Analysis of risk factors and preventive measures of veterinary drug residues in the foods of human health

V.Geethanjali
Research scholar, Dept. of Food Technology,
Tamilnadu Veterinary Animal Sciences University, India

ABSTRACT

In recent times, consumers have complained about the adulterations in animal meat, poultry and milk that are accumulated from the animals. They are also faced several health issues. The practice of using veterinary drugs in food-making animals has possible to produce remains in animal derived products (meat, milk, eggs and honey) and pretences healthiness risk to the user. There are many issues prompting the existence of deposits in animal products like properties of drugs and the biological progressions of animals and their products. The animal drug sanction progression worldwide is based upon the principle that the presence of drug residues in meat and poultry above acceptance is a public health hazard. The most expected motivation for drug remains might be due to inappropriate practice of drug usage and miscarriage to keep the withdrawal period. The remains of the drug in the tissue of the animal above the legal allowance undoubtedly create a major impact on the human health. The main communal health consequences of drug residue are growth of antimicrobial drug opposition, allergic reaction and interruption of intestinal normal vegetation. Nevertheless, there is inadequate information on the magnitude of veterinary drug residue worldwide. This paper describes the existing evidence for specific health hazards of some definite drugs and describes the hazardous risks associated with the remains of the drug in the foods consumed from animals with above established tolerance levels. This proposal defines the prevailing evidence for specific health hazards of certain pharmacological classes of drugs and describes the precarious risks related with drug residues in milk, meat and poultry above the recognized acceptance levels. An empathised effort has been carried out to determine the problem, to take necessary preventive measures for the occurrence of the drug remains and to explain all professionals who are in this field. The main effort is to minimize the health hazard of the public from the remains of the drug in animal as food.

KEYWORDS: *veterinary drugs, health hazard, adverse effects, pharmacological drugs.*

1. INTRODUCTION

The issues of sustaining the nutritional necessities of a growing world population are becoming progressively severe. Drugs that increase the rate of weight gain, develop feed productivity, or avoid and treat diseases in food-producing animals are disparagingly wanted to meet the challenge of providing adequate amounts of food for that population. But, the advantage of upgraded In both human medical and companion-animal veterinary practice, the primary concern in drug selection and use is the therapeutic end point, whether or not the drug is effective against the sickness being treated. Doses are usually administered at label recommendations, and if greater than label dose is administered, only potential toxicity is of concern. This is true to a large degree in food-animal production, veterinarians and producers convoluted in the treatment of disease in food animals tolerate the additional concern of the diligence of drug remains in the edible tissues after the disease process has been preserved. Contamination of the food supply with antimicrobial agents, insecticides, ecological pollutants, and other chemicals has been a rising source of issue to the general public and special-interest groups in recent years.

Human health is associated directly to the surroundings and in specific the nature and quality of the food. Quality of food from animal products is generally regarding public health assistances around the world since veterinary drugs have played a significant role in the field of animal farming and agro-industry, and growing existence of remains, and resistance have become stimulating issues. Veterinary drugs are disparagingly wanted to meet the challenges of providing sufficient amounts of food for the developing world population as drugs increase the rate of weight gain, develop feed efficiency, or avoid and treat diseases in food producing animals. On the other hand, the advantage of enhanced productivity from the use of products in food generating animals is not acquired without the risk related with drug residues that persist in the tissues of preserved animals at the time of slaughter or residues in animal consequent products and pretences a health hazard to the customer. The animal drugs and hormonal development agents are the chief products that possibly pollute foods of animal cause. Therefore, veterinary drug deposit is one of many worldwide disputes regarding food adulteration. Underneath the standard physical circumstances, resulting management of a drug to an animal, most drugs are digested in demand to simplify elimination and to great extent decontamination as well. In common, most of the parental product and its metabolites are evacuated in urine and a reduced amount via faeces. Though, these constituents may also be found in milk and eggs, and in the meat.

2. THREAT ISSUES FOR THE PROGRESS OF RESIDUE IN ANIMALS

Veterinary drug remains are one of the most important complications for food adulteration. The veterinary products and agricultural chemicals used permitting to label directions should not effect in remains during slaughter. Though, probable details for such remains comprise: Not subsequent suggested label directions or dosage; not observing to commended removal times; managing too large a capacity at a single inoculation site; practice of drug-contaminated apparatus, or failure to correctly sanitary equipment used to blend or manage drugs; medicating, determining, or mingling errors; permitting animals right to use to spill chemicals or medicated feeds. Veterinary drug remains commonly gather in the liver or kidney rather than other tissues. It has been renowned that altered residue levels can be originated in different tissue situations such as site and route of management. The most likely intention for drug deposits may effect from human administration, such as inappropriate usage, comprising extra-label or unlawful drug applications. Though, the most obvious reason for intolerable deposits might be due to disappointment to keep to the extraction period comprising using overdose and long acting drugs. Insufficient good hygienic care during animal or product conveyance, containing the cross adulteration of animal feeding stuffs with inadvertently applied drugs, environmental and animal to animal transfer of drugs may also cause residues.

Factors that are responsible for the progression of residue are as follows as:

2.1 FEEDING HABIT

Intake of food can have emotional impact on the bioavailability of drugs. For examples, study showed to decide the possessions of diet content on the bioavailability of managed Fenbendazole to cattle and Indian buffalo and nourished dry hay either with or without fresh green herbage exposed that animals getting feed comprising fresh herbage had depressed bioavailability of the drug. It halts in the rumen and is increasingly unconstrained with digestion, and the presence of fresh herbage increases instinctive activity and the flow rate of digestion, which reduces the existing stores of fenbendazole in the rumen. In regard to feeds, actual gut contents can also have an effect on drug uptake and pharmacodynamics.

2.2 STATUS OF THE INFECTION

The syndrome position of an animal can have emotional impact the pharmacokinetics of drugs managed, which can influence the possible for residues. This can take place either when the disease distresses the metabolic system, or when the occurrence of infection and/or inflammation causes the drug to mount up in affected tissues. For example, cattle with intensely exacerbated mastitis quarters, a pramycinbreaches these

areas of the body and attentiveness of the drug have been detected at ten times over the level verified from cows without mastitis. The critical level in milk proliferates during clinical mastitis where there is an influx of serum constituents into the udder. In calves with experimentally convinced fasciolosis, the eradication half-life of antipyrine was marginally improved, but somewhat reduced for erythromycin and statistically substantial decrease for oxytetracycline. The projected mechanisms for these variations were the alterations in liver function by fasciolosis, which transformed the processing of drugs through the liver.

2.3 ENERGY TRANSFORMATION

Energy transformation is the primary mechanism of removal of the transformation of drugs or xenobiotic into metabolites of the chemical reaction. Hepatocytes play an enormously essential role in the metabolism of drugs and xenobiotic-compounds that are external to the body, some of which are toxic. The kidneys are responsible eventually to organize of these substances, but for operative elimination, the drug or its metabolites must be made hydrophilic. This is because reabsorption of a matter by the renal tubules is in need of on its hydrophobicity. The more hydrophobicsubstance is, the more likely it will be reabsorbed. Many drugs and metabolites are hydrophobic, and the liver converts them into hydrophilic compounds by using the two classes of enzymatic pathways of biotransformation; Phase I corresponds to functionalization processes comprising oxidation, reduction, hydrolysis, hydration and isomerization responses. Phase II reactions comprise conjugation of the drug or phase I metabolite with the endogenous substrate such as glucuronic acid, sulphate, acetate and methyl group. Even though some drugs are eradicated from the body by uncharged, most drugs submit to metabolism where the liver is the chieforgan of reaction. Moreover, the liver's function may modify the drug's form to be inactive and easyto evacuate but some drugs may be transformed to astimulating custom.

2.4 WASTE REMOVAL

The process of removing parent drug or its residues from the body of the animal is called excretion. The kidney is the most significant spot of drug excretion. There are three renal mechanisms; glomerularfiltration, carrier mediated proximal tubular secretion and PH dependent, passive tubular desorption in the distal nephron. Renal in efficiency typically suggestively affects drug excretion. The general clearance and eradication half-life are significant factors referring to the overall rate of elimination. Even though most compounds are evacuated principally by the renal, some drugs are moderately or absolutely excreted through the bile. It has been described that there is an widespread species deviation among animals in their general ability to excrete drugs in the spleen; example, chicken are categorized as good biliary excretes, however sheep and rabbit are regarded as moderate and poor excretes.

2.5 USAGE OF DRUG

It refers to the use of a permitted drug in a way that is not in agreement with the accepted label directions. It occur when a drug only agreed for human use is used in animals, when a drug permitted for one species of animal is used in another, when a drug is provided to give a situation for which it was not sanctioned, or the use of drugs at levels in excess of suggested quantities. For examples, the use of phenobarbital which is permitted use of humans in animals to treat epilepsy in dogs and cats; the useof drugs in dogs and cats and the use of enrofloxacin solution as a topical ear medication are the general drug in veterinary medicine. There are conditions for the usage of drugs in food animals. For example, when considering ELU of an approved human drug in food animals: the veterinarian must have medical rational for the use; the veterinarian may not use an approved human drug if an animal drug approved for use in food-producing animals can be used instead for the particular ELU; and if scientific information on the human food safety aspect of the use of the drug in food-producing animals is not available, the veterinarian must take appropriate measures to assure that the animal and its food products will not enter the human food supply.

2.6 INAPPROPRIATE CLEARANCE PERIOD

The inappropriate clearance period or withdrawal time is the time period for the remains of toxicological disquiet to spread a safe concentration as defined by the acceptance level. Based on the drug product, dosage practice, and path of management, the extraction time may vary from a few hours to several days or weeks. It is the intermission needed between the last administration to the animals of the drug under normal situation of used and the time when treated animal can be thrashed for the production of harmless foodstuffs.

3. POSSIBLE INFLUENCE OF VETERINARY DRUG RESIDUES ON PUBLIC HEALTH

In general, the drug which contains low-level contamination may not create any serious problem to the consumed person health. On the other hand, extensive use of drugs may raise the risk of severe effect of remains on the customer as well as the existence of antibiotic resistance and hypersensitivity reaction. As a result, cautious use of drugs in the custom of avoiding feed contamination is needed.

3.1 IMPROVEMENT OF DRUG RESISTANCE

The health of the Human can either have impact through remains of drugs in food of animal origin, which may cause direct side effects, or ultimately, through selection of antibiotic resistance factors that may spread human pathogen. Resilient microorganism can have the impact to access inhuman, either through direct contact or indirectly via milk, meat, and or egg. As the bacteria of animal cause, they may either colonize human endogenous flora or overlay and additional load to the reservoir of conflict genes previously extant in man. The prospective thing for animal to human transmission of resistance is occurred. Obviously, the use of antibiotic in livestock production has been related with the growth of human antibiotic resistance. The animal nourished with the low prophylactic level of antibiotic may improve bacteria developing resistance to this antibiotic during the planning or consumption of food of animal source. It has been documented that human develop drug opposed to bacteria such as Salmonella, Campylobacter, and Staphylococcus from food of animal origin.

3.2 REACTION OF DRUG INTOLERANCE

Drug intolerance is defined as an immune acquiescent reaction to a drug agent in a sensitized patient, and drug allergy is limited to a reaction facilitated by IgE. An allergic or easily offended consequence following administration of a drugi.e., drug allergy is somewhat related to that characterized by allergic response to protein, carbohydrate, and lipid macromolecules. Allergic reactions to drugs may comprise anaphylaxis, serum illness, cutaneous reaction, a hindered hypersensitivity response to drugs seem to be more generally related with the antibiotics, particularly of penicillin. About 10% of the human population is deliberated hypersensitive to an aggregate of a substance, containing penicillin, but in animals, the range of easily offended condition to, the drug is not well known. Definite macro ides may also in extraordinary be responsible for liver injuries, initiated by a specific allergic response to macrolide modified hepatic cells.

3.3 INTERRUPTION OF COMMON INTESTINAL FLORA

The bacteria those are commonly live in the intestine deeds as an obstacle to avoid arriving pathogen from being recognized and affected diseases. Antibiotics may decrease the total number of the bacteria or selectively destroy some significant species. The broad-spectrum antimicrobials may undesirably affect a wide range of intestinal flora and subsequently cause gastrointestinal disturbance.

4. CONTROL AND PREVENTIVE MEASURES

According to European Union, the analysing and monitoring control methods are mainly based on the consistent logical methods. The supervisory framework in force is based on which structures the network of laboratories

approved for official residue control, laying down needs in terms of quality and performance of analytical methods. In common, the residue control strategy is based on a two-step approach: (i) the recognitionof residues using sensitive tests with a low rate of false refusals; (ii) tracked by validation, necessitating quantification against the Maximum Residual Limit and identification with a low rate of false positives. Therefore, the residue prevention strategy is based on avoiding entry of disrupted residues in meat or milk anticipated for human consumption by proper drug use guide developed for use by both veterinary and food animal (dairy and beef) producers include the following:

Herd strength management: All food animals should be conserved in a hygienic and healthy environment at whatever time possible. Drug residues are best evaded by executing management practice and herd health program that keep animals healthy and generating proficiently.

Practice of using permitted drugs: Dairy and beef manufacturers should not use or stock unapproved drugs, special mixes, or products within acceptable labels as unapproved drugs have no data concerning efficiency, security, or suppression time. The flock veterinarian should be confident that it includes only complimentary products.

Establishment of valid veterinarian-client-patient affiliation: The practice of using prescription drug and to demand a veterinary-client patient relationship, which is recognized hence a veterinarian is diligently with the owner in health management of the herd.

Suitable drug management and documentation of treated animals: Before managing or bestowing drugs one has to identify the drugs permitted for all classes of cattle on the farm and be aware with permitted dosage, path of administration, and squashing time.

Accurate maintenance of treatment records and identification of treated animals: Introduce a practical health record for each animal to record all health associated events, comprising supervision of treatment. Record the identification of all animals in the everlasting health record book.

Consuming proper drug remains testing proficiencies really accessible on and off the farm: This control point give a lecture the conditions under which residue testing should be deliberated; the proper choice and explanation of tests; the essential restriction and possible misappropriation of residue testing; and

Awareness: Generating attentiveness of suitable drug use, and techniques to evade promoting adulterated products chiefly educational, total residue anticipation program is based upon the objective of cultivating the livestock producer's management and quality control of promoting animals with reputation on evading of drug residues.

CONCLUSION

Veterinarians should be well conscious of the significance of drug/chemical remains in the food animals and their promising hazard to the common public. They must have rationalized information about the right withdrawal times of all the drugs/chemicals used in their zones of practice. They are essential to spread this information to the heifers and poultry farmers for the production of residue free comestible animal products like milk, meet and eggs. For residue exploration, skilled and qualified manpower are required. In this concern, the accessibility of delicate equipment and modern analytical performances are of supreme prominence. There is also inadequate data on the extent of veterinary drug residue available globally. Therefore, a widespread work has to be carried out to avoid the existence of residues and to publicize all animal health specialists with the awareness of effects of pharmacological provisions that are beneficial in avoidance, control, and handling of

animal disease as indicated times essential for removal of medication from food of animal origin prior to ready for human consumption.

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