

THE USE OF ANTIBIOTICS IN THE NEW ZEALAND POULTRY INDUSTRY

QUESTIONS AND ANSWERS 20 DECEMBER

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1 KEY POINTS

Growth Hormones are not used in the New Zealand Poultry Industry.

Growth Hormones are not registered for use in the New Zealand Poultry industry.

Growth promotants are not used in the New Zealand Poultry Industry.

Only antibiotics registered in New Zealand by the New Zealand Food Safety Partnership for poultry are used by members of the poultry industry.

Antibiotics help ensure the health and welfare of the National Poultry Flock.

All antibiotics are used according to the stated direction, unless otherwise directed by a veterinarian. Antibiotics maintain the health and welfare of groups of animals exposed to micro-organisms, which can cause disease and death. Without antibiotic intervention, animal deaths may occur.

The Poultry Industry of New Zealand Association's members participate in the New Zealand Food Safety Authority Residue-Monitoring Programme

Maintaining the health and welfare of poultry ensures poultry grow to their full potential.

Growth rates of chicken are achieved by excellent husbandry skills, advanced nutrition, optimum welfare conditions, and selective breeding improvements.

Antibiotics have no direct effect that promotes growth.

Provided chicken is thoroughly cooked, it is safe to eat.

Chicken is a nutritious and healthy food and provides excellent value for money.

2 EXECUTIVE SUMMARY

Background

The Poultry Industry Association of New Zealand (Inc.) (PIANZ) has developed this guide 'Antibiotic Use in the New Zealand Poultry Industry' to help explain the use of antibiotics in the New Zealand Poultry Industry. This paper . It is intended for use by both industry and the public. It is published in a user-friendly question and answer format. The questions seek to address the misconceptions about antibiotic use.

The New Zealand poultry industry is unique within the agriculture sector because of the extent of vertical integration. The major companies breed, feed, grow, process and market their poultry products. All these components are managed by industry employed highly skilled, nutritionists, veterinarians, food technologists, geneticists and marketing representatives.

In essence, New Zealand produced poultry provides healthy and nutritious and safe meat, which is easy to cook, and versatile. It provides a valuable and economical source of protein in the human diet.

The Poultry Industry is not affected by vast seasonal fluctuations faced by other agricultural industries. The industry is domestically orientated so the influence of international markets is minimal.

Antibiotics

Since the introduction of the first antibiotic penicillin, almost 50 years ago, antibiotics have made an important contribution to medicine by substantially reducing the number of people and animals that suffer or die from infectious bacterial diseases.

Antibiotics kill or inhibit bacteria and closely related organisms but they have no effect on viral and fungal infections.

When needed antibiotics are administered to large flocks of animals through feed or water under the professional guidance of a Veterinarian. Label directions define usage, species, dosage, duration and withdrawal periods prior to slaughter.

In summary, antibiotics are used:

In human medicine;
In animals commercially farmed for food production;
For the treatment of disease in companion animals, i.e. dogs and cats.

The Agricultural Compounds and Veterinary Medicines (ACVM) Group of the New Zealand Food Safety Authority (NZFSA) registers the antibiotics used in the New Zealand Poultry Industry.

Antibiotics are used to maintain the health of groups of animals that are often exposed to micro-organisms and where there is a risk that these can rapidly multiply and cause disease.

The New Zealand Veterinary Council registers all veterinarians who work in the New Zealand Poultry Industry. These industry veterinarians endorse and work with the Guidelines for the Prudent Use of Antibiotics.

Finally, New Zealand leads the world in taking action on this issue. In a country so dependent upon our reputation as a producer of safe food, protecting both our animal welfare/health and human health must be priorities.

3 PURPOSE

The purpose of the Guide is to supply information to the New Zealand public and media regarding the use of antibiotics within the New Zealand Poultry Industry.

4 OBJECTIVE

The Poultry Industry Association of New Zealand (Inc.) (PIANZ) has developed this guide in relation to the use of antibiotics in the New Zealand Poultry Industry.

This will be achieved by providing the New Zealand public and media with information gathered from numerous scientifically based information sources.

5 SCOPE

This fact sheet will be available to the general public and media of New Zealand.

It has been developed to cover a wide range of questions fielded from all sections of the public e.g. school children, business, consumer groups, media.

îPlease contact the PIANZ office if you seek further information, or if you intend to use this document for a basis for further reports.î 09 520 4300 michael@pianz.org.nz

6 INDUSTRY OVERVIEW

The Poultry Industry Association of New Zealand (Inc.) (PIANZ) represents approximately 99% of all poultry production in New Zealand, although membership is entirely voluntary.

The poultry industry is a dynamic sector of New Zealand agricultural production. In the mid 1960s the production of poultry meat using specialist meat breeds was just beginning in this country, with per capita consumption of poultry meat under 1 kg per annum. For the year ending June 2002 each New Zealander consumed 33.1 kg of poultry meat.

New Zealand is free from three major exotic poultry diseases. The diseases are Avian Influenza, Newcastle Disease and Infectious Bursal Disease. New Zealand's poultry and native birds therefore have a unique superior animal health status in the world. The unrivalled environment of low disease is one reason New Zealand has achieved an internationally coveted performance in livestock production especially in growth and feed conversion rates. This disease status enables New Zealand to produce healthy meat from the healthy poultry flock. Because of this health status, welfare conditions are also at a premium. This is as a result of historical and ongoing strict Government quarantine regulations in regard to avian related imports.

Genetic improvement of stock is an important aspect of our industry. Work with the genetics of poultry is ongoing worldwide. This does not mean poultry are genetically modified but the flock is continually improved by selective breeding. This results in the birds reaching sexual maturity quicker than most other commercially farmed mammals and can reproduce from approximately 5 months of age.

The New Zealand poultry industry is highly vertically integrated. The major companies breed, feed, grow, process and market the poultry. All these components are managed by industry employed highly skilled, geneticists, nutritionists, veterinarians, food technologists and marketers.

Nutrition is an important factor in the success of the New Zealand poultry industry. The industry keeps abreast of scientific advances in this field. Feed is tailored to the birds weight, age and sex and formulated accordingly. This ensures optimum nutrition.

The poultry industry provides New Zealanders with healthy and nutritious meat, which is easy to cook, versatile and has no cultural barriers. It provides a valuable and economical source of protein in the diet. The poultry industry does not experience the same seasonal fluctuations as other agricultural industries. Because the industry is domestically orientated the influence of international markets is minimal.

The poultry industry employs in excess of 3000 people directly but many thousands are employed in related industries such as feed milling, transport, and through to the people employed in the food trade.

7 GENERAL INFORMATION

7.1 What is an antibiotic?

Antibiotics are substances that kill or inhibit the growth of bacteria and related microorganisms.

With the introduction of the first antibiotic penicillin almost 50 years ago, antibiotics have made an important contribution to medicine by substantially reducing the number of people and animals that suffer or die from infectious bacterial diseases.

7.2 What is the true medical definition of an antibiotic?

Antibiotic - pertaining to antibiosis

Antibiosis - An association between 2 or more organisms, which is harmful to one of them.

(Gould's Medical Dictionary, 5th Edition)

7.3 How are antibiotics made?

Yeasts and fungi produce the antibiotics commonly used for in feed application within the New Zealand Poultry Industry. The antibiotic is then extracted and purified to medical quality.

7.4 How does an antibiotic work?

Antibiotics only kill or inhibit bacteria and closely related organisms. Antibiotics have no effect on viral and fungal infections. That is why the doctor doesn't generally prescribe antibiotics for a simple cold, because antibiotics have limited effect on infections of this type.

Antibiotics only control certain types of bacteria; they have a varying spectrum of activity. Some only control a few types of bacteria, whilst others have a much broader spectrum. The antibiotics used in the New Zealand Poultry Industry predominantly have a narrow spectrum of activity.

Some organisms have an intrinsic resistance to certain antibiotics, because of the structure of the organism. The cell wall structure of the bacterium for example will influence whether a specific antibiotic class will have an effect on it. While some antibiotics will kill a wide range of bacteria it is common that antibiotics designed to treat gram-negative infections will have little effect on gram-positive organisms.

Antibiotics inhibit or kill bacteria by targeting components of the bacteria that are vital for bacterial growth and metabolism.

Antibiotics can disrupt the bacterial cell wall, disrupt the ribosomal function; disrupt the DNA structure and function; or disrupt the cell membrane function.

(Expert Panel Review of Antibiotic Resistance, 31 July 1999, PG 19)

7.5 How are antibiotics administered?

When needed, antibiotics are administered to large flocks of animals through feed or water under the professional guidance of a Veterinarian. Antibiotics are used according to approved claims and label directions, unless the professional judgment of and care by a Veterinarian determines otherwise. Label directions define usage, species, dosage, duration and withdrawal periods prior to slaughter.

Antibiotics are delivered to animals either individually or in groups, depending on the circumstances such as disease severity and animal species.

Treatment and care of the entire flock or herd may be necessary if all animals are of similar immune status and all are exposed to the same potentially disease-causing micro-organism (bacterium). Since disease can spread rapidly in a large flock of birds it is at times essential to treat all the birds in a flock when it is suspected that they have been exposed to disease-causing organisms.

7.6 What sectors in New Zealand and Worldwide use antibiotics?

Antibiotics are used:

- In human medicine;
- In commercial farming of animals sector for food production;
- For the treatment of disease in companion animals, i.e. dogs and cats.

7.7 For what reasons are antibiotics used in food producing animals?

Disease treatment: - used for the cure or the amelioration of a disease

Antibiotics work by reducing bacterial levels and allowing for the animals own defence mechanisms to cure the infection.

Disease control ñ may follow on from treatment (as above)

To ensure the health of animals, farmers closely monitor such conditions and will add antibiotics to the feed or water of animals to contain such outbreaks.

Disease prevention ñ preventing the occurrence of disease in a susceptible population

Health maintenance ñ Shifting the population balance of the micro-flora in the gastrointestinal tract, and preventing proliferation of harmful organisms. Feed efficiency and average daily gain are indicators of healthy gut flora.

(Source: *Taber's 18th* and *Stedman's 27th* edition Medical Dictionaries)

8 THE USE OF ANTIBIOTICS IN THE NEW ZEALAND POULTRY INDUSTRY

As with humans, animals can get sick and need antibiotics to prevent, treat and manage bacterial caused disease.

More than 40 years ago, government regulatory authorities first approved the use of antibiotics in animals. Since then, antibiotics have been used safely for livestock and poultry production.

The antibiotics used in the New Zealand Poultry Industry are registered for use by the New Zealand Food Safety Authority (NZFSA).

Consumer confusion between antibiotic residue and antibiotic resistance is common. As a result these two terms are commonly and wrongly interchanged.

8.1 What is an antibiotic residue?

Residues are agricultural/medicinal compounds that may remain in the meat tissues once it has been slaughtered (ie meat) or the product has been taken (i.e. milk).

8.2 What is a MRL?

A Maximum Residue Level (MRL) is the amount of residue of a substance like an antibiotic that is allowed to be present in food sold for human consumption. The residue level decreases from the last treatment until the substance is no longer detectable in the animals. Therefore residue levels are controlled by imposing a withdrawal period after the last treatment before the animal can be slaughtered for human consumption. Extensive testing on the medication occurs prior to the product being licensed and registered for use with animals. Adherence to the stated withdrawal period of a particular product will ensure the maximum residue levels are not exceeded in the animal product. There is a considerable safety margin between the maximum residue level and any risk to humans.

8.3 What is an antibiotic feed withdrawal period?

Some antibiotics require a withdrawal period, whilst others do not. This is because some antibiotics are metabolised and/or excreted at differing rates depending on dosage and species.

The stated withdrawal period is a legal requirement. This is stated to ensure that the residues in the food product do not exceed the Maximum Residue Level (MRL) as determined by NZFSA. This is a legal requirement of the Agricultural Compounds and Veterinary Medicines Act and the Animal Products Act. Large penalties can be enforced if the company or individual does not adhere to the recommended withdrawal period, prior to the animal being slaughtered and the residue level in the animal product is higher than permitted.

A feed withdrawal period is the defined period during which time animal has not been given the medicine prior to slaughtering. This allows time for the animal to metabolise and excrete the medicine. The feed withdrawal period is specific to each medicine and species and is stated on the product. To control this the Livestock Manager (on farm) completes a declaration stating the day on which the medicine were last fed as a requirement of the Whole Flock Health Scheme, a prerequisite to the Risk Management Programme under the Animal Products Act. This declaration accompanies the chicken to the slaughterhouse as part of a company's quality assurance program and ensures that the meat is safe for human consumption.

8.4 What is the therapeutic use of antibiotics?

The administering of antibiotics for a limited period to individual or groups of animals showing signs of disease. (Expert Panel Review of Antibiotic Resistance, 31 July 1999, MAF)

8.5 Why are antibiotics used therapeutically?

The therapeutic use of antibiotics is necessary to treat the clinical symptoms of the infection caused by a disease causing bacteria. Without this antibiotic treatment the animal's body may not be able to fight the disease. Therapeutic doses of antibiotics often need to be sufficiently high to produce the desired result.

8.6 What is the prophylactic use of antibiotics?

The administering of antibiotics for a limited period to large or small groups of healthy animals deemed to be at risk of disease caused by pathogens susceptible to the drugs. (Expert Panel Review of Antibiotic Resistance, 31 July 1999, MAF)

8.7 Why are antibiotics used prophylactically?

Antibiotics are used prophylactically to prevent the animal from becoming sick with a disease when it is suspected that they have been exposed or are likely to be exposed to a disease-causing organism. Without antibiotic intervention the animal could show clinical symptoms of disease and could require therapeutic dosages of antibiotic.

8.8 Why Isn't the Use of Antibiotics Stopped Immediately?

Antibiotics maintain the health of groups of animals that are often exposed to microorganisms that can rapidly multiply and cause disease. Without antibiotic intervention to prevent, treat and manage disease, the health of the animals maybe compromised and a substantial number of animal deaths could occur with some diseases. In such circumstances the welfare of the birds is compromised.

In instances overseas where the practice of feeding antibiotics for growth promotion or for prevention of disease has been banned, it has resulted in an increase in disease and the therapeutic use of antibiotics for animal health and welfare reasons.

8.9 What are the legal controls applicable to industry in regard to the use of antibiotics?

Animal Products Act and the requirement of a Risk Management Programme (RMP). One prerequisite of the RMP is a Whole Flock Health Scheme. Under the Agricultural Compounds and Veterinary Medicines Act all antibiotic products must only be used in accordance with the conditions of their registration. Residues may not exceed those specified in the New Zealand (Maximum Residue Levels of Agricultural Compounds) Mandatory Food Standard 1999 and subsequent amendments which is issued under the Food Act

8.10 How are these interpreted by industry for the use of in feed antibiotics?

Within the New Zealand Poultry Industry there are Quality Assurance Programmes, Risk Management Programmes, Food Safety Programs, Whole Flock Health Schemes to ensure that the appropriate precautions are implemented in the use and control of medication.

Antibiotics are used according to correct usage guidelines specified in the registration of the products unless directed otherwise by a Veterinarian. Label directions provide the veterinarian with instructions for the proper use of the antibiotic such as the approved claim, species, dosage, duration and withdrawal periods prior to slaughter. A veterinarian would only deviate from the usage guidelines when there was unusual disease circumstance. In such an event the veterinarian would provide specific instruction that must be followed to avoid any hazard posed by that deviation.

Industry codes of practice are adhered to as well as documented Company Quality Control procedures.

9 THE USE OF ANTIBIOTICS AND THE ASSOCIATED BENEFITS

9.1 Why are antibiotics used?

Antibiotics are substances that inhibit the growth of or kill bacteria.

Antibiotics are used for preventing, treating and managing disease to ensure good health in humans and animals.

Intestinal infections can be a common disease of commercially farmed poultry. The use of in feed antibiotics reduces the incidence of these intestinal infections and ensures that optimal animal health and therefore welfare is maintained.

Because the bird is healthy they are better able to utilise food eaten for growth rather than using the nutrients to fight and recover from disease occurrences. A sick bird will also lose its appetite and thus not eat.

Antibiotics have been used safely in food animal production for more than 40 years.

Antibiotics are important health management tools allowing farmers to raise healthy animals. While the potential for resistance to develop has been identified in recent years the correct selection of and prudent use of the right antibiotic minimises the risk of resistance developing.

9.2 What are the benefits of using antibiotics?

The use of antibiotics in the poultry industry is to ensure that the birds remain healthy.

This is one of the requirements of the Animal Welfare Act, 1999.

Sections 4 and 10 of the Act state:

Section 4 (e) - Protection from, and rapid diagnosis of, any significant injury or disease; and

Section 10 - Obligation in relation to physical, health and behavioural needs of animals, the owner of an animal, and every person in charge of an animal, must ensure that the physical, health and behavioural needs of the animal are met in a manner that is in accordance with both good practise; and scientific knowledge.

Improved health:

Antibiotics are used to treat and prevent a variety of illnesses in food animals (poultry, swine and cattle).

Reduced mortality rates

Better nutrient utilisation:

When used for health maintenance, antibiotics decrease the amount of feed needed and allow the bird to grow at it's potential.

9.3 Specific Benefits to the Environment

Protection of resources and reduced environmental impact: In addition to the benefits of reduced pain and suffering, as well as lower incidence of sickness and death among food animals. The effect of improved efficiency means that less manure generated, less feed needed, less cropland required and less water usage.

10 ANTI COCCIDIALS

10.1 What is the definition of an anti-coccidial?

Anti-coccidials are substances used to prevent and treat coccidiosis in commercially farmed livestock and poultry. Coccidiosis is a disease caused by protozoa that may pass from one bird to another through the droppings. They can cause serious damage to the intestines of the animal thus inhibiting the absorption of nutrients and growth; infection does spread quickly and can be fatal.

Please note:

Anti-coccidials are used to prevent or treat protozoal infections.

Antibiotics are used to prevent or treat bacterial infections.

Ionophores are a class of anti-coccidial and:

are used to prevent infections of coccidia (single-cell intestinal parasites) in poultry and calves.

are different from antibiotics that are typically used in veterinary and human medicine, although they can inhibit the growth of gram-positive bacteria and coccidia. Ionophores have a non-specific physiochemical mechanism (*i.e.*, disruption of the ion-water balance within cells).

They are not approved for the cure, mitigation, treatment or prevention of bacterial or other diseases in humans. They are not used in human medicine and they are not structurally related to any compound used in human medicine and their mode of action is primarily physiochemical and is not shared with any compound used in human medicine. Ionophores do not contribute to the development of antibiotic resistance.

Bacteria vary in their sensitivity to ionophores because of differences in their cellular architecture. Ionophores can penetrate the outer layer of Gram-positive bacteria to disrupt ion movement through the underlying cell membrane. However, the complex outer layer of Gram-negative bacteria prevents the ionophore from penetrating the cell membrane; thus Gram-negative bacteria are naturally resistant to ionophores.

10.2 What are the benefits of using anti-coccidials?

Control of gut infections with protozoa
Increased welfare of the poultry flock
Increased utilisation of food.

11 CONSUMER RELATED INFORMATION

11.1 Consumer Food Safety

The Poultry Industry Association of New Zealand (Inc.) are members of the New Zealand Foodsafe Partnership, and are also represented on the New Zealand Foodsafe Partnership Working Group.

11.2 Is there an increased risk for those people who consume a lot of poultry?

No, provided chicken is thoroughly cooked, it is safe to eat.

Appropriate precautions when handling raw meat include:

washing hands after handling it,
storing and defrosting it in a sealed container in the refrigerator to ensure juice from raw meat or thaw drip from frozen meat is not allowed to contaminate other foods,
thoroughly cleaning any surface that raw chicken comes into contact with such as chopping boards, knives and bench tops.

The New Zealand Foodsafe Partnership makes some key recommendations the raw food handling procedures to ensure food safety.

Please see www.foodsafe.org.nz for more information on the messages of the partnership.

12 REGULATION AND LEGISLATION

The Agricultural Compounds & Veterinary Medicines (ACVM) Group is responsible for the registration of agricultural compounds and veterinary medicines, and monitoring their importation, manufacture, sale and use in conjunction with the Animal Remedies and Pesticides Boards.

The Agricultural Compounds and Veterinary Medicines (ACVM) Act (1997) is part of the wider reform of agricultural legislation agreed by Government in the late 1980s. It controls the agricultural compounds and veterinary medicines used in association with animals and plants, and is a companion measure to the Hazardous Substances and New Organisms (HSNO) Act 1996. The ACVM Act replaces the Animal Remedies Act 1967, the Stock Foods Act 1946, the Fertilisers Acts 1960 and 1982, and together with the HSNO Act (1996), the Pesticides Act 1979.

Under the new legislation, the Director-General of Agriculture and Forestry is the decision maker responsible for administering the ACVM Act. The ACVM Group is focused on the following core functions so that they do not pose unacceptable risks to trade in primary produce, agricultural security or animal welfare; and result in violative residues.

The Group also ensures that products are sold with sufficient consumer information so that they can be used safely and appropriately.

The ACVM Group has established a registration decision rationale for antibiotic products based on:

the relative importance of specific antibiotics to use in human medicine;
the likelihood of the development of antibiotic resistance to those antibiotics;
the potential for exposure of food animals to the antibiotics; and
the relative importance of those antibiotics to the welfare of animals.

Applying this rationale ensures that proper conditions are imposed on antibiotic products that could cause antibiotic resistance.

The International Federation for Animal Health, the World Veterinary Association and the International Federation of Agricultural Producers have developed a set of guidelines for the use of antibiotics in food animals. These recommendations are published in a document titled 'Prudent Use Of Antibiotics: Global Basic Principles'. These guidelines have been adopted by the New Zealand Veterinary Association as a code of professional conduct.

All Veterinarians who work in the New Zealand Poultry Industry are registered under the Veterinarians Act 1994 and are subject to the Veterinary Council of New Zealand Code of Professional Conduct that specifies a veterinarians professional responsibility when prescribing products as such as antibiotics. These industry veterinarians endorse and work with the Guidelines for the Prudent Use of Antibiotics.

13 WORLD WIDE ORGANISATIONS AND THEIR ROLE IN THE PRUDENT USE OF ANTIBIOTICS

The International Federation for Animal Health (IFAH, formerly COMISA), the World Veterinary Association (WVA) and the International Federation of Agricultural Producers (IFAP) have developed a set of guidelines for the prudent use of antibiotics in food animals. Core aspects of these guidelines were later incorporated into those adopted internationally by the World Health Organization (WHO) and should be used proactively by national and regional regulatory bodies to reduce overuse and misuse of antibiotics in animals.

Other organizations worldwide have also been involved in establishing initiatives to guide and control the prudent use of antibiotics.

13.1 The Guidelines for the prudent use of antibiotics are:

Minimize the need to use antibiotics in food animals

When antibiotics are used, use them properly

Minimise the consequences of antibiotic use with respect to human health and continued efficacy

13.2 The consensus prudent use basic principles are:

Antibiotics are health management tools to enhance good husbandry practices, codes of good practices, quality assurance programs, surveillance programs and education programs should promote responsible use

Antibiotics shall be used under the supervision of a veterinarian

Therapeutic antibiotics should only be used when it is known or suspected that an infectious bacterial pathogen is present

Bacterial culturing and sensitivity testing should be utilized

Label instructions should be carefully followed

Antibiotics used for therapy should be used only as long as needed, over as short a dosage period as possible, and at the appropriate dosage regimen

Records should be kept of all antibiotic administrations

Coordinated bacterial resistance surveillance should be conducted, scientifically proven alternatives to antibiotics are needed as an important part of good husbandry practices

13.3 Details of monitoring of the MRLs in New Zealand.

The NZFSA conducts a sampling programme monitoring chickens for compliance with approved MRLs.

13.4 What are government authorities doing to ensure the safe use of these products?

The ACVM group of NZFSA reviews antibiotic products before they are granted a registration for use in food animals. To receive registration, antibiotics must satisfy stringent criteria for safety, quality and efficacy, thus ensuring food safety and animal health. The introduction by the ACVM Group of a registration decision making rationale in regard to antibiotic resistance has seen significant changes in the conditions imposed on antibiotic resistance. All antibiotics that are of significance to the antibiotic resistance problem are now prescription products that can be used only for therapeutic or prophylactic purposes. They cannot be used for growth promotion.

Extra conditions have been imposed where necessary to ensure that veterinarians prudently prescribe the use of antibiotics. Manufacturers are obliged to report annually the sales of their antibiotic products.

Monitors MRLs in the New Zealand Poultry Industry.

Government regulatory process requires audit procedures for Residue Control and the Whole Flock Health scheme as required by the Animal Products Act.

14 RESEARCH AND DEVELOPMENT

14.1 What research is being undertaken in NZ in regard to understanding the use of antibiotics in NZ?

The poultry industry is establishing a programme to monitor antibiotic resistant bacteria in all of its broiler sheds. Currently 90% of the industry is monitored.

The industry has a Research Programme to explore the feasibility of using alternatives to antibiotics which is entitled 'Necrotic Enteritis Microbial Management System'. This study is collaboration between Crop and Food that is a Crown Research Institute; the Monogastric Research Centre at Massey University; the University of Otago; Poultry Industry Association of New Zealand (Inc.), Kemin Industries Pte Limited and the Foundation for Science and Technology.

The aim of this project is to develop the various tools and associated management systems for the manipulation of gut micro flora in intensively reared broiler chickens to control necrotic enteritis with significantly reduced or possibly even no levels of antibiotics.

15 ANTIBIOTIC RESISTANCE

Many factors contribute to antibiotic resistance. The agricultural use of antibiotics is one factor in a very complex equation.

15.1 What is antibiotic resistance?

Antibiotic resistance in bacteria may be intrinsic or acquired. Antibiotic resistance is a relative term and describes a situation where a bacterium is not inhibited or killed by concentrations of antibiotic that would normally be lethal to that bacteria.

15.1.1 Intrinsic Resistance

Intrinsic Resistance occurs when a bacterium normally does not possess the particular target structure of the antibiotic or does not allow the antibiotic to penetrate in the cell to produce its effects. An example of this is the resistance of gram-negative organisms (i.e. salmonella) to an antibiotic from the penicillin family.

15.1.2 Acquired Resistance

Acquired resistance occurs when a bacterial strain that is normally susceptible becomes resistant by one of a number of mechanisms for example:

- Producing enzymes that inactivate the antibiotic,
- Altering the cellular target,
- Actively removing the antibiotic from the bacteria cell.

15.2 Does the use of antibiotics in animals contribute to antibiotic resistance in human medicine?

The Ministry of Health has monitored the prevalence of antibiotic resistance among important human pathogens since 1972, and there is no evidence in New Zealand to date that the use of in-feed antibiotics in animals has promoted resistance in any human pathogens. The actions taken by MAF Food recognise that there is a risk that resistance could occur. In light of this the changes made are considered prudent with the controls designed to minimise any opportunities of this happening in New Zealand. Any developments are monitored and new evidence of risk will be reflected in additional controls.

To date, there is only indirect scientific evidence linking the use of antibiotics in food animals with the potential to compromise the efficacy of related antibiotics in human medicine.

In 1999, an independent foundation of renowned and respected scientists in Europe, the Heidelberg Appeal Nederland Foundation, released the most extensive scientific review of antibiotics used in intensive animal production. They found there was no evidence that these antibiotics used in animal production compromised the efficacy of related antibiotics in human medicine and no epidemiological data suggesting it increases infectious diseases.

15.3 What is the animal health industry's position on antibiotic use?

Antibiotics are important health management tools for livestock and poultry that help prevent, control and treat disease, allowing farmers to raise healthy animals and produce safe food. Disease prevention is an important element of animal welfare.

16 ANTIBIOTIC USE IN OTHER COUNTRIES

The position in a number of overseas countries is that regulators are looking closely at controls or even bans on antibiotics. New Zealand government regulators have largely pre-empted this position as a result of recommendations from the Expert Panel Review on Antibiotic Resistance (comprising government regulators, medical specialists etc).

All antibiotic products registered for use with animals have been reviewed and specific conditions of registration developed from these recommendations were implemented in July 2002.

16.1 How does New Zealand compare with other countries?

New Zealand is ahead of the rest of the world in taking action on this issue. In a country so dependent upon our reputation as a producer of safe food, protecting both our animal welfare and human health must be priorities.

The NZFSA is confident that the actions taken in regard to antibiotic resistance have positioned us well to continue to safeguard this reputation.

Some products used for therapeutic medication in Europe and in the USA are specifically prohibited in food producing animals in New Zealand because of the use of these products specifically to treat some bacterial infections in humans.

16.2 What is happening in the European Union?

There is evidence of increased animal disease and the need for more disease treatment after certain antibiotics were banned.

16.2.1 Denmark

A Danish study showed that organic chickens ñ raised without antibiotics ñ were three times more likely to carry bacteria that make people sick than chickens raised in more conventional ways using antibiotics.

(*Letters in Applied Microbiology*, Vol. 33, p 269).

The use of some antibiotics was banned, more livestock and poultry became sick and required greater use of therapeutic levels of antibiotics. In Denmark during the same period, from 1999 to 2000, the therapeutic use of antibiotics rose nearly 30%. (*DANMAP 2000*, www.svs.dk).

16.2.2 Switzerland

According to data collected in 1999, more antibiotics for animal health in the European Union and Switzerland were used for treatment rather than to promote growth (Source: Survey of Antimicrobial Usage in Animal Health in the European Union in 1999, Boatman Consulting).

Between 1997 and 1999, antibiotic use aimed at improving nutritional efficiency decreased by 50% (from 1599 metric tonnes to 787 metric tonnes), whereas antibiotic use for disease treatment and control increased during the same period by 10% (from 3494 metric tonnes to 3827 metric tonnes). Total antibiotic use for animal health decreased by 7%; however, the trend toward increased therapeutic or treatment applications indicate that higher levels of disease were experienced.

16.2.3 Sweden

In Sweden, the incidence of necrotic enteritis in poultry increased (*Wierup, 2001*). As a result, deaths and condemnations also increased, as did the use of penicillin to treat disease.

16.2.4 United Kingdom

In the United Kingdom, according to a recent report from the Veterinary Medicines Directorate (VMD), "Ö the increase in the use of therapeutic products in food animals might well be attributed to the EU ban on certain anti-microbial uses at the end of 1999Ö ". (Source: "*Sales of anti-microbials used as veterinary medicines, growth promoters and coccidiostats in the UK in 2000*,")

In the European Union, 65% of all antibiotics are used for human medicine and 35% for animal medicine. (Source: *Boatman Consulting*) The European experience shows that once certain antibiotics were phased out or banned, an increase in bacterial disease outbreaks occurred so that the use of other antibiotics was needed for treatment.

16.2.5 Internationally

Globally, all antibiotics used in food animals undergo a stringent review by government regulatory authorities. This review includes scientific data addressing safety (human, animal and environmental), quality and efficacy. This scientific review process ensures that the use of these products produces a safe food supply.

17 THE DIFFERENCES BETWEEN ANTIBIOTICS AND GROWTH HORMONES

There is confusion in the media and the general public in relation to Antibiotics and Growth Hormones.

17.1 Do antibiotics make the poultry grow faster?

Yes, antibiotics can make poultry grow faster relative to poultry not given antibiotics, although only in the presence of disease causing organisms.

If poultry were not subject to disease causing micro-organisms that are naturally present in the environment they would maintain 100% health. Because the flock is subject to these naturally occurring organisms, antibiotics are given to prevent it from becoming sick.

A healthy animal is able to fully utilise its food and gain full benefit of the nutrition in that food, therefore this enables the bird to grow faster than an otherwise sick bird who hasn't been fed the antibiotics.

Healthy growth rates are therefore as a result of the bird being healthy, an indirect result of the antibiotics.

18 ANTIBIOTICS VERSUS GROWTH HORMONES

18.1 What is a growth hormone?

Growth hormones make animals grow faster by altering the metabolic processes at a cellular level in the animal. Any growth rate changes in animals that are given hormones are the direct result of the hormone.

A growth hormone is a chemical messenger within an animal that stimulates or inhibits specific metabolic activities in tissues or organs. A synthetic growth hormone is a man-made chemical that is similar enough in amino acid sequence and structure to allow it to mimic the effect of the natural hormone it is copying.

18.2 What is the difference between antibiotics and a growth hormone?

Antibiotics do not mimic the effect of natural hormones nor do they alter any metabolic process of the animal (like growth hormones do). They only work on bacteria, which can affect the health and welfare of the bird. Growth hormones have no antibacterial effect.

18.3 Antibiotics and Growth hormones are often confused. Why is this?

When poultry are given antibiotics in the presence of disease causing organisms they will grow faster because they are able to grow at their potential and make full use of available nutrition.

The purpose of growth hormones is to affect the metabolism of the animal to increase growth rates.

The outcome with both substances is an improvement in growth rates but for entirely different reasons.

18.4 Are growth hormones registered for use in the NZ Poultry Industry?

Growth hormones are not registered for use in the New Zealand Poultry Industry.

18.5 Are growth hormones used in the NZ Poultry Industry?

Growth hormones are not used in the New Zealand Poultry Industry.