Nitrofurans

Prelims: *Current events of national and international importance | Health*

Why in news?

The FSSAI has directed food safety officers across India to collect samples of both branded and unbranded eggs for testing after a viral video claimed the presence of nitrofuran residues.

- **Nitrofurans –** It is an antibiotic, banned on food-producing animals.
- **Key Compounds and Their Uses**
- The four primary parent compounds in this class include:
    - **Nitrofurantoin** - Primarily used in human medicine to treat and prevent uncomplicated urinary tract infections (UTIs).
    - **Furazolidone** - Traditionally used to treat bacterial diarrhoea, cholera, and Giardia.
    - **Nitrofurazone (Nitrofural)** - Used topically for skin infections, burns, and skin grafts.
    - **Furaltadone** - Historically used in veterinary medicine for poultry and livestock.
- **Mechanism of Action -** Nitrofurans work by entering bacterial cells, where they are reduced by bacterial enzymes (nitroreductases) into highly reactive electrophilic intermediates.
- These intermediates attack multiple targets simultaneously, including:
    - **DNA and RNA -** Causing genetic damage and inhibiting transcription.
    - **Proteins** - Disrupting protein synthesis and the citric acid cycle.
- This multi-target approach makes it difficult for bacteria to develop resistance compared to other antibiotics.
- **Persistence -** Although the parent drugs metabolise quickly (half-life of less than an hour), their side-chain metabolites (e.g., AOZ, AMOZ, SEM, AHD) bind to tissues and can persist for weeks.
- **Health risks -** They are considered carcinogenic and genotoxic, meaning they can damage DNA and increase cancer risk.
- **Residues persist -** Even after stopping use, nitrofuran metabolites remain in animal tissues (meat, eggs, fish).

Food Safety and Standards Authority of India (FSSAI)

• FSSAI is the ***statutory body*** responsible for regulating and supervising food safety and standards in India.
• **Established under -** Food Safety and Standards Act, 2006
• **Ministry** - Ministry of Health and Family Welfare
• **Headquarters** -New Delhi.
• **Chairperson** - Appointed by the Central Government
• **Functions** - Lays down science-based standards for food articles.
• Regulates the manufacture, storage, distribution, sale and import of food.
• Grants licensing and registration to food businesses.
• Conducts food surveillance, inspections and testing.
• Promotes food safety awareness and hygiene among consumers.

References

1. New Indian Express | Nitrofurans' presence in Egg
2. Times of India | Test Eggs for banned antibiotics

SHANKAR IAS PARLIAMENT
Information is Empowering