

Kurthia huakuii sp. nov., isolated from biogas slurry, and emended description of the genus *Kurthia*

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A novel facultatively anaerobic bacterium, designated strain LAM0618^T, was isolated from biogas slurry samples collected from the large-scale anaerobic digester of Modern Farming Corporation in Hebei Province, China. Cells of strain LAM0618^T were Gram-stain-positive, motile, non-spore-forming and short-rod-shaped. The optimal temperature and pH for growth were 30 °C and 7.0, respectively. The strain did not require NaCl for growth but tolerated up to 70 g NaCl l⁻¹. The major fatty acids of strain LAM0618^T were iso-C_{15:0}, anteiso-C_{15:0}, iso-C_{14:0}, C_{16:0} and C_{18:0}. The predominant menaquinones of strain LAM0618^T were menaquinone 7 (MK-7) and menaquinone 6 (MK-6). The main polar lipids of strain LAM0618^T were phosphatidylglycerol, diphosphatidylglycerol, phosphatidylethanolamine and six unknown glycolipids. The genomic DNA G + C content was 41 mol% as determined by the *T_m* method. Analysis of the 16S rRNA gene sequence revealed that strain LAM0618^T was a member of the genus *Kurthia*, and was most closely related to '*Kurthia massiliensis*' DSM 24639, *Kurthia zopfii* DSM 20580^T, *Kurthia gibsonii* DSM 20636^T and *Kurthia sibirica* DSM 4747^T, with 96.9, 95.7, 95.6 and 94.9% sequence similarity, respectively. Based on its phenotypic and genotypic properties, strain LAM0618^T is suggested to represent a novel species of the genus *Kurthia*, for which the name *Kurthia huakuii* sp. nov. is proposed. The type strain is LAM0618^T (=ACCC 06121^T=JCM 19187^T).

The genus *Kurthia* belongs to the family *Planococcaceae* of the phylum *Firmicutes*, and was created by Trevisan (1885) in honour of H. Kurth who published the description of the first species, *Bacterium zopfii*, which was isolated from the intestinal contents of chickens (Kurth, 1883). The genus name *Kurthia* came into general use only after the publication of the seventh edition of *Bergey's Manual of Determinative Bacteriology* (Breed *et al.*, 1957). At the time of writing, the genus *Kurthia* comprised three recognized species (<http://www.bacterio.net/ijk/kurthia.html>) namely *Kurthia zopfii*, *Kurthia gibsonii* (Shaw & Keddie, 1983) and *Kurthia sibirica* (Belikova *et al.*, 1986). In year 2012, a novel strain, '*Kurthia massiliensis*' DSM 24639 was isolated and described (Roux *et al.*, 2012). While studying the bacterial diversity of biogas slurry from the large-scale anaerobic

digester in Hebei Province in China, a *Kurthia*-like strain, designated LAM0618^T, was isolated. Based on its phenotypic and genotypic properties, the new isolate was considered to represent a novel species of the genus *Kurthia*.

Strain LAM0618^T was isolated in 2012 from biogas slurry samples collected from the large-scale anaerobic digester of Modern Farming Corporation (41° 52' N 115° 48' E) located in Hebei Province in China. The strain grew well on nutrient agar (BD/Difco 212000, Sparks, MD, USA) plates at 30 °C. Morphological and physiological characteristics of cells from an exponentially growing culture were investigated by using a light microscope (Nikon 80i) and a transmission electron microscope (Hitachi 7500). The physiologically optimal growth conditions for strain LAM0618^T were tested in nutrient broth medium. All tests were conducted independently in duplicate. The strain was cultured at temperatures of 4, 10, 15, 20, 25, 30, 35, 40, 45, 50 and 55 °C; pH 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5 and 10; and NaCl concentrations of 0, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 8, 10, 12 and 14%. The

The GenBank/EMBL/DDBJ accession number for the 16S rRNA gene sequence of strain LAM0618^T is KC904244.

Two supplementary figures and one supplementary table are available with the online version of this paper.