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Publication date
2022

Document Version
Final published version

Published in
Bergey's Manual of Systematics of Archaea and Bacteria

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Citation (APA)
Sorokin, D. Y., & Merkel, A. Y. (2022). Dethiobacteraceae fam. nov. In W. B. Whitman (Ed.), *Bergey's Manual of Systematics of Archaea and Bacteria* (pp. 1-2). John Wiley & Sons.

Family

Firmicutes D/Dethiobacteria/Dethiobacterales/

Dethiobacteraceae fam. nov.

Dimitry Y. Sorokin, *Winogradsky Institute of Microbiology, Research Centre of Biotechnology, Russian Academy of Sciences, Moscow, Russia and Department of Biotechnology, Delft University of Technology, Delft, The Netherlands*

Alexander Y. Merkel, *Winogradsky Institute of Microbiology, Research Centre of Biotechnology, Russian Academy of Sciences, Moscow, Russia*

Edited by: William B. Whitman, *University of Georgia, Athens, GA, USA*

De.thi'o.bac.ter.a.ce.a.e. N.L. masc. n. *Dethiobacter*, the type genus of the family; L. fem. pl. n. suff. *-aceae*, ending to denote a family; N.L. fem. pl. n. *Dethiobacteraceae*, the family of the genus *Dethiobacter*.

The family *Dethiobacteraceae* includes obligately anaerobic, moderately salt-tolerant, and obligately alkaliphilic bacteria able to grow chemolithoautotrophically by elemental sulfur disproportionation and fixing CO_2 by the Wood–Ljungdahl pathway. The two strains currently known in pure culture are both isolated from saline soda lakes. H_2 can serve as an additional electron donor for sulfur and thiosulfate reduction. The family consists of a single genus *Dethiobacter* with the type species *Dethiobacter alkaliphilus*.

DNA G + C content (%): 48.3–48.5 (genomes of two isolates).

Type genus: **Dethiobacter** Sorokin et al. 2008, VL123.

The family *Dethiobacteraceae* includes strictly anaerobic bacteria with cells as short motile rods, occasionally forming round terminal endospores, and with the Gram-positive type of cell wall. The main metabolism is chemolithoautotrophy using elemental sulfur disproportionation for energy generation and the Wood–Ljungdahl pathway for autotrophic carbon dioxide fixation (Sorokin et al., 2008; Poser et al., 2013; Melton et al., 2017). In contrast to the neutrophilic sulfur-disproportionating bacteria, alkaliphilic *Dethiobacter* can grow by sulfur disproportionation without addition of Fe(III). The type species *Dethiobacter alkaliphilus* can use H_2 as the electron donor for anaerobic sulfur and thiosulfate respiration (Sorokin et al., 2008). A second, yet undescribed, strain Z-1002 was enriched and isolated with ferrihydrite as the electron acceptor and formate as the electron donor (Zavarzina et al., 2018). This isolate has 99.6% identity of its 16S rRNA gene sequence to the type species. Both strains are moderately salt-tolerant, obligate alkaliphiles. The family currently consists of a monospecific genus *Dethiobacter* with the type species *D. alkaliphilus* AHT1^T isolated from a Mongolian soda lake. The second isolate, strain Z-1002, was obtained from the hypersaline soda lake Magadi in Kenya. *Dethiobacteraceae* is currently the only family of the order *Dethiobacterales* in the class *Dethiobacteria* as established by the phylogenomic analysis based on 120 single-copy conserved proteins.

DNA G + C content (%): 48.3–48.5 (genomes of two isolates).

Type genus: **Dethiobacter** Sorokin et al. 2008, VL123.

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DOI: 10.1002/9781118960608.fbm00282. Published by John Wiley & Sons, Inc., in association with Bergey's Manual Trust.

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