



Implementation of Antimicrobial Stewardship in the Seafood Chain, India

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Opinion

Volume 4 Issue 2

Received Date: March 15, 2021

Published Date: March 29, 2021

DOI: 10.23880/izab-16000295

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Rising incomes and a growing population are driving an increased demand for animal products in India. Among the animal products, the fisheries and aquaculture production contributes about 1% to India's Gross Domestic Product (GDP), and also positioned one of the top global producer of seafood like shrimp. This production is estimated to double by 2030. But for large-scale production, farmers rely on antibiotics as a substitute for disease prevention and growth promotion. This ease of availability and overuse is driving an increase of antibiotic resistance in animals and their environment. Many reports have been there for the detection of multidrug resistant bacteria and antibiotic residues in fish and other seafood from many parts of the Country. These resistant bacteria can be transmitted through human and animal waste, manure, sewage etc., and new strains can be formed through gene transfer. This resistance will lead to the ineffectiveness of many drugs, even the last line antibiotics to bacterial infections. India, China, U.S., and Brazil collectively represent nearly 75% of total antibiotic consumption worldwide. Export markets are also highly exposed to risks associated with antibiotic resistance. In 2016, due to the contamination with banned antibiotics, the USFDA reported a record refusals to import of Asian shrimp, and in 2019, rejected 26 shipments of Indian shrimp due to the same. Thus there is a need for the implementation of Antimicrobial Stewardship Program (AMSP) in the seafood industry also. AMSP involves adopting systematic measures to optimize antimicrobial use, decrease unnecessary antimicrobial exposure and to decrease the emergence and spread of resistance.

The National Action Plan on Antimicrobial Resistance (NAP-AMR) accelerated the stewardship activities in India. The National Health Policy- 2017, states AMR as a major

issue and highlights the development of guidelines for antibiotic use, over use, limiting the use of antibiotics as growth promoters in livestock etc. Currently, few laws in India regulate antibiotic use in food animals, and are concerned with exports and aquaculture. Recommendations have been made by the National Centre for Disease Control, the Central Drugs Standard Control Organization, the Directorate General of Health Services, and the Ministry of Health & Family Welfare. General Statutory Rule (GSR) 28(E) mandates a withdrawal period for use of antibiotics in food producing animals from the time of administration until the production of foodstuffs. GSR 588 (E) specifies that all drugs in the H1 category, including many antibiotics, require a prescription, and requires separate pharmacy documentation of those prescriptions that are subject to review. Statutory Order (SO) 722(E) dated July 10, 2002 restricts some antibiotics like nitrofurans (including furaltadone, furazolidone, furylfulamide, nifuratel, nifuroxime, nifurpazine, nitrofurantoin and nitrofurazone), chloramphenicol, neomycin, nalidixic acid, sulfamethoxazole, dapsone, dimetridazole, metronidazole, ronidazole, ipronidazole, other nitroimidazoles, sulfonamide drugs (except approved sulfadimethoxine, sulfabromomethazine, and sulfaethoxyypyridazine), fluoroquinolones, glycopeptides use in aquatic animals for export.

In 2002, S.O. 722(E) amended an order from 1995 to include restrictions for antibiotics in fresh, frozen, and processed fish and fishery products intended for export. The amendment includes maximum residue limits (MRL) for tetracycline oxytetracycline, trimethoprim, and oxolinic acid, and it prohibits the use of certain antibiotics in units processing all types of seafood. In 2003, order S.O. 1227(E) prohibited the use of 'antibacterial substances, including

quinolones' from the culture of, or in any hatchery for producing the juveniles or larvae or nauplii of, or any unit manufacturing feed for, or in any stage of the production and growth of shrimps, prawns or any other variety of fish and fishery products without authorization from qualified veterinary surgeons or fishery scientists. In addition to these laws regarding use of antibiotics in aquaculture, the Export Inspection Council (EIC) of India regulates processing procedures of fish and fishery products for export (eg; antibiotic residue testing). Another international program, the United States Center for Disease Dynamics, Economics and Policy (CDDEP) supports a program called the Global

Antimicrobial Resistance Partnership (GARP) which provides tools for low- and middle-income countries to collect data on nation-wide trends in antibiotic use and AMR along with supporting stewardship activities. India also has partnered with this program.

Compared to clinical AMSP aspects, there is a need for further strengthening of stewardship activities in the seafood industry, even if regulations and recommendations are there. Thus more research should be conducted to study the use of antimicrobials in seafood and evaluate the effectiveness of the implementation of stewardship activities in India.

