Antibiotics in poultry production

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The worldwide increase the use of antibiotics as an important part of poultry production industry to treat and save from infectious bacterial diseases and as growth performance increases at subtherapeutic levels in poultry feed has caused the problem of the development of bacterial antibiotic resistance. The use for antibiotic in poultry feed which will effect growth efficiency and effects on intestinal microflora and effects on the host animal. The use of growth promoting antibiotics must be found to promote growth or production at or near the genetic potential of the modern day broiler, turkey, and egg producer.

Key words: antibiotics, poultry, growth.

Introduction:

The word “ antibiotic growth promoter” is used to tell us any medicine that kill or stop bacteria growth and is used at a low, sub therapeutic level. The antibiotics used for best growth performances arises with increasing at large level of poultry and livestock farming. Disease causing agents decrease the production of farmed food animals and, these are controlled by , the usage of sub-therapeutic antimicrobial and antibiotics agents has been shown to be efficient. The use of growth-promoters is a problem of farming and the problems caused by higher use then those of developed rather than developing countries.

Poultry is one of the world’s fastest growing sources of meat, representing nearly one-fourth of all the meat produced. The modern production unit can produce market ready broiler chickens in less than six weeks. This development comes from genetic improvement, feeding and health management practices by using of of antibiotics as therapeutic agents to treat bacterial diseases in rural poultry farming. The recommended levels of antibiotics in feed were 5-10g in 1 kg in the 1950’s and have increased by ten to twenty folds since then. In many modern countries, antibiotics used in poultry is for treatment of infections. The characteristics of resistant becteria transfer from poultry products to human population may occur through consumption or handling meat contaminated with the pathogens (Van den Bogaard and Stobberingh, 2000). According to WHO the resistance to antibiotics is an ability of bacterial population to survive the effect of inhibitory concentration of antimicrobial agents (Catry et al., 2003). The resistant bacteria can damage the human intestine and the genes coding

resistance to antibiotics can be transferred to other bacteria belonging to the endogenous flora of humans, thereby jeopardizing effective treatment of bacterial infections (De Leener, 2005). These resistant bacteria then increasing their numbers a million fold a day, becoming the micro-organism in the population. Such bacteria transmit their genetically defined resistance characteristics to their offspring's of the strains and to other bacterial species via mutation(Gould, 2008).

Antibiotics may reduce the maintenance cost associated with turn our of the intestinal epithelium.(visek 1978) sugests that up to 20% of nutrient requirement for maintenance are directed to epithelial resupply. because antibiotic cause the thinning of epithelium,.(Visek 1978) concluded that a for a 1000 gram Broiler gaining at 50% per day reduce maintenance needs for epithethial regeneration caused by feeding, Anitibiotics could account for the 4-5% improvements in growth, offen seen with in these products.

The objective of this review is to provide information on the development of resistance to antibiotics, incidence of antibiotic resistance in poultry, public health implications, strategy for the containment of the evolving bacterial resistances, as well as probiotic application as an alternative approach to sub-therapeutic antibiotic usage in poultry.

Purposes of antibiotics used:

There are three main purposes of the antibiotics usage in the animals: therapeutic use to treat sick animals; prophylactic use to prevent infection in animals; as growth promoters to improve feed utilization and production. Generally, therapeutic treatment involves treatment of individual animals

over a short period with doses of antibiotic exceeding the minimal inhibitory concentration of the known or suspected pathogen. Sometimes, with intensively-farmed animals, therapeutic treatment is delivered by feed or drinking water; however, this treatment can be of doubtful efficacy in some situations, as sick animals often do not drink or eat. Applications of antibiotics in poultry production bring about an increase in resistance to antibiotics not only in pathogenic bacterial strains, but also in commensal bacteria (Lukasova and Sustackova, 2003).

Prophylactic uses of the antibiotics:

Prophylactic treatment again involves moderate to high doses of antibiotic, often given in feed or water for a defined period to a group of animals. The recognition of the dangers of antibiotic resistance prompted the ban on sub-therapeutic antibiotic usage in Europe and the potential for a ban in the United States and many developed countries, there is increasing interest in using probiotics that have potential to reduce enteric disease in poultry and subsequent contamination of poultry products (Patterson and Burkholder, 2003).

Antibiotics as the growth promoters:

Antibiotics used as growth promoters tend to be given in feed at subtherapeutic levels over extended periods to entire herds and flocks, and are available for purchase over the counter by feed manufacturers and farmers. It is necessary to note that subtherapeutic levels generally still exceed the minimal inhibitory concentration of enteric organisms such as Clostridium perfringens and Enterococcus spp. (van den Bogaard & Stobberingh, 1999).

According to the National Office of Animal Health, 2001, antibiotic are used “ as growth promotors to digest their feed more efficiently to get maximum benefit and allow to develop into good and healthy bird/animal”. it is believed that the antibiotics suppress harmfull populations of bacteria in intestines. It has been shown that as more as 6 % of the net gain energy in the poultry feed could be waste due to microbial fermentation in the intestine (Jensen, 1998). If the population of microbes or bacteria’s could better controlled, so that the lost energy could be using growth.

Thomke & Elwinger (1998) hypothesize that cytokines released during the immune response may also stimulate the release of catabolic hormones, which decrease the muscle mass. So decrease in GIT infections which will result in the subsequent increase in muscle weight. The mode of action, the result of the use of growth promoters is an increases in daily growth performance between 1 and 10 per cent resulting in meat of a good quality, with less fat and increased protein content in meat. There fore that growth promoters are effective; Prescott & Baggot (1993), however, showed that the effects of growth promoters are much higher in sick animals and those housed in unhygienic conditions, bad environment. On a world map, the use of antibiotics as growth promoters in animal differs dramatically. The following information is taken through the Report of the Joint Advisory Committee on Antibiotic Resistance (JETACAR, 1999) on the use of antibiotics in food producing animals.

Now a days it is difficult to raise poultry without the using growth promoters, since clostridial organisms often increase rapidly and inflammation of intestine develops. While some countries have a ban on sub-therapeutic

growth promoters used in feed, their use as water additives. Without the use of such ‘ antibiotics’, there will unfortunately be greater risk of bacterial growth in the bird’s digestive tract(GIT), especially when ‘ bad’ digested ingredients are included since these provide substrates for microbial fermentation in the lower gut.(Commercial poultry Nutrition) . There is a lack of definitive information on the overall of antibiotics used in feed as growth promotor, and there are obstacles to this information since feed formulations are considered confidential business information under U. S. law. our data are consistent with studies highlighting the prevalence of resistant enterococci and staphylococci in the poultry environment (Hayes et al., 2004; Lu et al., 2003).

Antibiotics used for growth-promotant purposes constitute a large proportion of the total antibiotic usage, but the scale of the problem is diffcult to estimate since there is little published information on the overall quantities of antibiotics used in animals or human subjects. Prescott (1997) reported that 40% of antibiotic production in the USA was for use in stock feeds, including 55- 60% of penicillin G and tetracycline production. European Federation of Animal Health (1998). The availability of antibiotics in poultry production depends on greater understanding of their risks and benefits.

Benefits of using antibiotics:

The advantage of antibiotics in poultry feed include increasing the feed conversion ratio and growth rate, treating sick birds and reducing or preventing the chances of infectious disease. The impotant use of antibiotics is increased efficiency, i. e. a more ability of conversion of feed to animal products, and an improved growth performance. In poultry feed, the usage of

, tetracycline and penicillin show the improvement in egg production, feed conversion ratio and hatchability, but no necessary effect on mortality. Chlorotetracycline, penicillin and oxytetracyclin also resulted in good growth performance, but no or a less effect on mortality. Antibiotics in animal feed, in general, are used regularly for increased feed conversion ratio and growth performance to combat then specific diseases. (The Rise of Antibiotic-Resistant Infections" (1995) FDA Consumer, 29).

Allegations and residues in products:

Concern about use of antibiotics in animals and the possible impact on human health covers two major issues: the antibiotic agents that are used; the way in which they are used. There is a view the antibiotics that are important in human medicine should not be used therapeutically in food-producing animals, particularly for mass medication. Prophylactic use presents a problem on two grounds: the antibiotic agents used; the lack of defnition of what is the appropriate duration of prophylactic use. Growth-promoters use is probably the area of highest concern, as some of the antibiotics used are now regarded as compromising the efficacy of some key human antibiotics and the duration of treatment may be for the whole life of the treated animals.

Regulatory controls:

All antibiotics control growth and proliferation of microorganisms; however, all antibiotics do not accomplish this control by the same mechanism (Ferket, 2004). Consequently, antibiotics differ with regard to their ability to influence certain disease states or improve growth and feed efficiency. Much of the work with antibiotic growth promoters continues to be from the standpoint of

studying the effects on easily cultured bacterial populations such as lactobacili and Clostridium perfringes and poultry health rather than resulting physical changes to the GIT (George et al., 1982; Engberg et al., 2000; Sims et al., 2004). Several researchers have studied intestinal morphology in poultry during the last decade but predominantly from the standpoint of normal development and not with regard to effects of antibiotics (Uni et al., 1995, 1998, 1999; Geyra et al., 2001).

Controls vary from country to country. For example, in Australia there are three points of control of antibiotic use in animals. First, all importations are controlled by a permit system (no 280 M. D. Barton antibiotics are produced in Australia). Second, at the registration level, there are strict regulatory guidelines over which antibiotics can be used in food-producing animals. Since 1970, antibiotics intended for animal use have been assessed for their potential to compromise human health. As a result, fuoroquinolones, amphenicols, colistin and gentamicin have not been registered for use in food-producing animals because of concerns about antibiotic resistance, and the registration of carbadox was withdrawn in the late 1980s and of nitrofurans in 1992 because of concerns about carcinogenicity (Joint Expert Technical Advisory Committee 1999). Finally, there is control-of-use legislation that restricts antibiotics registered for therapeutic or prophylactic use to registered veterinary surgeons, but allows overthe- counter sales to farmers or stock-feed companies of products registered for use as growth promoters. Agricultural use of antibiotics in the USA and Canada is also regulated. There are three categories of use: as feed antibiotics; as over-the-counter drugs; as veterinary prescription drugs. Feed antibiotics include

antibiotics used as growth promotants and those used for subtherapeutic (including prophylactic and some growth-promotant use) and therapeutic purposes (Prescott, 1997). Feed antibiotics are licensed for specifc uses such as for meat chickens or young pigs or calves or feedlot cattle. In the USA preregistration assessment specifically addresses human health issues relating to antibiotic resistance in enteric coliforms, salmonella excretion and increased resistance in salmonella, increased virulence and pathogenicity of bacteria, animal disease that is difficult to treat, and residues and risk of hypersensitivity in consumers (Sundlof et al. 1997). In Canada, the risk of development of antibiotic resistance is not assessed at this stage (Joint Expert Technical Advisory Committee on Antibiotic Resistance, 1999).

In the UK and other EU countries, antibiotics are authorised as either veterinary medicinal products or zootechnical feed additives. Veterinary medicinal products and growth promoters are subject to assessment for safety, including residues (veterinary medicines) and the risk of emergence of antibiotic resistance, cross-resistance to therapeutic antibiotics and selection for transferable resistance (both veterinary medicines and growth promoters; Rutter, 1997). Other European countries outside the EU have their own regulations. China has regulated the use of antibiotics in animal feeds since 1989 and only non-medical antibiotics are permitted as feed additives. Antibiotics used include monensin, salinomycin, destomycin, bacitracin, colistin, kitasamycin, enramycin and virginiamycin. However, in practice, other antibiotics such as tetracyclines are used and the mycelial by-products from the production of antibiotics are incorporated into animal feeds (Jin, 1997). Russia also restricts feed antibiotics to non-medical drugs;

bacitracin, grizin, ¯avomycin and virginiamycin are registered for use in this way (Panin et al. 1997).

The regulatory status and use of antibiotics in poultry production were addressed in research presented The use of antibiotics as preventative growth promotants is probably the most misunderstood by the general public. The use of antibiotics as preventative growth promotants is probably the most misunderstood by the general public. Many people interpret the use of antibiotics to be the same, whether it is a therapeutic treatment of disease or preventative control of subclinical disease such as necrotic enteritis. When reading the summaries that have been published by both domestic and foreign organizations on antibiotic use in food animals, the reader should be aware of whether the reports include one or a combination of the three antibiotic categories. For example, some reports may only include therapeutic and preventative growth promotants, whereas others will include therapeutics, preventative growth promotants and ionophore coccidiostats. (Fairchild and C. L. Hofacre, 2011)

CONCLUSIONS:

The good alternative to Antibiotic growth-promoters is a the increase the animal conditions that produce meat eggs etc, for example, the antibiotics must be prevent from use in a good growth performance role as a matter of immediately. Antibiotic are widely used for Poultry production due to their high efficiency and much more price. Tetracycline, sulfonamide, penicillin and tylosin are the most widely used antibiotic in poultry farm.