Usher, 1981)
REFERENCES


