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Drug Residues in Eggs, Meat and Milk

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Introduction

Usage of veterinary medicines in livestock management and production is critical for illness treatment and prevention, increasing growth and productivity using growth boosters, and guaranteeing food safety. Veterinary medicines are used all around the world and include a wide range of chemical substances, including as vaccinations, drugs, antiparasitic drugs, growth boosters, and other substances These medicines have been utilised to increase the cost-effectiveness and yield of contemporary food-animal production by allowing for earlier weaning, augmenting carcass output, milk, meat and egg quality, and less expensive feed (Ronquillo and Hernandez, 2017).

Table no. 1 Commonly used veterinary drugs

Sl. No.	Types of drugs	Name of the drugs
1.	**Antimicrobial drugs**	Tetracyclines, amprolium, β-lactams, sulphonamides, tylosin, aminoglycosides, macrolides, penicillin, streptomycin, lincosamides, quinolones, sulfonamides, tetracyclines.
2.	**Anti endo-parasitic drugs**	Stilbenes, amphenicols, anthelmintics, coccidiostats, nitrofurans, nitroimidazoles.
3.	**Anti ecto-parasitic drugs**	Carbamates, pyrethroids.
4.	**Growth promoters**	Bambermycin, avilamycin, efrotomycin, monensin, salinomycin, narasin, lasalocid, zeranol, trenbolone acetate, estradiol.
5.	**Physiological**	Sedatives, tranquilizers, anaesthetics, antidepressants.

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Many medicines used in cattle are the same or similar to those used in human. The majority of drugs used in cattle can result in the development of drug-resistant bacteria in egg, milk and muscle food, which can subsequently be transferred to people through food and other ways. The rise in drug residues in milk, meat, and their products was caused by a number of outbreaks of animal illnesses, as well as increased demand for milk, meat, and their products (Hughes and Heritage 2004). Consistent usage of significant quantities of these medicines results in drug residue accumulation in muscle and organs of animals, as well as excretion through milk and egg. Intake of these medication residues in animal products (egg, milk, meat, and their derivatives) may endanger consumers' well-being, including the development of drug resistance and hypersensitivities. According to FAO/WHO, drug residue in edible animal products has risen over the permitted threshold (extremely high) in developing nations. So, the European legislation has set maximum residue limits for veterinary drug residues in different animal food products (European Commission Council Regulation (EEC), (Falowo and Akimoladun, 2019).

The consequences for consumer health indicate an increase in drug resistance and animal to human drug resistance transfer. The resistant microorganisms can enter people directly via contact or indirectly through animal goods and by-products (e.g., egg, milk, meat etc.). Drug treatment will fail as a result of these resistant strains. In a sensitised patient, hypersensitivity responses or immune-mediated response to a chemical agent (e.g., medication) might occur. The allergic reaction to macrolide antibiotics (such as erythromycin and clarithromycin) destroys liver cells. Other traces of harm include carcinogenic, mutagenic, and teratogenic effects and disruptions of normal intestinal flora (De Santis *et al.*, 2018).

The world economy suffers as a result of sub-therapeutic or therapeutic dose and drug residues in food animals. The occurrence of illnesses such as cancer, as well as the distortion of the body functions caused by the intake of such food of animal origin, has eroded consumer self-confidence, resulting in a progressive reduction in animal goods exported. Drug residues in egg, milk and meat products are the consequence of noncompliance with withdrawal periods, antibiotic overdose, and continued use of prohibited antibiotics of food

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animals. There is a plethora of regulations in place to safeguard consumers from potentially hazardous residues of veterinary medications, pesticides, and environmental pollutants in food of animal origin. Maximum residual limits (MRLs) for veterinary medications, insecticides, and environmental pollutants have been established (European Regulation (EC) No 470/2009).

Antibiotic residues in animal food should be controlled by screening for the presence of drug residues, either qualitatively or quantitatively. The confirmation method is carried out with the assistance of a more sensitive microbiological screening technology, direct and indirect sandwich ELISA. Sandwich ELISA, HPLC-MS-MS coupling, and biosensors have all resulted in significant reductions in analysis time.

Drug residues in milk, meat, and related products can be eliminated through developing disease-resistant animal breeds, in vitro cultured meat, and ethno-veterinary techniques as alternatives to veterinary medicines. Furthermore, government authorities or regulatory bodies should enforce proper withdrawal times for drug medication applications, as well as reduce drug usage in animal production. The widespread public knowledge of the implications of drug drug residues in egg, milk, meat, and their products, development of quick screening technologies for identifying and segregating samples before food items are distributed to consumers (Mitchell *et al.*, 1998).

Conclusion

Occurrence of veterinary medication residue in food items is a worldwide health problem since these implications for treating and preventing animal illness reach well beyond the farm. Animal products (eggs, meat, milk, and their products) must be tested to verify that residues do not exceed maximum residue levels as the unintentional ingestion of drug residues in food items results in drug resistance of microorganisms harmful to people, posing a severe hazard to human health. Control of drug residues needs a synchronized regulatory agency that will monitor the use of medicines to control illnesses and punish against its indiscriminate use. Development of reliable and sensitive analytical methods for readily detecting and monitoring drug residues in eggs, meat, milk, and their derivatives products is necessary.

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