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Prevalence and Antibiotic Resistance of Bacteria Isolated from Farmers' Market Fruits and Vegetables Collected from Frostburg and Cumberland Areas in Maryland

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Abstract : Fresh fruits and vegetables are rich in vitamins, minerals, and fibers and help maintain a healthy weight over high-calorie food. Eating fruits and vegetables protects us from free radicals produced by metabolic reactions and safeguards us from cardiovascular disease and cancer. However, there has been an increased concern about foodborne diseases tied to contaminated farmers' market produce. In addition, very little information is available about the contribution of eating raw fruits and vegetables to human exposure to antibiotic-resistant bacteria. This research aims to identify bacteria isolated from farmers' market fruits and vegetables and understand their antibiotic resistance. Vegetables and fruits were collected from farmers' markets around Frostburg and Cumberland areas in Maryland and transported to the microbiology lab at Frostburg State University for the isolation of bacteria. Bacteria were extracted from tomatoes, cucumber, strawberry, and lettuce using Tryptic soy broth overnight at 37°C, and Tryptic Soy agar was used for the streak plate technique to isolate bacteria. Pure cultures were used to identify bacteria using biochemical reactions after conducting Gram staining technique. The research used many biochemical reactions, including Mannitol Salt agar, MacConkey agar, and Eosin Methylene blue agar, for identification. Antibiotic sensitivity was tested for many different types of antibiotics, including amoxicillin, penicillin, tetracycline, ampicillin, and erythromycin. Most prevalent bacteria in the isolates were Staphylococcus, Bacillus, Micrococcus, Enterococcus, Enterobacter, Citrobacter, and other bacteria from the family Enterobacteriaceae. The data obtained from this research will be useful to educate and train farmers and individuals involved in post-harvest processes such as transportation and selling in farmers' markets. Further results for bacterial antibiotic resistance will be obtained, and unculturable bacteria will be identified by next-generation DNA sequencing.

Keywords : antibiotic resistance, farmers markets, fruits, bacteria, vegetables
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