

# Draft Genome Sequence of *Lactobacillus plantarum* XJ25 Isolated from Chinese Red Wine

Meijing Zhao,<sup>a,b</sup> Shuwen Liu,<sup>a,b</sup> Ling He,<sup>c</sup> Yu Tian<sup>a,b</sup>

College of Enology, Northwest A&F University, Yangling, China<sup>a</sup>; Heyang Experimental and Demonstrational Stations for Grape, Weinan, Shaanxi, China<sup>b</sup>; College of Horticulture, Northwest A&F University, Yangling, China<sup>c</sup>

Here, we present the draft genome sequence of *Lactobacillus plantarum* XJ25, isolated from Chinese red wine that had undergone spontaneous malolactic fermentation, which consists of 25 contigs and is 3,218,018 bp long.

Received 23 September 2016 Accepted 27 September 2016 Published 17 November 2016

**Citation** Zhao M, Liu S, He L, Tian Y. 2016. Draft genome sequence of *Lactobacillus plantarum* XJ25 isolated from Chinese red wine. *Genome Announc* 4(6):e01216-16. doi:10.1128/genomeA.01216-16.

**Copyright** © 2016 Zhao et al. This is an open-access article distributed under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/).

Address correspondence to Shuwen Liu, liushuwen@nwsuaf.edu.cn, or Ling He, heling@nwsuaf.edu.cn.

*Lactobacillus plantarum* can survive harsh winemaking conditions to efficiently conduct malolactic fermentation (MLF) (1, 2). Moreover, *L. plantarum* has been shown to produce bacteriocins that could combat spoilage lactic acid bacteria in wine (3). And *L. plantarum* XJ25 was characterized as a bacteriocin-producing strain when it was cocultured with other lactic acid bacteria. Intrigued by the unique features of *L. plantarum* XJ25, we sequenced its genome to reveal its genetic structure and to explore its potential to be used as a novel MLF starter culture.

The genome of *L. plantarum* XJ25 was sequenced using an Illumina HiSeq 4000 platform. A paired-end library was constructed with an insert size of 350 bp. The filtered reads (1,364 Mb) were assembled by SOAPdenovo (4, 5) to generate 25 contigs and 24 scaffolds with approximately 400-fold coverage. Moreover, Gene prediction was performed using GeneMarkS (6). Coding genes were subsequently annotated with six databases, including KEGG (7), COG (8), NR, Swiss-Prot (9), and GO (10). With the COG database, a total of 2,323 coding sequences (CDSs) were divided into 21 functional groups.

*L. plantarum* XJ25 has a genome with an approximate size of about 3,218,018 bp, a mean GC content of 44.5%, and 3,075 CDSs; 58 tRNA genes were predicted with tRNAscan-SE (11). Furthermore, 62 transposons and 96 tandem repeats were identified. Moreover, the genome sequencing results for *L. plantarum* XJ25 showed the genetic potential for the production of metabolites. Specifically, a complete organization of the plantaricin locus was found in the XJ25 strain. Several single-nucleotide polymorphisms were identified in the function genes *plnF*, *plnJ*, and *plnK*, which may lead to variations in the strain's antimicrobial activity.

**Accession number(s).** This whole-genome shotgun project has been deposited at DDBJ/ENA/GenBank under the accession number [MAXE00000000](https://www.ncbi.nlm.nih.gov/nuclink/MAXE00000000). The version described in this paper is the first version, MAXE01000000.

## ACKNOWLEDGMENTS

This work was supported by China's earmarked fund for the modern agro-industry technology research system (no. nycytx-30).

## REFERENCES

- Bravo-Ferrada BM, Hollmann A, Delfederico L, Valdés La Hens D, Caballero A, Semorile L. 2013. Patagonian red wines: selection of *Lactobacillus plantarum* isolates as potential starter cultures for malolactic fermentation. *World J Microbiol Biotechnol* 29:1537–1549. <http://dx.doi.org/10.1007/s11274-013-1337-x>.
- G-Alegria E, López I, Ruiz JI, Sáenz J, Fernández E, Zarazaga M, Dizm M, Torres C, Ruiz-Larrea F. 2004. High tolerance of wild *Lactobacillus plantarum* and *Oenococcus oeni* strains to lyophilisation and stress environmental conditions of acid pH and ethanol. *FEMS Microbiol Lett* 230: 53–61. [http://dx.doi.org/10.1016/S0378-1097\(03\)00854-1](http://dx.doi.org/10.1016/S0378-1097(03)00854-1).
- Du Toit M, Engelbrecht L, Lerm E, Krieger-Weber S. 2011. *Lactobacillus*: the next generation of malolactic fermentation starter cultures—an overview. *Food Bioprocess Technol* 4:876–906. <http://dx.doi.org/10.1007/s11947-010-0448-8>.
- Li R, Zhu H, Ruan J, Qian W, Fang X, Shi Z, Li Y, Li S, Shan G, Kristiansen K, Li S, Yang H, Wang J, Wang J. 2010. De novo assembly of human genomes with massively parallel short read sequencing. *Genome Res* 20:265–272. <http://dx.doi.org/10.1101/gr.097261.109>.
- Li R, Yu C, Li Y, Lam TW, Yiu SM, Kristiansen K, Wang J. 2009. SOAP2: an improved ultrafast tool for short read alignment. *Bioinformatics* 25:1966–1967. <http://dx.doi.org/10.1093/bioinformatics/btp336>.
- Besemer J, Lomsadze A, Borodovsky M. 2001. GeneMarkS: a self-training method for prediction of gene starts in microbial genomes: implications for finding sequence motifs in regulatory regions. *Nucleic Acids Res* 29:2607–2618. <http://dx.doi.org/10.1093/nar/29.12.2607>.
- Diep DB, Straume D, Kjos M, Torres C, Nes IF. 2009. An overview of the mosaic bacteriocin *pln* loci from *Lactobacillus plantarum*. *Peptides* 30: 1562–1574. <http://dx.doi.org/10.1016/j.peptides.2009.05.014>.
- Tatusov RL, Fedorova ND, Jackson JD, Jacobs AR, Kiryutin B, Koonin EV, Krylov DM, Mazumder R, Mekhedov SL, Nikolskaya AN, Rao BS, Smirnov S, Sverdlov AV, Vasudevan S, Wolf YI, Yin JJ, Natale DA. 2003. The COG database: an updated version includes eukaryotes. *BMC Bioinformatics* 4:41. <http://dx.doi.org/10.1186/1471-2105-4-41>.
- Magrane M, UniProt Consortium. 2011. UniProt Knowledgebase: a hub of integrated protein data. *Database* 2011:bar009.
- Ashburner M, Ball CA, Blake JA, Botstein D, Butler H, Cherry JM, Davis AP, Dolinski K, Dwight SS, Eppig JT, Harris MA, Hill DP, Issel-Tarver L, Kasarskis A, Lewis S, Matese JC, Richardson JE, Ringwald M, Rubin GM, Sherlock G. 2000. Gene Ontology: tool for the unification of biology *Nat Genet* 25:25–29. <http://dx.doi.org/10.1038/75556>.
- Lowe TM, Eddy SR. 1997. tRNAscan-SE: a program for improved detection of transfer RNA genes in genomic sequence. *Nucleic Acids Res* 25: 955–964. <http://dx.doi.org/10.1093/nar/25.5.0955>.