Rejection of the species *Methanothrix soehngenii*^{VP} and the genus *Methanothrix*^{VP} as *nomina confusa*, and transfer of *Methanothrix thermophila*^{VP} to the genus *Methanosaeta*^{VP} as *Methanosaeta thermophila* comb. nov. Request for an Opinion

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We request an Opinion of the Judicial Commission regarding rejection of the species *Methanothrix soehngenii*^{VP} Huser, Wuhrmann and Zehnder 1983, 439, and the genus *Methanothrix*^{VP} Huser, Wuhrmann and Zehnder 1983, 439, as *nomina confusa* because their descriptions were based on the characterization of an impure type strain, strain Opfikon^T. We also propose the transfer of *Methanothrix thermophila*^{VP} Kamagata et al. 1992, 465, to the genus *Methanosaeta* as *Methanosaeta thermophila* comb. nov.

Keywords: Request for an Opinion, *Methanothrix soehngenii*^{VP}, *Methanothrix thermophila*^{VP}, *Methanosaeta thermophila* comb. nov., *nomina confusa*

Rejection of *Methanothrix* and *Methanothrix soehngenii*

The genus *Methanothrix* was established with *Methanothrix soehngenii* as the type and sole species (Huser et al., 1982). However, *Methanothrix soehngenii* is considered illegitimate because its description was based on characterization of strain Opfikon^T, whose purity at the time of characterization is doubted (Wayne, 1994; Patel, 1992). A viable, pure culture of strain Opfikon^T has never been deposited in a culture collection (Boone, 1991; Patel & Sprott, 1990). Rule 31a of the Bacteriological Code (Lapage et al., 1992) stipulates that the type strain, whose description is the basis of the species description, must be pure. The purity of strain Opfikon^T was discussed intensively by the Subcommittee for the taxonomy of methanogens of the International Committee on Systematic Bacteriology. Exactly half of the subcommittee concluded that strain Opfikon^T had never been pure, but the other half felt that in the absence of proof to the contrary they should assume, despite some personal doubts (Patel & Sprott, 1990), that the culture had been pure (Boone, 1991; Patel & Sprott, 1990). A Request for an Opinion was then published (Boone, 1991) that sought to retain the species *Methanothrix soehngenii* with strain GP6 (the type strain of *Methanosaeta concilii*) as the neotype strain. However, the Opinion issued by the Judicial Commission

doubted the purity of strain Opfikon^T (Wayne, 1994), and it rejected the establishment of a neotype strain of *Methanothrix soehngenii* for this reason. This decision left two established genera, *Methanothrix* and *Methanosaeta*, that are widely considered to be subjective synonyms. Further, the type species of each of these two genera, *Methanothrix soehngenii* and *Methanosaeta concilii*, respectively, are also widely considered to be subjective synonyms (Boone, 1991; Patel & Sprott, 1990; Touzel et al., 1988). The name *Methanothrix soehngenii* has priority but its legitimacy is doubtful.

The judgement that strain Opfikon^T was impure renders *Methanothrix soehngenii* illegitimate, and we request an Opinion to reject this species on this basis as a *nomen confusum*. Further, the genus *Methanothrix* was described based solely on the species *Methanothrix soehngenii*, so we request an Opinion to reject this name also as a *nomen confusum*, and to place these two names on the list of rejected names (*nomina rejicienda*).

Other species of *Methanothrix*

Another species of thermophilic *Methanothrix*, '*Methanothrix thermoacetophila*', was proposed (Nozhevnikova & Chudina, 1984) but has never been validated. The type strain of this species is not axenic (Kamagata et al., 1992; Nozhevnikova & Chudina, 1984), so the name is illegitimate.

Methanothrix thermophila^{VP} Kamagata *et al.* 1992, 465, is a legitimate species that contains thermophilic organisms (Kamagata *et al.*, 1992). Rule 32b of the Bacteriological Code (Lapage *et al.*, 1992) indicates that a species epithet is not rendered illegitimate because of the illegitimacy of the generic name. The type strain of this species (strain P_T^T) has 95% sequence similarity of its 16S rDNA gene to that of the type strain of *Methanosaeta concilii*, so these two species should be classified within the same genus. We therefore propose the transfer of *Methanothrix thermophila* to the genus *Methanosaeta* as *Methanosaeta thermophila*, without a change in the type strain of the species or the species circumscription. Thus, *Methanosaeta* would currently comprise just two species: *Methanosaeta concilii* (the type species) and *Methanosaeta thermophila*.

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