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Prevalence and Genomic Investigation of *Salmonella* Isolates Associated with Watermelons and Their Environmental Reservoirs in Bejaia, Algeria

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Abstract

This study was conducted in Bejaia, Algeria, to determine the presence of *Salmonella* in fresh watermelon ($n = 105$), soil ($n = 23$), and irrigation water samples ($n = 17$) collected from two different farms. After isolation, antimicrobial susceptibility testing, serotype determination, multilocus sequence typing, antimicrobial resistance genes detection, and whole genome sequencing were performed. Twenty watermelon samples (19%) were contaminated with *Salmonella*, but none were found in the soil or irrigation water. Among the 20 *Salmonella* isolates, 2 serovars were identified (*Salmonella* Liverpool and *Salmonella* Anatum), belonging to sequence types ST1959 and ST64, respectively. Ten *Salmonella* isolates showed significant resistance to nalidixic acid, ofloxacin, and ciprofloxacin but were susceptible to all other antibiotics. The coexistence of point mutations (*parC*:p.T57S) in Quinolone Resistance-Determining Regions and the *qnrB19* gene may contribute to quinolone resistance. The study identified 164 virulence genes in the *Salmonella* isolates. Our study found *Salmonella* in fresh watermelon during the preharvest season in Bejaia, Algeria. Our study indicates a relatively high prevalence of *Salmonella* on watermelon samples before harvest. Although we cannot directly compare our results with previous studies, it is crucial to recognize that the absence of comprehensive comparative data underscores the need for further research and surveillance.

Keywords: *Salmonella*, antibiotics resistance, WGS, fresh watermelon

Introduction

VEGETABLES AND FRUITS are essential to a healthy and balanced diet (Slavin and Lloyd, 2012). However, because these products are primarily consumed raw and often undergo minimal processing that could otherwise reduce their microbiological contamination, they can become sources of infection and transmit pathogens that cause human food poisoning (Kowalska, 2023). Health agencies such as the World Health Organization, European Food Safety Authority, Food and Agriculture Organization, and French

Agency for Food Safety (AFSSA) strongly encourage the consumption of these foods to protect against various illnesses, including cancer and cardiovascular diseases (Abaza, 2017).

Consuming fresh vegetables, root vegetables, sprouts, and fruits in their raw form can expose humans to foodborne pathogens, including antibiotic-resistant bacteria. In recent years, exposure to antimicrobial-resistant pathogens through the food chain has become increasingly associated with foodborne disease outbreaks (Pérez-Rodríguez and Mercanoglu Taban, 2019; Rahman et al., 2021). Disease outbreaks

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