

***Gluconacetobacter kakiaceti* sp. nov., A Novel Acetic Acid Bacterium Isolated From Kaki Vinegar (Persimmon Vinegar)**

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Abstract:

This study aims to isolate acetic acid bacteria from various kinds of vinegar in Japan, and characterize two strains of unknown acetic acid bacteria based on morphological, biochemical, physiological and phylogenetic properties. Eighteen samples of Japanese vinegar such as black vinegar, brown rice vinegar, kaki vinegar (persimmon vinegar) and sake lees vinegar were collected from vinegar plants in Japan. Sixty-four strains of acetic acid bacteria were isolated by using GYP, EM I and EM II agar plates. A comparative 16S rRNA gene sequence analysis showed that 62 isolates were closely related to *Acetobacter* or *Gluconacetobacter* species, and two strains were not identified with any known species in the acetic acid bacteria. Unidentified strains of No. 11 and No. 15 isolated from kaki vinegar were rod-shaped, Gram-negative, aerobic, non-motile, non-sporulating, catalase-positive, and oxidase-negative. The two strains oxidized acetate and lactate, produced acid from ethanol, and produced gluconic acid from D-glucose. The growth temperature for the strains ranged from 15 to 30°C. No growth was observed at 10 or 37°C. The pH range for growth was between 3.5 and 8.0. No growth was observed at pH 3.0 or 8.5. Growth occurred between 1 and 30 % (w/v) of D-glucose. No growth was observed at 35 % (w/v) D-glucose. Growth occurred between 0 and 7 % (v/v) of ethanol. No growth was observed at 10 % (v/v) of ethanol. The major quinone was Q-10. The strains of No. 11 and No. 15 formed a distinct subline in the genus *Gluconacetobacter* in the family *Acetobacteraceae* with the phylogenetic analysis based on the 16S rRNA gene sequences. The strains of No. 11 and No. 15 showed high values of DNA-DNA relatedness each other, but low values less than 63 % with eight type strains of phylogenetically related *Gluconacetobacter* species. Further, the strains did not completely coincide with the known *Gluconacetobacter* species on the production of cellulose, and acid from D-fructose, maltose, raffinose, sucrose, D-mannitol, D-sorbitol or 1-propanol. On the basis of phenotypic and phylogenetic properties, *Gluconacetobacter kakiaceti* sp. nov. is proposed for the strains of No. 11 and No. 15.

**Key words:** Acetic acid bacteria, *Gluconacetobacter*, *Gluconacetobacter kakiaceti*, Japan, Vinegar