Reclassification of *Streptomyces flavidofuscus* as a synonym of *Nocardiopsis dassonvillei* subsp. *dassonvillei*

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The genus *Streptomyces* is the largest genus of actinomycetes, containing more than 500 species with validly published names. They are characterized phenotypically by morphology and the presence of a type I cell wall. The genus *Nocardiopsis* was established by Meyer (1976) on the basis of morphological characteristics and the presence of cell-wall type III/C. The genus currently comprises more than 20 species. Members of this taxon are characterized chemotaxonomically by possessing phosphatidylcholine and phosphatidylethanolamine as diagnostic phospholipids, menaquinone (MK)-10 with variable degrees of saturation (Collins *et al.*, 1977), iso-, anteiso- and 10-methyl-branched fatty acids (fatty acid type 3d sensu Kroppenstedt, 1985) and meso-diaminopimelic acid (meso-A$_2$pm). They lack diagnostic sugars (cell-wall chemotype III/C sensu Lechevalier & Lechevalier, 1970) and mycolic acids. They contain the acetyl type of muramic acid and have a G+C content of 64–69 mol% (Grund & Kroppenstedt, 1990).

During the course of quality control studies of the collection of the NITE Biological Resource Center (NBRC), phylogenetic analysis based on 16S rRNA gene sequences of actinomycetes revealed that *Streptomyces flavidofuscus* NBRC 15404$^\mathrm{T}$ formed a cluster with *Nocardiopsis dassonvillei* and *Nocardiopsis synnemataformans*. Strain NBRC 15404$^\mathrm{T}$ contained meso-diaminopimelic acid as a cell-wall amino acid and DNA–DNA hybridization studies also showed that *S. flavidofuscus* NBRC 15404$^\mathrm{T}$ was a close relative of *N. dassonvillei* subsp. *dassonvillei* NBRC 14626$^\mathrm{T}$. Based on chemotaxonomic, phenotypic and genetic analysis of the type strain, *Streptomyces flavidofuscus* should be reclassified as a later heterotypic synonym of *Nocardiopsis dassonvillei* subsp. *dassonvillei*.

The GenBank/EMBL/DDBJ accession number for the 16S rRNA gene sequence of strain NBRC 15404$^\mathrm{T}$ is AB184655.
The microplate hybridization method developed by Ezaki et al. (1989) was used for the determination of DNA–DNA relatedness. The relatedness values of *S. flavidofuscus* NBRC 15404T to *N. dassonvillei* subsp. *dassonvillei* NBRC 14626T, *N. dassonvillei* subsp. *albirubida* NBRC 13392T and *N. symnemataforms* NBRC 102581T were 81–87, 55–79 and 55–63 %, respectively. *N. dassonvillei* subsp. *albirubida* NBRC 13392T exhibited high relatedness (59–73 %) to *N. dassonvillei* subsp. *dassonvillei* NBRC 14626T, as reported (2000). Further, *N. symnemataforms* NBRC 102581T exhibited 43–61 % relatedness to *N. dassonvillei* subsp. *dassonvillei* NBRC 14626T and 53–79 % relatedness to *N. dassonvillei* subsp. *albirubida* NBRC 13392T. These species and subspecies are genetically closely related to each other.

The cultural characteristics of *S. flavidofuscus* NBRC 15404T were similar to those of *N. dassonvillei* subsp. *dassonvillei* NBRC 14626T, i.e. they produced a pale-brown soluble pigment in NBRC medium 229 containing (l-1) 5 g yeast extract, 50 g glycerol, 1 g CaCO3 and 20 g agar, pH 7.3; NBRC catalogue and developed colourless to pale-brown colonies on NBRC medium 229, yeast extract-starch agar, pH 7.3; NBRC catalogue

**Fig. 1.** Phylogenetic tree derived from the 16S rRNA gene sequences of *S. flavidofuscus* NBRC 15404T and members of the genus *Nocardiopsis*. *N. dassonvillei* subsp. *dassonvillei* DSM 43884 is the type strain of *Nocardiopsis antarctica*. The tree was constructed using the neighbour-joining method (Saitou & Nei, 1987). The sequence of *Streptomyces ambofaciens* ATCC 23877T was used as an outgroup. Bar, 0.01 Knt in nucleotide sequences. Numbers on branches are confidence limits estimated by bootstrap analysis with 1000 replicates (only values above 500 are presented).

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The results of the present study revealed that strain NBRC 15404T, the type strain of *S. flavidofuscus*, was identified as a strain of *N. dassonvillei* subsp. *dassonvillei*. The identity of the 16S rRNA gene sequence of strain NBRC 15404T to that of NRR B-16366T strongly suggests that this is not merely true for this particular strain but is generalized to the concept of the species. Therefore, the name *Streptomyces flavidofuscus* Preobrazhenskaya 1986 should be treated as a later heterotypic synonym of *Nocardiopsis dassonvillei* subsp. *dassonvillei* (Brocq-Rousseau 1904) Meyer 1976.

References


