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Emerging Concerns of Foodborne Pathogens

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Foodborne pathogens remain a serious concern for public health, as they can cause severe diseases and economic losses worldwide. Studies have shown that microorganisms such as Salmonella, *Cronobacter* and *Escherichia coli* are frequently present in various food sources, including cereals, cereal products, poultry, herbs, and spices. According to WHO, the incidence of Salmonella in Pakistan is reported to be the highest in the world, 412 cases out of 100,000 cases per annum [1]. Contamination in these foods highlights the need for ongoing monitoring and evaluation to prevent infections [2,3].

Cronobacter spp., for instance, are important foodborne pathogens that can cause meningitis, sepsis, and necrotizing enterocolitis in neonates. Analysis of diverse food products has revealed that cereals and cereal products have the highest prevalence of *Cronobacter,* whereas commercial powdered infant formula, infant food formula, vegetables, and fruits may show lower rates of contamination. Molecular methods, including 16S rDNA sequencing and PCR-RFLP, can be used to identify isolates accurately, and *Cronobacter sakazakii* is frequently the dominant isolate. The susceptibility testing of antimicrobials reveals that the majority of the strains are still susceptible to the widely used antibiotics, though some resistance has been reported against some antibiotics like ampicillin [4,5].

Similarly, *E. coli* is a commensal bacterial flora of the gastrointestinal tract of poultry, yet pathogenic serotypes may be the cause of colibacillosis, a systemic infection with significant economic consequences. Research in poultry farms has shown that *E. coli* isolates are widely resistant to different drugs. High resistance rates to tetracycline, rifampicin, and oxytetracycline have been reported, and isolates often show resistance to multiple antibiotics used in poultry production. The development of antimicrobial-resistant strains is associated with the massive usage of antibiotics in the form of feed additives, growth promotion, and disease prevention. This resistance can be transferred to the human pathogens, posing a threat to the population health [5].

Salmonella is one of the prominent food-borne pathogens which often contaminate poultry and meat products, eggs and other food products of animal origin. It causes various diseases with such mild cases as gastroenteritis and severe diseases like typhoid fever and bacteremia. Research has revealed that infections of Salmonella are widespread in such countries as Pakistan where it is one of the highest rates in the world. Surveillance and hygiene Surveillance and hygiene practices are important in the management of Salmonella outbreaks and food safety [6].

The importance of food hygiene, controlled use of antimicrobial agents, and frequent monitoring is emphasized by foodborne pathogens and antimicrobial resistant strains. Modern molecular techniques are helping in more precise and quicker identification, which assists in carrying out epidemiological studies and prevention of risks. Contamination patterns and resistance profiles are vital issues in the prevention of foodborne outbreaks and spread of resistant strains. Food safety is a microbiological, public health, and agricultural cross over that is taken seriously. The need to carry on research, monitoring and responsible practices is necessary to minimize the risks, safeguard human health and deliver safe food products across the globe.

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