

# Poultry Feed Industry and Antibiotics Issues and Challenges – A Review

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**Abstract** — The use of natural feed additives (phytogenics) in feed production is gaining increasing interest since the ban on the use of antibiotics by the European Union in 2006. They are relatively cheap, safe, effective and have also been used to bridge the gap between food safety and livestock production. Phytochemicals in plants confers it the ability to perform multiple biological activities such as anti-inflammatory, antioxidant, antifungal, anthelmintic, antiviral, antimicrobial and antidiuretic activities. The use of plants extracts (phytogenic) also aids in alleviating some ailment which could be contracted via consumption of meat, eggs, milk or any other animal products and has no deleterious on the general performance of animals.

**Keywords**— Phytogenics; phytochemicals; food safety; livestock.

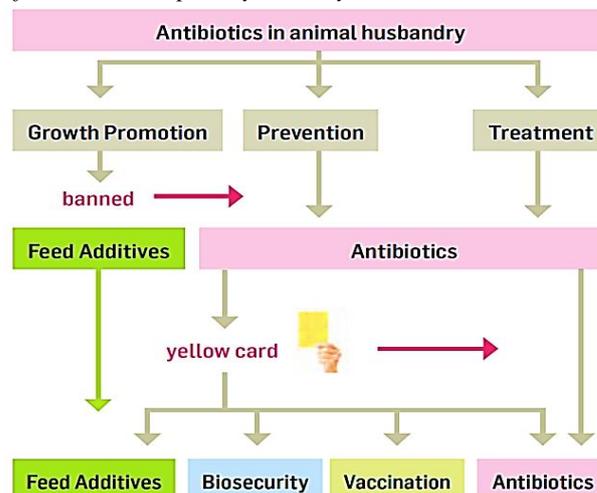
## I. INTRODUCTION

The fast growing nature of birds and their short generation interval to produce meat and eggs has been linked with the use of antibiotic growth promoters at sub-therapeutic doses in animal feeds gut (Olafadehan et al., 2020). At present, there is a global increase in population rate which has caused a significant rise in the use of antibiotics in order to meet up with protein requirement for humans especially in developing countries. Ojo (2003) reported that an average Nigerian consumes only about 8.6g of animal protein per day as against 53.3g by the inhabitants of developed countries. There is therefore concern about the extensive and indiscriminate use of antibiotics due to the growing population which has led to antibiotic resistance (ABR) diagnosed in animals and humans via direct contact, environmental contamination and food consumption, causing high cases of ailments (Alagbe et al., 2020).

These developments prompted the European Union in 2006, to place a ban on the use of antibiotics and focus on alternatives growth promoters to be used in poultry feed. Several compounds such as enzymes, organic acids, probiotics, prebiotics and phytogenics are used to improve the performance. Recently aromatic plants and their associated essential oils or extracts are being concerned as potentially growth promoters (Akintayo and Alagbe, 2020; Alagbe, 2019; Castanon, 2007). Most

phytogenics consist of mixtures of compounds such as phenolics and polyphenols, terpenoids, saponines, quinine, esters, flavone, flavonoids, tannins, alkaloids and non-volatiles residues; and their chemical composition and concentration of compounds is variable. These compounds have many effects as antimicrobial, stimulating animal digestive system, antioxidants, increase production of digestive enzymes and improve utilization of digestive products by enhancing liver functions (Gadde et al., 2017; Lilehoj et al., 2012). Phytogenics are of high medicinal values and have also been reported to be loaded with bioactive chemicals, minerals, vitamins, other nutrients which are considered to be relatively safe, cheap and effective (Olafadehan et al., 2020; Lambert et al., 2001; Carson et al., 2002). Previous researchers suggested that feed additives (phytogenics) contains secondary metabolites or phytochemicals which confers plant, herbs or spices the ability to perform multiple biological activities (Hyun et al., 2018). The concentrations of phytochemicals vary among plants according to species, age or maturity, geographical location, soil type and extraction method (Callaway et al., 2003; Reddy et al., 2003; Oluwafemi et al., 2020) and are often referred to as natural growth promoter because they exert positive effects on an animals general performance (Hyun et al., 2018), reduce ceaca pathogenic bacteria (Van et al., 2016; Fandino et al., 2008; Alagbe, 2020).

Fig. 1: Image showing the move towards a prudent use of antibiotics in poultry industry



Source: BIOMIN

### THE CHALLENGES FACING THE ANTIBIOTICS REGULATION IN POULTRY

1. Farmers are not comfortable with spending much money on cost of production.
2. When antibiotics are used sub-therapeutically (for animal performance, increased growth, and improved feed efficiency), then the costs of meat, eggs, and other animal products are lowered (National research Council, 1999).
3. One big argument against the restriction of antibiotic use is the potential economic hardship that would result for producers of livestock and poultry that could also result in higher cost for consumers (National research Council, 1999).
4. Another challenge is that it is difficult to get comprehensive data on the use of antibiotics in poultry feed because majority of the poultry industry utilizes vertical integration. As a consequence, farmers are often unaware of what components go into the feed, including whether or not antibiotics are used (Sneeringer, 2015).
5. In antibiotic usage in general, there are criteria to define bacterial resistance to specific antibiotics, however, there are no standards to divide the bacteria into resistant and susceptible categories based on antibiotics utilised (Dorsey et al., 2013).
6. Both the agriculture and pharmaceutical industries have been lobbying against legislation that seeks to quell non-therapeutic antibiotic use in livestock since the first introduction of such legislation in 1970s (Tavernise A., 2013).
7. Despite scientific evidence suggesting a strong association between antibiotic use in poultry and other livestock, agribusiness lobbies such as The National Chicken Council argue that there is not sufficient evidence to purport that there is a measurable impact to humans and shifts the blame of the problem of antibiotic resistance to overprescribing in the field of medicine (Dorsey et al., 2013).
8. With antibiotic restrictions, integrators will bear the immediate costs of these changes, and would likely result in modified finances and contracts with growers (Dorsey et al., 2013).
9. Also, public health agencies may not have adequate scientific evidence for making appropriate decisions for better public health outcomes, secondary to lack of research funds.
10. As a reference, the US spends about \$101 billion per year for both governmental and biomedical industrial research, which is only 5% of total health expenditures. (Dorsey et al., 2013).

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