# **Shriram Institute for Industrial Research**

**Delhi Campus:** 19, University Road, Delhi -110007; Email: customercare@shriraminstitute.org **Bengaluru Campus:** 14-15, Sadarmangla Indl. Area, Whitefield Road, Bengaluru - 560048

## Antibiotics Residues in Animal Products & Other Food Items

### Introduction

Antibiotics are popularly used in various industries such as livestock production, poultry production, aquaculture, and agriculture to increase economic productivity. The foodstuffs of animal origin like meat, milk, honey and eggs may present antibiotic residues from their direct application to these animals during their medication. The World Health Organization (WHO), Food and Agricultural Organization (FAO), World Organization for Animal Health (OIE), European Union (EU), European Center for Disease Prevention and Control (ECDC), and governments across the globe are committed to develop guidelines and policies to regulate and to monitor the use of antibiotics in food animals and subsequent development of antibiotic resistance.



### Why are antibiotics being used in animals?

- As treatment for animals that show clinical signs of an infectious disease.
- As prophylaxis to prevent those at risk from being infected
- As a growth promoter to boost the weight of the animals.

### Why are antibiotic residues in food a concern?

Antibiotic residues in foods produced by animals may be the cause of numerous health hazards in humans as these residues bioaccumulate in the human body through the food chain. The problems include toxic effects, transfer of antibiotic resistant bacteria to humans, immunopathological effects, carcinogenicity (e.g sulfamethazine, oxytetracycline & furazolidone), mutagenicity, nephropathy (e.g gentamicin), hepatotoxicity, reproductive disorders, bone marrow toxicity (e.g chloramphenicol) and allergy (e.g penicillin). The development of resistant strains can cause failure of antibiotic therapy in clinical situations. The rising concern of



Antimicrobial Resistance (AMR) has prompted the regional and global authorities to develop the guidelines and policies concerning judicious use of antibiotics and containment of AMR. Consequences of infection with AMR bacteria include long hospital stays, increased mortalities, loss of protection for patients requiring surgery, and increased treatment costs. The World Health Organization has given a caution that human society is likely to face a catastrophe by 2050 where the factor of antibiotic resistance would be a giant killer of human lives, no way inferior to any deadly diseases including cancer. The WHO has endorsed the 'One Health approach' to address the problem of antimicrobial resistance globally through an alliance between WHO, FAO and OIE referred as 'Tripartite Alliance' (WHO, 2015).

### Is there any effect on the Indian market?

India's livestock sector is one of the largest in the world. India ranks first in cattle and buffalo production and is the largest producer of milk and buffalo meat. India is the third largest egg producer, second largest producer of goat meat and third largest producer of poultry. Frozen shrimp is India's largest exported seafood item.At the same time,

Contact Details: SIIR Customer Care : +91-11-2700.0100 (Delhi); +91-80-3500.0500 (Bengaluru) Email: customercare@shriraminstitute.org



## Shriram Institute for Industrial Research

**Delhi Campus:** 19, University Road, Delhi -110007; Email: customercare@shriraminstitute.org **Bengaluru Campus:** 14-15, Sadarmangla Indl. Area, Whitefield Road, Bengaluru - 560048

India has become a hotspot for antimicrobial use. India accounts for about 3% of the global consumption of antimicrobials in food animals. The consumption of antimicrobials in food animals is expected to double by 2030. Prolonged and inappropriate usage of such antibiotics in livestock production may lead to residues appearing in



milk and meat which pose the risk of human health hazards and also interfere with the processing of milk and milk products. Moreover the exports of all the above food items get affected if the residues cross the set limits.

## Why is there a problem of residual antibiotics in food items?

Maximum residue levels (MRLs) of antibiotics have been established, over which products are deemed unfit for consumption, and should be discarded. The presence of antibiotic residues, beyond the recommended levels, is an indication that antibiotics have been used in animals, however their withdrawal periods have not been adhered to. A withdrawal period is established to safeguard humans from exposure of antibiotic added food. Additionally farmers may not be even aware many times that the purchased animal feeds may also have antibiotics in them resulting in antibiotic residue in food products of animal origin.

### **Growth drivers**

Due to high dietary recommendation, consumer awareness for quality, the egg industry is expected to grow 5 times by 2030. In 2024, the Indian meat industry is forecast to have a value of \$ 4.9bn.

### How to address this concern?

WHO has a list of critically important antimicrobials wherein they have mentioned the antibiotics which are critically important for human health and thus their use should be restricted in the Veterinary sector. International organizations such as Codex Alimentarius Commission has laid down Maximum residue levels (MRLs) and recommended risk management for residues of veterinary drugs in foods. Various antibiotics with high toxicity, such as quinolones are forbidden for use in food production. In India, Food Safety and Standard Authority of India (FSSAI) publishes regulations laying down such limits to be followed by food producers in India. Compared to food producing animals, there are many more rules and standards laid by Marine Products Export Development Authority (MPEDA) governing antimicrobial use in aquaculture production because they are used for exports.

# How can SIIR help in addressing this problem and help Indian exporters?

Antibiotics can be detected using various detection techniques such as High performance liquid chromatography, Gas chromatography, electrophoresis,



ELISA, microbiological techniques etc. As a safety measure, rapid and effective analytical approaches for detecting these residues by using Rapid detection kits can be developed to prevent contaminated products from reaching the consumers. The animal foodstuff

processors should get their products tested for these antibiotic residues for the welfare of the consumers to ensure that the residues are within the recommended maximum residue limits established by WHO or CODEX standards.

### The way forward

Please feel free to contact SIIR for your needs.

Contact Details: SIIR Customer Care : +91-11-2700.0100 (Delhi); +91-80-3500.0500 (Bengaluru) Email: customercare@shriraminstitute.org