Complete Genome Sequence of the Linear Plasmid pJD12 Hosted by Micrococcus sp. D12, Isolated from a High-Altitude Volcanic Lake in Argentina

Julian Rafael Dib,a,b Angel Angelov,c Wolfgang Liebl,a Johannes Döbber,d Sonja Vogt,a Jörg Schuldes,a Marta Gorritia,e Maria Eugenia Farias,a,e Friedhelm Meinhardt,d Rolf Daniela,e

PROIMI-CONICET, Tucumán, Argentina; Department of Microbiology, Universidad Nacional de Tucumán, Tucumán, Argentina; Leibniz-Institut für Mikrobiologische Technologie, Technische Universität München, Freising, Germany; Institut für Molekulare Mikrobiologie und Biotechnologie, Westfälische Wilhelms-Universität, Münster, Germany; Genomic and Applied Microbiology and Göttingen Genomics Laboratory, Georg-August University, Göttingen, Germany

The linear plasmid pJD12 from Micrococcus D12, isolated from the high-altitude volcanic Diamante Lake in the northwest of Argentina, was completely sequenced and annotated. It is noteworthy that the element is probably conjugative and harbors genes potentially instrumental in coping with stress conditions that prevail in such an extreme environment.


Copyright © 2015 Dib et al. This is an open-access article distributed under the terms of the Creative Commons Attribution 3.0 Unported license. Address correspondence to Rolf Daniel, rdaniel@gswdg.de.

Micrococcus are widely distributed and have been isolated from diverse locations including extreme sites (1–4). Among members of the phylum Actinobacteria, the genus Micrococcus is of increasing biotechnological importance; Micrococcus species can be used for biodegradation and bioremediation processes (5, 6), and they can be applied for producing useful compounds such as industrially relevant enzymes (7, 8) and long-chained alkenes for termini of the plasmid's Sanger sequencing. Finally, the lacking terminal sequences were obtained by restriction with AfeI, which cuts close to the telomeric regions, followed by self-ligation and PCR amplification of the unknown DNA and Sanger sequencing. Annotation was performed by the Integrated Microbial Genomes (IMG) annotation pipeline (11).

The plasmid pJD12 consists of linear DNA spanning 75,989 bp with an average G + C content of 68.8%. The annotation revealed the presence of 80 putative open reading frames (ORFs). The element encodes plasmid typical genes, including those for conjugation and replication. Interestingly, it also contains genetic information encoding a glutaredoxin and a putative cobalt-zinc-cadmium efflux system, which are potentially involved in coping with oxidative stress and heavy-metal poisoning, and may be favorable for the host survival and growth in the hostile environment. Moreover, because the lack of efficient genetic tools for Micrococcus, pJD12 as a potential conjugative element may serve as the basis of novel vectors for genetic engineering.

Nucleotide sequence accession numbers. The genome sequence of linear plasmid pJD12 has been deposited in the GenBank database under the accession no. KR152226. The version described here is version KR152226.1.

ACKNOWLEDGMENTS

This work was partially funded by the Alexander von Humboldt Foundation. J.R.D. is grateful for the support from Deutscher Akademischer Austausch dienst (DAAD).

REFERENCES


