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Editorial

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Antimicrobial-Resistance Bacteria in Food Products

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Antimicrobial resistance (AMR) is one of the emerging issues that can seriously impact human health directly and food supply indirectly. Antimicrobial agents are commonly used in food production environments to control animal diseases. Repeated exposure to different concentrations of antimicrobial agents may result in the foodborne bacteria to become resistant through specific genetic resistance mechanisms or the selective pressure of antimicrobials. Antimicrobial-resistant foodborne pathogens are dangerous in many ways i.e., infection with a resistant microorganism may have prolonged illness due to limited treatment options or have acquired more virulent characteristics.[1] AMR among some foodborne pathogens has been increasing during 15 to 25 years.

Foods contamination with antimicrobial-resistant bacteria may occur at primary production stage or at other stages in the supply chain.[2] The antimicrobial-resistant bacteria can be passed to food products through several routes. Animal origin foods may have the highest risk of carrying antimicrobial-resistant bacteria. Contamination of such foods is more likely because of the animals that have received antimicrobial treatments. Animal products such as meat, poultry and eggs could have AMR microbes transferred into them during slaughtering process due to faecal contamination. It is also to remember that antimicrobial-resistant bacteria can spread to other animals in a herd/flock.

Results of some studies have found the colistin resistant *E. coli* and other bacterial isolates from food animals.[3] The resistance was reported due to the presence of a gene (*mcr-1*) on a plasmid. Colistin belongs to a group of antibiotics called polymyxins that are the last option to treat multiple-resistant infections in human. This sort of bad consequences happen when clinically important drugs are given to animals. The *mcr-1* gene could be detected in sequenced genomes of bacteria isolated from imported foods and from the blood a hospitalised patient in Denmark.[4]

Water can serve a source of AMR microbes in certain food products. For example, vegetables and fruits can become contaminated with antimicrobial-resistant bacteria if the irrigation water has AMR microbes. Moreover, washing of fresh produce using such water can also pass resistant microorganisms. Fishery products may be contaminated with antimicrobial-resistant bacteria if they live in water that has AMR microbes or given feed that contains antibiotics.

Antimicrobial-resistant bacteria may also enter into food products through environmental sources. A variety of antimicrobial agents such as antibiotics, antifungals, sanitizers, and food preservatives are used during food production, processing, storage and distribution. These agents are primarily applied to improve the efficiency of the food system and increase the safety and quality of food products. Soil, manure and dust particles in the air generally carry AMR microbes. Preparation and handling of food in an unhygienic manner can spread antimicrobial-resistant bacteria from one type of food or environmental source to another food through cross-contamination.

Above-mentioned information present a glimpse of the actual threatening situation

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that world will be facing due to AMR. In fact, AMR microbes are around us all the times in our bodies to our foods and in our environment to food production systems. These all factors are strongly inter-connected, just adding to the complexity of this problem.

It would be self-deceiving to believe that AMR problem is easy to address and can be tackled. The global facts and predictions are indicating AMR as a serious threat to global public health and economy. Scientific and technical reports estimate that world could possibly see the global impact of AMR spread in the form of 10 million deaths annually and total economic cost up to US $100 trillion by 2050.[5] Recent high-level UN meeting on AMR demonstrated that world has realised an urgent need to take practical measures and develop a strong global political commitment to address the challenge.[6] This could be regarded as a very positive global move to increase and improve awareness of AMR.

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