

The PPCC approach in alternative to antibiotics

(Promotive, Preventive, Corrective, Curative approach)

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Introduction of antibiotics in poultry

During the last decade, herbs and phytochemical compounds have attracted a lot of attention for their potential role as alternatives to antibiotic growth promoters (AGPs) in monogastric animals. AGPs have been an integral part of the poultry feed industry for more than fifty years. However, AGPs alternatives have been searched since antibiotics prolonged use has precipitated the development of resistant strains within groups of primary pathogenic or opportunistic bacteria and the breakdown of the symbiosis between animals and desirable flora. The industrialization of poultry husbandry and the improvement of feed nutritional efficiency have accelerated the introduction of feed additives which became widely used in animal feed for many decades.

Impacts of antibiotics

In 1950, a group of United States scientists found that adding antibiotics to animal feed increases the growth rate of livestock. The use of antibiotics in poultry feed as a growth promoter is beneficial in improvement of production parameters and diseases prevention. However this large utilization has led to the increasing resistance of pathogens to antibiotics and the accumulation of antibiotic residues in animal products and in the environment. This situation requires the world to restrict using AGPs in animal feed. This practice has been banned in Europe since 2006.

Antibiotic use in livestock

An antibiotic is a drug that kills or slows the growth of bacteria. (Drugs that kill bacteria are referred to

as bacteriocidal; those that slow the growth of bacteria are referred to as bacteriostatic.) Antibiotics are chemicals produced by microorganisms such as bacteria and fungi. There are many different kinds of antibiotics, and they destroy bacteria in different ways.

Major classes of antibiotics involved in poultry production include the following:

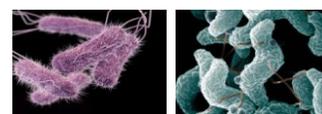
- Aminoglycosides
- Bambermycins
- Beta-Lactams
- Glycopeptides
- Ionophores
- Lincosamides
- Macrolides
- Polypeptides
- Quinolones
- Streptogramins
- Sulfonamides
- Tetracyclines.

Boon and bane of antibiotics

Since the time of discovery, antibiotics have played vital roles in the prevention, control and treatment of infectious diseases for humans and animals. China produces and consumes the most antibiotics of all countries. Half of the antibiotics manufactured in China are used in the production of livestock. In 2012 India manufactured about a third of the total amount of antibiotics in the world. Most of the meat animals raised in United States have received drugs as a routine part of their daily growth, either through feed or water they drink. They are given not only for prevention and cure, but also to increase the weight on animals.

However the unreasonable use of antibiotics has given rise to the fear of the development of resistance to

certain bacteria like *Salmonella*, *Campylobacter jejuni* and *Campylobacter coli*, and *Escherichia coli*, which may lead to the transfer of resistant bacteria and its resistant factors from animals to humans. Due to this concern, Sweden and European Union member nations banned all antibiotic growth promoters. Thus the ban of in-feed use of antibiotics has led to increase of infections in animals and thereby decrease in animal production. In-order to overcome this, a quality feed and potal water with proper hygiene should be provided to ensure the production of nutritious animal products with desired organoleptic properties.



Salmonella

Campylobacter jejuni



Escherichia coli

Campylobacter coli

Phytogenics, a better replacement for antibiotics

Phytogenics are a group of natural growth promoters (NGPs) or non-antibiotic growth promoters used as feed additives, derived from herbs, spices or other plants. In recent years, the use of additives of natural origin in animal and human nutrition has been encouraged. These phytogenic feed additives are herb and plant extracts which positively affects the poultry health and productivity, by improving digestibility, nutrient absorption and eliminating the pathogens from animal gut. Herbs provide potent anti-

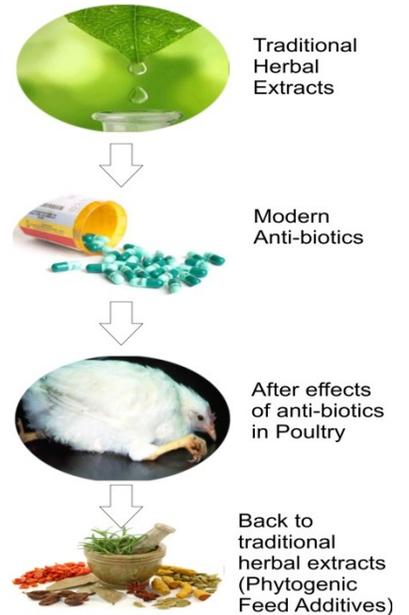
inflammatory, antibacterial, antiviral and antifungal benefits.

Physiologically, phytoenes have been reported to decrease ammonia output, oxidative stress and lipid peroxidation in poultry as well as increase overall gut health by supporting symbiotic gut micro-flora. Many phytoenic agents are well known from human nutrition, where they have a long tradition in the flavouring of foods. It is not only used in flavouring of food but also has many biological properties which make an emerging approach in animal nutrition. The massively increasing demand for organic meat is acting as a major driver for the phytoenic market. Phytoenes along with enzymes seem to have beneficial effects in poultry as it prevents and treats pathological conditions, acts as a defense agent against physiological and environmental stress, better appetizer and digestive stimulant with controlled litter. Enzymes also play a vital role in treating some diseases like necrotic enteritis.

Back to traditional method

Since ancient times, medicinal plants have been used to treat humans and livestock. All creatures of this world have the combination of vatha, pittha, kapha properties. These three bio-elements always fluctuate in the body. As long as these three are properly placed in the body, the health will be perfect. If there is an imbalance, the disease will occur. To cure the diseases certain herbal or ayurvedic medicines are invented by our sages. They also wrote medicines for elephants, horse, cattle and believed that animals also have the same tridoshas just like human beings and cured them in same manner but only difference is that according to size the dosage was administered. Some of those include oregano, thyme, fennel seed, garlic, cumin, neem, amla, tulsi, aloe vera, turmeric, ginger, ginseng etc.

In ancient days our ancestors had a better knowledge regarding the benefits of herbal extracts. They are highly effective and have a better curative property than the current way of treatment. Herbal / traditional plant medicines have been used for longer time in order to maintain the immune system and for strengthening the body. Chinese, Tibetan, Taoist, Japanese, Indian ayurveda are well known methods for treating the diseases in olden days. As India is having a rich bio-diversity of herbs and medicinal plants, now western and eastern countries are trying to adopt the natural medicine of Indian origin for their application on poultry, cows and aqua culture. Our experience in the field of research and development over these years has expertise us to identify the novel innovative product with best components, a blend of enzymes and herbals for animal nutrition.



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