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Fahim Aziz Eldein Shaltout *

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Review Article

Quick Methods to Make Sure That Your Food Is Good and Free from Hormonal Residues

Fahim Aziz Eldein Shaltout

Department of Food Hygiene and Control (Meat hygiene), Faculty of Veterinary Medicine, Benha University, Benha 13736, Egypt.

***Correspondence Author:** Fahim Aziz Eldein Shaltout, Department of Food Hygiene and Control (Meat hygiene), Faculty of Veterinary Medicine, Benha University, Benha 13736, Egypt.

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Abstract:

Hormonal residues in meat have become a growing concern due to their potential health and environmental impacts. These residues result from the use of hormonal growth promoters (HGPs) in livestock production, which are employed to enhance growth rates, improve feed efficiency, and increase meat yield. This paper explores the sources, detection methods, regulatory measures, and potential risks associated with hormonal residues in meat products.

Keywords: hormonal residues; growth promoters; livestock production; potential risks

Introduction

The global demand for meat has led to intensified livestock production systems (1-7). Hormonal growth promoters, such as estrogen, progesterone, and synthetic anabolic steroids, are commonly used to accelerate growth in cattle, poultry, and swine (8-15). While these practices improve economic efficiency, they raise concerns about hormonal residues entering the food chain (144-150). potentially affecting human health and environmental systems (151-156).

Sources of Hormonal Residues

Hormonal residues in meat originate from Natural Hormones (137-143). Produced endogenously by animals (16-23). Synthetic Hormones, administered to enhance growth and productivity, such as trenbolone acetate, zeranol, and melengestrol acetate (24-30). Mismanagement, Overuse or improper withdrawal periods before slaughter can lead to residue accumulation (31-37).

Detection of Hormonal Residues

Modern techniques have advanced the detection of hormonal residues in meat as Enzyme-Linked Immunosorbent Assay (ELISA), Used for rapid and cost-effective screening (38-44). Gas Chromatography-Mass Spectrometry (GC-MS) Offers high sensitivity and specificity (45-51). High-Performance Liquid Chromatography (HPLC): Common for quantifying hormone levels (52-58).

Health Implications

Endocrine Disruption: Residues may interfere with hormone receptors, leading to reproductive and developmental issues (59-65). Carcinogenic Risks, Long-term exposure to some hormones is linked to increased cancer risks (66-72). Antibiotic Resistance, Hormone treatments often coincide with antibiotic use, compounding public health challenges (73-79).

Regulations and Standards

Regulatory frameworks differ globally (130-136). European Union (EU) Prohibits hormonal growth promoters in livestock. United States (FDA/USDA) Permits limited use under strict guidelines. Codex Alimentarius Provides international food standards, including Maximum Residue Limits (MRLs) (80-86).

Environmental Concerns

Hormonal residues excreted by livestock can contaminate water systems, affecting aquatic organisms and ecosystems (87-93). Studies show hormonal disruption in fish populations near livestock farming areas, highlighting the broader ecological impact (94-100).

Mitigation Strategies

1. Improved Livestock Management, Adhering to withdrawal periods and monitoring feed additives (101-108). Alternative Growth Promoters,

Using probiotics, enzymes, or plant-based additives (109-115). Policy Enforcement: Strengthening inspections and penalties for non-compliance (116-122). Hormonal residues in meat remain a contentious issue, balancing economic benefits against potential health and environmental risks (123-129).

Conclusion

Advances in detection methods and stricter regulations are critical to ensuring food safety and sustainability. Collaborative efforts among scientists, policymakers, and industry stakeholders are essential to mitigate risks and protect public health.

Conflicts of Interest

The author declares no conflicts of interest.

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