

Purdue University Interlibrary Loan (IPL)



ILLiad TN: 1382634

ILL Number: 173200035



Borrower: HNI

Aging Date: 20170210

Transaction Date: 2/13/2017 9 52 48 AM

Lending String: *IPL UIU EYM VRC

Patron:

Journal Title: Global advances in selenium research from theory to application : proceedings of the 4th International Conference on Selenium in the Environment and H

Volume: Issue:
Month/Year: 2015

Pages: 121 - 122

Article Author: Gary S. Banuelos

Article Title: Wautersiella enshiensis sp. nov. – selenite-reducing bacterium isolated from a selenium-mining area in Enshi, China

Call #: QH545.S45 I58 2015

Location: Life Sciences

Ship Via: EMail
ODYSSEY ENABLED

Charge
Maxcost: 50.00IFM

Shipping Address:
N.I.H. Library- Interlibrary Loan Unit
Bldg 10, Rm. B1L-306
10 Center Drive, MSC 1150
Bethesda, Maryland 20892-1150
Fax: 301 496-3702
Odyssey: 206 107 44 214
Ariel:
Email:
lendILL@purdue.edu

COPY PROBLEM REPORT

Purdue University Libraries Interlibrary Loan Department (IPL)

Odyssey 128 210 126 171

Ariel 128 210 125 135

Fax 765-494-9007

Phone 765-494-2805

Please return this sheet within **5 BUSINESS DAYS** if there are any problems

Resend legible copy

Wrong article sent

Other explain _____

DOCUMENTS ARE DISCARDED AFTER 5 DAYS. PLEASE RESUBMIT REQUEST AFTER THAT TIME.

NOTICE: This material may be protected by copyright law (Title 17, United States Code)

Wautersiella enshiensis sp. nov. – selenite-reducing bacterium isolated from a selenium-mining area in Enshi, China

Zhihao Qu

Jiangsu Bio-Engineering Research Centre of Selenium, Suzhou, Jiangsu, China;

China Center for Type Culture Collection, College of Life Sciences, Wuhan University, Wuhan, Hubei, China

Linxi Yuan* & Xuebin Yin

Jiangsu Bio-Engineering Research Centre of Selenium, Suzhou, Jiangsu, China

Fang Peng*

China Center for Type Culture Collection, College of Life Sciences, Wuhan University, Wuhan, Hubei, China

1 INTRODUCTION

Selenium (Se) is an essential trace element for human beings and is required for the synthesis of the essential amino acid selenocysteine for bacteria but it can be poisonous at high concentrations (Jong et al., 2015). A previous study revealed that a Se-mine drainage area in Enshi, Hubei contained Se concentrations as high as 20–500 mg/kg (DW) in soil/sediment (Yuan et al., 2013), but until now no Se-tolerant bacteria were reported from the sampling sites. This study focused on identifying and isolating Se-tolerant bacteria in the Se-mining area in Enshi.

2 MATERIALS AND METHODS

Soil samples were collected from the Se-mine drainage area in Enshi, China (Yuan et al., 2013) and cultured in a medium containing Se of 200 µg/L. Strain YLX-1^T was selected to perform 16S rRNA gene analysis. Cell morphology was examined by phase-contrast (Olympus BX51) and transmission electron microscopy (Hitachi H-8100). The metabolism parameters and enzyme activities on YLX-1^T were also tested. The DNA G + C content was determined using HPLC following the method by Mesbah and Whitman (1989). The fatty acids methyl esters were obtained and tested according to Sherlock Microbial Identification System's protocol and analyzed by Agilent 6890 N, MIDI Sherlock TSBA6 (Sasser, 1990). Polar lipids were extracted and analyzed as described by Tindall (1990) and Ventosa et al. (1993) using two-dimensional TLC (silica gel 60 F254 plates, layer thickness 0.2 mm, Merck).

3 RESULTS AND DISCUSSION

The strain YLX-1^T cells were rod-shaped (0.4–0.7 × 0.8–2.0 µm), non-spore-forming, Gram-negative, facultatively anaerobic and non-motile. Its colonies were yellow, smooth, circular, and convex with entire margins on TSA medium after 1 day at 28°C. Growth occurred at 4–37°C (but optimum 28°C) and at pH 5.0–9.0 (but optimum at pH 7), but no growth in the presence of ≥ 1.0% NaCl. The strain was catalase- and oxidase-positive. Tween 40 was hydrolysed, but not Tween 20, 60, 80, starch, DNA and casein.

The strain YLX-1^T was identified as *Wautersiella enshiensis* based on 16S rRNA data (Fig. 1). The GenBank/EMBL/DDBJ accession number for the 16S rRNA gene sequence of strain YLX-1^T is KF923410. In API ZYM strips, cells were positive for the activities of alkaline phosphatase, esterase (C4), esterase lipase (C8), leucine arylamidase, trypsin, acid phosphatase, naphthol-AS-BI-phosphohydrolase, α-glucosidase and β-glucosidase, were weakly positive for the activities of valine arylamidase and negative for other reactions in the strip. In API 20NE and API 20E strips, the reduction of nitrate and the production of hydrogen sulfide did not occur. It is positive for urease, gelatinase, galactosidase, arginine dihydrolase, aesculin hydrolysis, citrate utilization and Voges-Proskauer reaction. Moreover, it could assimilate glucose, maltose, malic acid and sodium citrate.

In summary, this study showed that *Wautersiella enshiensis* can grow in selenite-enriched medium, having a Se concentration of up to 6000 µg/mL, and it is able to reduce selenite into red elemental nano-Se.

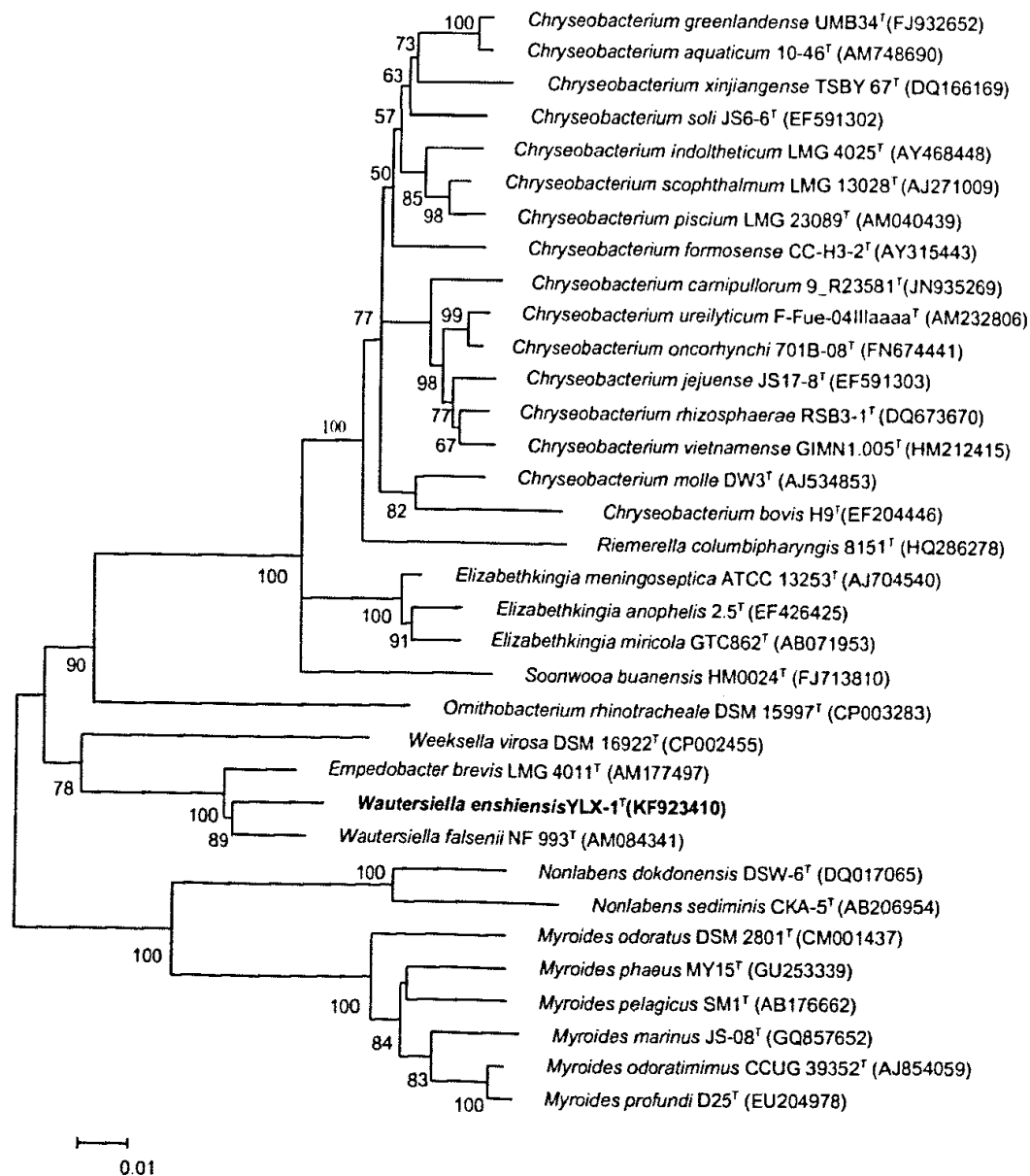


Figure 1. Neighbor-joining phylogenetic tree, based on 16S rRNA gene sequences, showing the phylogenetic position of strain YLX-1^T. Bootstrap values (1000 replications) are shown as percentage at each node only if they are 50% or greater. Bar, 1% sequence diverge.

ACKNOWLEDGEMENTS

This work was supported by National Natural Science Foundation of China (NNSFC31400091), Natural Science Foundation of Jiangsu Province (BK2012195, BK2012202), and Applied Basic Research Project of Suzhou (SYN201306).

REFERENCES

- Jong, M.S., Reynolds, R.J.B., Richterova, K., Musilova, L., Staicu, L.C., Chocholata, I., et al. 2015. Selenium hyperaccumulators harbor a diverse endophytic bacterial community characterized by high selenium resistance and plant growth promoting properties. *Frontiers in Plant Sciences*, 6: 113.
- Mesbah, M., Premachandran, U. & Whitman, W.B. 1989. Precise measurement of the G+C content of deoxyribonucleic acid by high-performance liquid chromatography. *Journal of Systematic and Evolutionary Microbiology*, 39: 159–167.
- Sasser, M. 1990. Identification of bacteria by gas chromatography of cellular fatty acids, MIDI Technical Note 101. Newark, DE: MIDI.
- Tindall, B.J. 1990. Lipid composition of *Halobacterium lacusprofundi*. *FEMS Microbiological Letter*, 66: 199–202.
- Ventosa, A., Marquez, M.C., Kocur, M. & Tindall, B.J. 1993. Comparative study of “*Micrococcus* sp.” strains CCM 168 and CCM1405 and members of the genus *Salinicoccus*. *International Journal of Systematic and Evolutionary Microbiology*, 43: 245–248.
- Yuan, L.X., Zhu, Y.Y., Lin, Z.Q., Banuelos, G., Li, W., Yin, X.B. 2013. A novel selenocystine-accumulating plant in selenium-mine drainage area in Enshi, China. *PLoS ONE*, 8(6): e65615. doi:10.1371/journal.pone.0065615.