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Impact of Livestock Diseases on the Safety and Quality of Meat and Milk

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Meat and milk are important sources of high-quality protein, essential amino acids, vitamins, and minerals that support human growth and health. Livestock production plays a vital role in food security, rural livelihoods, and the national economy. However, diseases affecting livestock can significantly influence the safety, quality, nutritional value, and shelf life of animal-derived foods. Some diseases directly affect meat and milk production, while others pose a risk of transmission from animals to humans through contaminated food. Therefore, maintaining livestock health is essential for ensuring safe and nutritious animal products.

Impact of Livestock Diseases on Meat Quality and Safety

Livestock diseases can affect meat quality by altering its colour, texture, tenderness, flavour, and overall acceptability. Sick animals may exhibit reduced growth, poor body condition, muscle damage, and decreased meat yield, resulting in economic losses to farmers and the meat industry. Certain disease-causing microorganisms can contaminate meat during slaughter, processing, and handling. Bacteria such as Salmonella, pathogenic Escherichia coli, and Campylobacter can cause foodborne illnesses in humans. Parasitic infections, including bovine cysticercosis and trichinellosis in susceptible animal species, are also important food safety concerns. Systemic infections and other serious pathological conditions may result in carcass condemnation or restrictions on meat use following veterinary inspection. Furthermore, inappropriate use of veterinary medicines can lead to drug residues in meat if withdrawal periods are not observed. These issues highlight the importance of disease diagnosis, ante-mortem and post-mortem inspection, hygienic slaughter, proper refrigeration, and adequate cooking.

Impact of Livestock Diseases on Milk Quality and Safety

Milk is a highly nutritious food containing proteins, fats, lactose, vitamins, and minerals. However, its composition and quality can be affected by diseases, particularly those involving the mammary gland. Mastitis, an inflammation of the udder, is one of the most economically important diseases in dairy animals. It reduces milk yield and may alter fat, protein, lactose, and mineral content. Infected milk may contain increased somatic cell counts and show changes in its appearance and processing properties. These changes can reduce the quality and suitability of milk for manufacturing dairy products such as curd, yoghurt, cheese, and butter. Zoonotic diseases are another major concern. Brucellosis and bovine tuberculosis can be transmitted to humans through unpasteurised milk from infected animals. Other harmful microorganisms may enter milk through contaminated udders, equipment, water, or improper handling. Since contaminated milk may appear normal, visual inspection alone cannot guarantee safety.

Veterinary drug residues are also important. When antibiotics are used to treat mastitis or other infections, milk should not be marketed until the prescribed withdrawal period has elapsed. Drug residues can pose food safety concerns and interfere with starter cultures used in fermented dairy products.

Major Livestock Diseases of Public Health Importance

Several livestock diseases have important implications for food safety and public health.

- Brucellosis: May spread to humans through unpasteurised milk and certain dairy products from infected animals.
- Bovine tuberculosis: Can be transmitted through unpasteurised milk and other exposure routes.
- Mastitis: Reduces milk yield and quality and may introduce harmful bacteria into milk.
- Salmonellosis: Can be transmitted through contaminated meat, poultry, eggs, and other foods.
- Foot-and-mouth disease: Primarily affects cloven-hoofed animals, causing fever, mouth and foot lesions, reduced milk production, and substantial economic losses. It is not considered a major foodborne zoonosis.

These examples demonstrate that livestock diseases differ in their transmission routes and effects, requiring disease-specific prevention and control measures.

Prevention and Control Measures

The prevention of livestock diseases requires coordinated efforts from farmers, veterinarians, food processors, and regulatory authorities. At the farm level, balanced nutrition, clean drinking water, proper housing, vaccination where appropriate, regular veterinary examinations, and effective biosecurity help maintain animal health. Early identification and isolation of sick animals can reduce disease transmission within herds. During milk production, hygienic milking practices, clean equipment, udder health management, and rapid cooling help preserve milk quality. During meat production, ante-mortem and post-mortem inspection, hygienic slaughter, prevention of contamination, and appropriate refrigeration are essential. At the processing and consumer levels, milk should be pasteurised or adequately heat-treated, while meat should be cooked thoroughly. Proper storage temperatures, prevention of cross-contamination, and responsible handling help minimise foodborne risks. Veterinary medicines must be used under professional guidance, and prescribed withdrawal periods must be followed.

Conclusion

Livestock diseases have far-reaching consequences for animal productivity, food quality, public health, and economic sustainability. Healthy animals are fundamental to the production of safe and nutritious meat and milk. Effective veterinary care, disease surveillance, hygienic production, appropriate processing, and consumer awareness are essential to reduce foodborne risks. The One Health approach, which recognises the interconnected health of humans, animals, and the environment, provides an important framework for addressing these challenges. Protecting livestock health ultimately contributes to safer food, healthier communities, and sustainable livestock production.