

Simple Biosecurity Measures for Small Poultry Farms: Keep Disease Out, Keep Profits In

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Key Points

- **Use antibiotics responsibly:** Antibiotics should be used in poultry farming only under veterinary diagnosis and guidance. Routine administration to healthy birds for growth promotion or without a valid indication should be avoided.
- **Prevent antimicrobial resistance and drug residues:** Misuse of antibiotics can promote resistant bacteria. Selling birds or eggs before the prescribed withdrawal period is completed may result in drug residues in meat and eggs.
- **Prioritise disease prevention:** Biosecurity, timely vaccination, clean drinking water, balanced feed, proper ventilation and dry litter help reduce disease risks and the need for antibiotics.

Abstract

India is one of the world's leading egg-producing countries, and the responsible use of antibiotics is essential for maintaining poultry health and food safety. Although antibiotics are necessary for treating bacterial infections, their routine use in healthy birds for growth promotion or without proper diagnosis can be harmful. Such misuse may promote antimicrobial-resistant bacteria, including *Escherichia coli* and *Salmonella*. These bacteria can reach humans through meat, eggs, direct contact with birds and litter, and poultry manure contaminating agricultural land and water. Furthermore, slaughtering birds or using eggs before the prescribed withdrawal period may result in drug residues in food products. Therefore, antibiotics should be administered under veterinary supervision at the prescribed dose and for the recommended duration. Preventive vaccination, effective biosecurity, proper housing, hygiene and balanced nutrition can improve flock health and reduce dependence on antibiotics. Responsible antibiotic use is essential for protecting poultry, consumers and the environment while preserving the effectiveness of medicines for future use.

Keywords: Poultry farming; antibiotics; antimicrobial resistance; drug residues; food safety; biosecurity; vaccination; poultry health; veterinary treatment; environmental health

Introduction

India produced an estimated 142.77 billion eggs in 2023–24, 3.18% more than in the previous year, and ranks second in the world in egg production; total meat production was 10.25 million tonnes[1]. Antibiotics are essential for treating sick birds, but they are also given to healthy birds through feed or water: in a 2024 reply in Parliament, the Government noted reports that many poultry farmers use antimicrobials as non-therapeutic feed additives, including growth promoters[2]. Careless use can leave residues in meat and eggs and help bacteria become resistant, so that medicines stop working in both birds and people. Worldwide, antimicrobial use in food animals was estimated at about 99,500 tonnes in 2020 and is projected to reach about 107,500 tonnes by 2030, with India among the five largest users[3].

Why are antibiotics used in poultry?

Antibiotics are used on poultry farms for three main purposes:

- **Treatment:** to cure a bacterial disease diagnosed by a veterinarian, such as colibacillosis, fowl cholera or necrotic enteritis, usually by medicating the flock's drinking water.
- **Prevention:** given through feed or water to healthy birds when infection is suspected but not yet visible[4].
- **Growth promotion:** low doses mixed in feed, usually for most of the bird's life, to improve weight gain and feed efficiency[4].

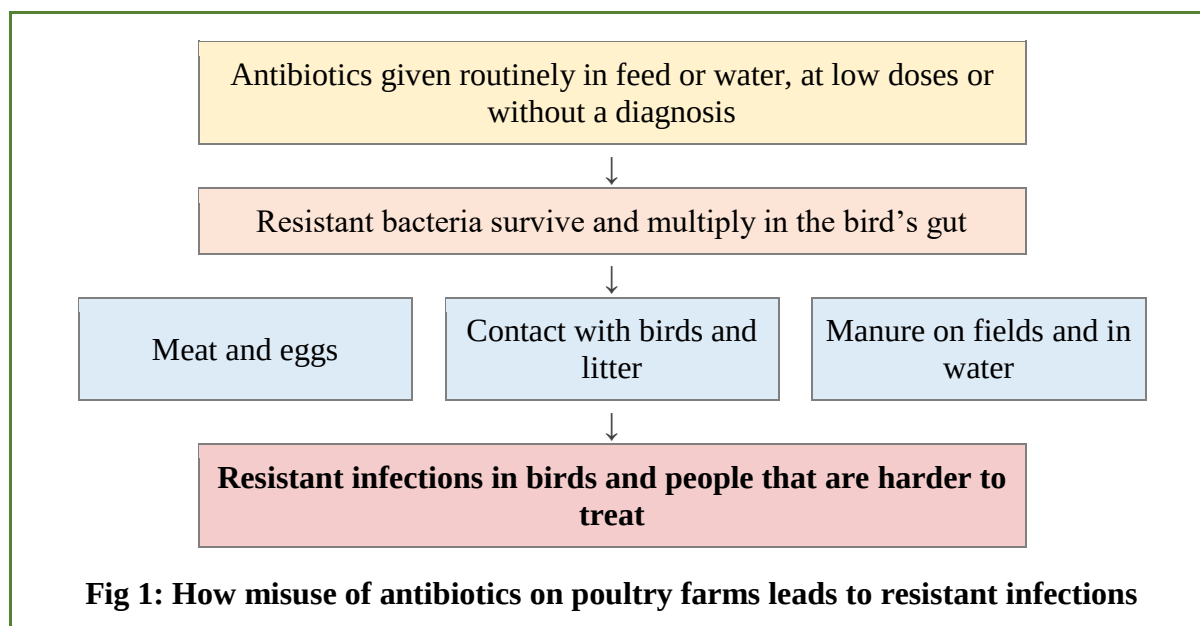
How growth promoters work is still not fully understood. They are thought to act mainly on gut bacteria, reducing the microbes that compete with the bird for nutrients or produce growth-depressing substances, and they may also damp down inflammation in the gut[5]. However, long-term low-dose feeding favours resistant bacteria, which is why the World Health Organization (WHO) recommends ending it for medically important antibiotics[6].

How misuse of antibiotics causes harm

Antimicrobial resistance (AMR). Each time antibiotics are used, bacteria that can survive them are favoured. Resistant bacteria such as *Escherichia coli* and *Salmonella* can reach people through meat and eggs, through direct contact with birds and litter, and through poultry manure spread on fields (Fig 1), and resistance genes can pass from one bacterium to another. In low- and middle-income countries, the share of antibiotics to which more than half of the bacteria tested in chickens were resistant rose from 15% in 2000 to 41% in 2018, and China and India were the largest hotspots of resistance in farm animals[7]. Resistant infections are harder and costlier to treat, in birds as well as in people.

Residues in meat and eggs. If birds are slaughtered, or their eggs are used as food, before the withdrawal period is over, the drug may remain in the meat or eggs above safe limits. In 2014, the Centre for Science and Environment tested 70 chicken samples from Delhi and the National Capital Region for six antibiotics of the tetracycline, fluoroquinolone and aminoglycoside groups and found residues in 40% of them; 17% contained more than one antibiotic[4].

Residues can cause allergic reactions and help resistant bacteria reach people, and some drugs are toxic: chloramphenicol can damage the bone marrow, and furazolidone, a nitrofurantoin, has been linked to cancer[8]. Both are prohibited in food production in India[9].



What do the rules say?

- **Colistin ban:** On 19 July 2019, the Ministry of Health and Family Welfare banned the manufacture, sale and distribution of colistin and its formulations for food-producing animals, poultry, aqua farming and animal feed supplements[10]. Colistin is a last-resort antibiotic for human infections caused by multidrug-resistant bacteria.
- **FSSAI residue rules:** The Food Safety and Standards (Contaminants, Toxins and Residues) First Amendment Regulations, 2024, in force since 1 April 2025, prohibit glycopeptides, nitrofurans, nitroimidazoles, carbadox, chloramphenicol, colistin, streptomycin and sulphamethoxazole at any stage of production of meat, poultry, eggs, milk and aquaculture products, and set tolerance limits for residues of 27 antibiotics[9].
- **WHO guidance:** WHO recommends reducing the use of medically important antibiotics in food animals and stopping their use for growth promotion and for preventing diseases that have not been clinically diagnosed. Prevention is justified only when a veterinarian judges, on the basis of recent culture and sensitivity tests, that a particular disease is at high risk of spreading[6].
- **National action plan:** India's second National Action Plan on AMR (NAP-AMR 2.0, 2025–2029), launched on 18 November 2025, includes action plans for each key ministry and department, including animal husbandry[11].

Responsible use of antibiotics on the farm

Antibiotics remain essential for treating sick birds. The aim is not to stop using them altogether but to use them correctly. Table 1 lists simple do's and don'ts for farmers.

Table 1: Do's and don'ts for responsible use of antibiotics on poultry farms

Do	Don't
Use antibiotics only after a veterinarian has diagnosed the disease and prescribed the drug	Buy and use antibiotics on the advice of shopkeepers or other farmers
Give the prescribed dose for the prescribed number of days	Stop treatment early or give lower doses than prescribed
Follow the withdrawal period on the label before selling birds or eggs	Sell birds or eggs during the withdrawal period
Keep written records of every treatment: drug, dose, dates and batch	Mix several antibiotics without veterinary advice
Buy feed from reliable manufacturers and read the label for added antibiotics	Use antibiotics routinely in feed as growth promoters
Prefer antibiotics of lower importance to human medicine, as advised by the veterinarian	Use banned drugs such as colistin, chloramphenicol or nitrofurans
Dispose of expired drugs, empty containers and litter safely	Use antibiotics as a substitute for cleanliness and biosecurity

Withdrawal period. The withdrawal period is the minimum time that must pass between the last dose of a medicine and the slaughter of birds or the use of their eggs as food, so that residues fall to safe levels. It differs from product to product. Since a 2012 amendment to the Drugs and Cosmetics Rules (G.S.R. 28(E)), the container of a medicine for food-producing animals must be labelled with its withdrawal period for the species it is meant for[2]. Some products carry a warning that they must not be used in birds producing eggs for human consumption; these must never be given to laying flocks whose eggs are eaten.

Medicating through drinking water. Sick birds often eat less but keep drinking, so treatment is usually given through drinking water. A few simple steps make it work better:

- Work out the daily dose from the total body weight of the flock and mix it into about the volume of water the flock drank the previous day. For example, 1,000 broilers weighing 1.5 kg each weigh 1,500 kg in all; at a prescribed dose of 10 mg per kg body weight per day, they need 15 g of the active drug each day.
- Water intake changes with the birds' age and health, the weather and the lighting programme, so check it daily and adjust the amount of medicine per litre.
- Prepare fresh medicated water every day and make it the only drinking water during treatment, with enough drinker space for every bird.
- Clean drinkers and water lines before and after treatment, and do not add sanitisers, vitamins or mineral supplements to medicated water unless the veterinarian advises it; minerals such as calcium, magnesium and iron bind some antibiotics, such as tetracyclines, and reduce their effect.

- If medicine has to be mixed into feed on the farm, mix it thoroughly so that every bird gets the correct dose.

Alternatives to antibiotic growth promoters

Healthy birds need fewer medicines. The most reliable alternatives are good management practices:

- **Biosecurity:** restrict visitors and vehicles, use footbaths, follow all-in–all-out batches, control rodents and wild birds, and clean and disinfect sheds between batches.
- **Vaccination:** follow a vaccination schedule suited to local diseases, such as Ranikhet (Newcastle) disease and Gumboro (infectious bursal) disease, and maintain the vaccine cold chain.
- **Housing and management:** provide the correct brooding temperature, good ventilation, proper stocking density and dry litter.
- **Water and feed:** sanitise drinking water regularly and use fresh, mould-free feed.

Several feed additives can also support gut health and performance[5]:

- **Probiotics and prebiotics:** beneficial live microbes, and feed ingredients that encourage their growth.
- **Organic acids:** lower the pH of feed and the upper gut and discourage harmful bacteria.
- **Phytogenics:** herbs, spices, essential oils and other plant-derived products.
- **Enzymes:** improve the digestion of feed.
- **Newer options:** bacteriophages, antimicrobial peptides and egg-yolk antibodies, which are still being studied.

Results with these products vary from farm to farm, so they work best when combined with good management and hygiene[5].

Key messages for farmers

- Antibiotics are medicines, not feed supplements.
- No diagnosis, no antibiotic: always consult a veterinarian.
- Follow the prescribed dose and duration, and respect the withdrawal period.
- Never use banned drugs such as colistin, chloramphenicol or nitrofurans.
- Biosecurity and vaccination prevent disease and reduce the need for antibiotics.

Conclusion

Antibiotics have helped make poultry farming productive, but their careless use in feed threatens the health of birds, consumers and the environment. Everyone in the chain shares the responsibility: veterinarians should prescribe rationally, feed manufacturers should label their products clearly, and farmers should use antibiotics only for diagnosed disease and respect withdrawal periods. Good management, biosecurity, vaccination and safe feed additives can keep flocks healthy and profitable while protecting the medicines we all depend on.

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