Taxonomic Note

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Taxonomic problems arising in the genera Haloterrigena and Natrinema

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Data currently available on members of the genera Haloterrigena and Natrinema suggest that some strains of the species Haloterrigena turkmenica that have been shown by DNA–DNA hybridization to belong to this species show a high degree of 16S rDNA sequence similarity to members of the genus Natrinema. However, closer examination of the data presented in the original publications and in subsequent publications suggests that there may be a number of problems associated with some of the published data.

The genera Haloterrigena and Natrinema were created by Ventosa et al. (1999) and McGenity et al. (1998). However, some confusion has arisen from the fact that the 16S rDNA sequence and DNA–DNA hybridization data suggest that the species Haloterrigena turkmenica and members of the genus Natrinema ‘overlap’. Closer examination of the data suggests that the situation may not be as confusing as it currently appears.

Ventosa et al. (1999) presented data that indicated that the type strain of Haloterrigena turkmenica (obtained from the VKM as VKM B-1734) was indistinguishable from Halobacterium trapanicum JCM 9743, despite the fact that the 16S rDNA sequence similarity was 96%. The high DNA–DNA hybridization value between these two strains was the basis for transferring strain JCM 9743 to the species Haloterrigena turkmenica, despite significant differences in lipid composition. Data provided by the same authors indicate that JCM 9743 was derived from Halobacterium trapanicum NCIMB 767, although the 16S rDNA sequence data indicate that it is almost identical to Halobacterium trapanicum NCIMB 784, a fact also supported by lipid data published by Xin et al. (2000) and by Torreblanca et al. (1986). The current problem centres around the fact that McGenity et al. (1998) have shown that Halobacterium trapanicum NCIMB 784 should be transferred to the genus Natrinema as a strain of Natrinema pallidum and provide evidence that this strain is sufficiently similar to the type strain of this species, NCIMB 777, to warrant this transfer. The lipid data of Ross & Grant (1985) and Xin et al. (2000) are consistent with NCIMB 784 and JCM 9743 being similar to NCIMB 777 (strain NCIMB 777 appears as JCM 8980 in the work of Xin et al., 2000). Although McGenity et al. (1998) did not carry out DNA–DNA hybridization work with the type strain of Haloterrigena turkmenica, Xin et al. (2000) have provided evidence that contradicts the data published by Ventosa et al. (1999). Xin et al. (2000) show that JCM 9743 shows no significant DNA–DNA hybridization to the type strain of Haloterrigena turkmenica. Furthermore, they also show that JCM 9743 shows a high degree of DNA–DNA hybridization with the type strain of Natrinema pallidum (NCIMB 777). If strain JCM 9743 is, in fact, derived from Halobacterium trapanicum NCIMB 784, and not from NCIMB 767 (the latter has been shown by numerous authors to be a member of the genus Halococcus; see Tindall, 1991; Kamekura & Dyall-Smith, 1995; Ventosa et al., 1999), this would explain the lipid data published by Torreblanca et al. (1986), Ventosa et al. (1999) and Xin et al. (2000), as well as the fact that this strain is a member of the species Natrinema pallidum as indicated by the data provided by McGenity et al. (1998) and Xin et al. (2000).

The present confusion centres around the fact that the type strain of Haloterrigena turkmenica (VKM B-1734) shares a high degree of DNA–DNA hybridization with strain JCM 9743 (Ventosa et al., 1999), despite the fact that it is well documented in the literature that strains sharing 96% 16S rDNA sequence similarity have never reliably been shown to have high DNA–DNA hybridization values, together with data that show that strains within the family Halobacteriaceae that have ‘significantly different’ lipid compositions have also never been shown to share high DNA–DNA hybridization values. The only exceptions would appear to be cases such as one strain of Halobacterium saccharovorum that has been shown conclusively not to be identical to the type strain of Halobacterium saccharovorum = Halorubrum saccharovorum (Tindall, 1990; Kamekura & Dyall-Smith, 1995). Based on the data currently available, it would appear that the strain history of JCM 9743 may be unreliable and that the DNA–DNA data provided by Ventosa et al. (1999) may also be in error. Although data available at present may appear to be contradictory and to
cause problems, a careful evaluation of the data suggests that errors may have occurred and that there is a degree of consistency between some publications, from which one may deduce where the potential errors may have occurred. The situation is not new and has been highlighted by Tindall (1991).

References


