



## Phenotypic Diversity And Antimicrobial Resistance Patterns of *Bacillus Cereus* in Meat, Milk, and Street Food Samples: A Cross-Matrix Analytical Study For Risk Assessment

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### Abstract:

*Bacillus cereus* is a toxin-producing pathogen that has been identified as a major cause of foodborne diseases because it is a toxin-producing pathogen with a high prevalence in a wide array of food matrices worldwide. There is an increased risk of contamination of meat, milk, and street foods due to poor handling, storage, and exposure to the environment. To gain an insight into the variability of *Bacillus cereus* and its possible health hazards, the current research paper will examine the phenotypic diversity and antimicrobial resistance patterns of *Bacillus cereus* isolated in various food sources. Standard microbiological tests, such as isolation on selective media, biochemical characterization, and phenotypic profiling, were performed on samples. The disk diffusion approach was used to determine the antimicrobial susceptibility test of the common antibiotics. The findings demonstrated that there was a major difference in the morphology of colonies, hemolytic activity, and biochemical characteristics of the isolates in different matrices. Also, various resistance patterns of antimicrobials were detected, including those that were multi-drug resistant, especially in the street food samples. These results demonstrate the adaptability of *Bacillus cereus* and its possible hazard to human health. The study underscores the need for continuous monitoring, improved hygiene practices, and effective risk assessment strategies to ensure food safety and minimize the spread of antimicrobial-resistant strains.

### Keywords:

*Bacillus cereus*, phenotypic diversity, antimicrobial resistance, food safety, risk assessment.