

Characteristics of ESBL-producing Enterobacteria isolated from sprouts

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Abstract:

Extended-spectrum β -lactamase (ESBL)-producing *Enterobacteria* has become a pandemic widespread in different reservoirs and is the most important causes of beta-lactam-antibiotic resistance in nosocomial and community-acquired infections. ESBL genes were able to spread between bacteria via the exchange of plasmids, which may harbour additional antimicrobial resistance genes. We determined the prevalence and characteristics of extended-spectrum β -lactamase (ESBL) producing *Escherichia* spp., *Klebsiella* spp. and *Enterobacter* spp. in fresh produce (cucumber, carrots, fresh herbs, leaf lettuce, and ready-to-eat mixed salad leaves, sprouts) at retail level. A high prevalence of ESBL genes was found in sprout samples. Mainly *Klebsiella* species were found as ESBL producers, occasionally *Escherichia* spp., *Enterobacter* spp. and *Serratia fonticola* were detected. After genotyping of all isolates, we select 10 Isolates for genome sequencing. Genetic investigation showed that the predominant ESBL enzyme was CTX-M-15 and was located in a distinct genetic environment (5' ISEcp1-CTX-M-15-orf477 3'). This genotypic pattern was present in previous studies from clinical isolates. Also in silico Replicon typing revealed that various IncF plasmid sequences were the most abundant plasmid groups in our isolates. Next to beta-lactam- and monobactam-resistance most of the isolates were resistant to several antibiotic classes (including Tetracyclines, Aminoglycosides and Fluoroquinolones). Additionally some of the ESBL producing *Klebsiella pneumoniae* isolates belong to clinical relevant clonal complexes (sequence type ST14, ST278), indicating that fresh produce may act in the dissemination of ESBL-genes and potentially pathogenic bacteria. Fortunately Carbapenem resistant *Escherichia* spp., *Klebsiella* spp., *Citrobacter* spp. or *Enterobacter* spp. were not detected in sprouts. This presentation showing clinical relevant bacteria strains are present in food, typically eaten raw. The impact of a potential transfer to the human gut is still unclear.