

**TITLE:** *qnrD* IN *Providencia rettgeri* RECOVERED FROM LETTUCE

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**ABSTRACT:**

Qnr proteins protect DNA gyrase and topoisomerase IV from quinolones activity, conferring slight reduction of susceptibility to both quinolones and fluoroquinolones. Genes encoding Qnr proteins are plasmid-mediated, which contribute to horizontal spread of resistance to these antimicrobial classes. Seven families of *qnr* genes have been reported, namely *qnrA*, *qnrB*, *qnrS*, *qnrC*, *qnrD*, *qnrVC* and *qnrE*. These genes have disseminated worldwide, mainly among *Enterobacteriaceae*, often inserted on large conjugative multidrug resistance plasmids. The *qnrD* gene has been described in a variety of enterobacteria from both clinical and environmental origin. However, only five reports of *qnrD* in *Providencia* sp. are known, including four clinical *P. rettgeri* isolates, two described in France and two in China; and one environmental *Providencia* sp. obtained from surface river water in Poland. Curiously, all reports addressing the genetic environment of *qnrD* describe it harbored on small nonconjugative plasmids, along with *orf2*, encoding a hypothetical protein. In the present work, we identified *qnrD* in a *Providencia rettgeri* (isolate AB213) that was recovered from lettuce acquired at a supermarket in Rio de Janeiro city. The isolate exhibited reduced susceptibility to ciprofloxacin (MIC of 0,125 µg/mL). Plasmid extraction and Southern blot hybridization showed that *qnrD* was present on a small replicon of about 2.7 kb which we named pAB213. This plasmid was amplified by PCR using primers annealing on *qnrD* ends directed to its external flanking regions. Amplicons sequenced by Sanger technique showed significant identity (99%) with *qnrD*-carrying plasmids from *P. rettgeri* reported in France. In addition, a blastn survey of pAB213 against NCBI non-redundant nucleotide collection retrieved 22 hits showing high percentage of coverage (100%) and identity (96 to 99%). These hits included sequences of small and nonconjugative plasmids from *Proteus* spp. and *Morganella* spp. These genera are grouped in the *Proteeae* tribe of the *Enterobacteriaceae* family along with *Providencia* spp. Occurrence of *qnrD* gene on a vegetable typically consumed uncooked highlights a possible environmental source of these genes and further strengthen the role of food products as route for dissemination of antimicrobial-resistance to human microbiota. Our data also support the hypothesis that *Proteeae* tribe may play an important role as early intermediary in *qnrD* mobilization from its original reservoir.

**Keywords:** *qnrD*, PMQR, *Providencia rettgeri*, lettuce

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