Request for an Opinion

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email address can be found at
www.dsmz.de*Lysobacter enzymogenes* subsp. *enzymogenes* Christensen and Cook 1978, *L. enzymogenes* subsp. *cookii* Christensen 1978 and *Streptococcus casseliflavus* (Mundt and Graham 1968) Vaughan *et al.* 1978 should have been cited in the Approved Lists of Bacterial Names. Request for an OpinionB. J. Tindall¹ and J. P. Euzéby²¹DSMZ – Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH, Inhoffenstrasse 7b, D-38124 Braunschweig, Germany²Société de Bactériologie Systématique et Vétérinaire (SBSV) and École Nationale Vétérinaire de Toulouse (ENVT), 23 Chemin des Capelles, BP 87614, 31076 Toulouse Cedex 3, France

Lysobacter enzymogenes subsp. *enzymogenes* Christensen and Cook 1978, *L. enzymogenes* subsp. *cookii* Christensen 1978 and *Streptococcus casseliflavus* (Mundt and Graham 1968) Vaughan *et al.* 1978 were inadvertently omitted from the Approved Lists of Bacterial Names. According to Rule 24a, Note 1, the authors request that these names be considered as included in these Lists.

Rule 24a, Note 1 of the Bacteriological Code (1990 Revision) Lapage *et al.* (1992) states ‘names **validly published*** between 1 January 1978 and 1 January 1980 were included in the Approved Lists of Bacterial Names. No further names will be added to the Approved Lists. Those names **validly published** prior to 1 January 1980 but not included in the Approved Lists have no further **standing in nomenclature**.’

In 1978, Christensen and Cook (Christensen & Cook, 1978) proposed the genus *Lysobacter*, with *Lysobacter enzymogenes* as the type species. On 1 January 1980, the names *Lysobacter* Christensen and Cook 1978 and *L. enzymogenes* Christensen and Cook 1978 were included in the Approved Lists of Bacterial Names (Skerman *et al.*, 1980, 1989).

In the same paper, Christensen and Cook also proposed that *L. enzymogenes* be divided into the following subspecies: *L. enzymogenes* subsp. *enzymogenes* Christensen and Cook 1978 and *L. enzymogenes* subsp. *cookii* Christensen 1978. These names were published in the July 1978 issue of the *International Journal of Systematic Bacteriology* which would qualify them for inclusion in the Approved Lists of Bacterial Names (Skerman *et al.*, 1980, 1989). However, the names of these two subspecies were not cited either in the Approved Lists of Bacterial Names (Skerman *et al.*, 1980) or in the Approved Lists of Bacterial Names (Amended Edition) (Skerman *et al.*, 1989). Moore *et al.* (1985) included both

subspecies names in their lists covering names published between 1 January 1980 and 1 January 1985, implying that the names should be considered to be **validly published**.

Close examination of the paper by Christensen & Cook (1978) indicates that all tables consistently mention only the names *L. enzymogenes* and *L. enzymogenes* subsp. *cookii*, as do the abstract and introduction of the paper. However, in the description of the new taxa, the authors do not provide a description for *L. enzymogenes*, only descriptions for *L. enzymogenes* subsp. *enzymogenes* and *L. enzymogenes* subsp. *cookii*. Cross-checking of the written descriptions of the two subspecies and the data contained in the tables strongly suggests that the data listed under *L. enzymogenes* correspond to the written description of *L. enzymogenes* subsp. *enzymogenes*. Although, from a nomenclatural point of view, the creation of the subspecies *L. enzymogenes* subsp. *cookii* automatically creates the subspecies *L. enzymogenes* subsp. *enzymogenes* (within the species *L. enzymogenes*), the **circumscription** of the species *L. enzymogenes* must include the **circumscription** of both subspecies. It should also be noted that the type strain of the species *L. enzymogenes* is automatically the type strain of the subspecies *L. enzymogenes* subsp. *enzymogenes*. *L. enzymogenes* is the designated type species of the genus *Lysobacter*. In order to preserve nomenclatural stability, we suggest that the Judicial Commission adopt the following course of action.

*Technical terms used in the Bacteriological Code are marked in bold text.

Although the authors do not appear to have provided a separate **circumscription** of the species *L. enzymogenes*, the **circumscription** should be taken as being coincident with that provided for both the subspecies *L. enzymogenes* subsp. *enzymogenes* and *L. enzymogenes* subsp. *cookii*. The data in the tables under the names *L. enzymogenes* and *L. enzymogenes* subsp. *cookii* should be taken as applying to *L. enzymogenes*, while the data listed in all tables under *L. enzymogenes* should be taken as applying to *L. enzymogenes* subsp. *enzymogenes*. This ruling would solve the problems of providing appropriate **circumscriptions** of the species and the corresponding two subspecies, allowing all three names to be treated as being **validly published** and included on the Approved Lists. The alternative would be to deny this request, but this would call into question the **circumscription** of the species *L. enzymogenes*, which may be construed as specifically excluding one of its subspecies. In writing the chapter in the 1st and 2nd editions of *Bergey's Manual of Systematic Bacteriology*, Christensen (1989, 2005) does not refer to the subspecies *L. enzymogenes* subsp. *enzymogenes* or *L. enzymogenes* subsp. *cookii* and appears to have based the description of the species *L. enzymogenes* on the properties published for both subspecies by Christensen & Cook (1978).

This issue needs to be dealt with given the fact that a number of novel species within the genus *Lysobacter* have been described recently (Bae *et al.*, 2005; Lee *et al.*, 2006; Weon *et al.*, 2006). In particular, the DNA G+C contents of the two subspecies *L. enzymogenes* subsp. *enzymogenes* and *L. enzymogenes* subsp. *cookii* differ by 4 mol% (Christensen & Cook, 1978) and recent work indicates that DNA G+C content may be consistent with 16S rRNA groupings, implying that the taxonomic status of the subspecies *L. enzymogenes* subsp. *cookii* may also need to be re-evaluated in the context of more modern methodologies.

A similar problem arises with *Streptococcus casseliflavus*. In 1968, Mundt and Graham described '*Streptococcus faecium* var. *casseliflavus*' (Mundt & Graham, 1968). The abbreviation 'var.' was used for variety and, according to the Bacteriological Code (1975 Revision) (Lapage *et al.*, 1976) and to the Bacteriological Code (1990 Revision) (Lapage *et al.*, 1992), variety is a synonym of subspecies. Vaughan *et al.* (1979) specifically recognize this variety as a subspecies in their paper, at the same designating a type strain, a course of action explicitly mentioned in Rule 16 of the Bacteriological Code.

In examining the genetic relatedness among 25 yellow-pigmented strains of group D streptococci, Vaughan *et al.* (1979) showed that these strains were divided in two groups (I and II). The DNA of group II strains exhibited a high degree of binding with the DNA of the type strain of '*S. faecium* subsp. *casseliflavus*'. Three physiological traits were characteristic of group II organisms and Vaughan *et al.* (1979) proposed that the group II strains constituted a separate and distinct species. The strains placed in this species include the type strain of '*S. faecium* subsp. *casseliflavus*'. These authors proposed the name

Streptococcus casseliflavus (Mundt and Graham 1968) Vaughan *et al.* 1979 comb. nov. It should be noted that a formal description of this species is not given after the designation of the new combination, but this is mentioned briefly on page 209, by reference to Table 2, as well as the DNA–DNA hybridization data and by reference to a previous publication on the subspecies '*S. faecium* var. *casseliflavus*' (Mundt & Graham, 1968). Given the fact that the Approved Lists had not yet been published, it cannot be determined whether Vaughan *et al.* (1979) would have been aware that the name '*S. faecium* var. *casseliflavus*' would not be on those lists. However, given the clear reference to this subspecies and the authors of that name, one may consider that Vaughan *et al.* (1979) intended to revive a subspecies name as a species name, a course of action covered by Rule 33c of the Bacteriological Code.

The name *Streptococcus casseliflavus* was published in the July 1979 issue of the *International Journal of Systematic Bacteriology*, which would qualify it for inclusion in the Approved Lists of Bacterial Names. However, this name did not appear in the Approved Lists of Bacterial Names (Skerman *et al.*, 1980) or in the Approved Lists of Bacterial Names (Amended Edition) (Skerman *et al.*, 1989). Collins *et al.* (1984) make clear and unambiguous reference to the fact that the name *Streptococcus casseliflavus*, as proposed by Vaughan *et al.* (1979), was not included in the printed version of the Approved Lists, but they do not seem to have been aware that Rule 24a, Note 1 would allow this name to be considered as having appeared on the Approved Lists. Given the fact that a type strain had been designated for '*S. faecium* subsp. *casseliflavus*', which automatically becomes the type strain of the species *S. casseliflavus*, and that the properties of the novel species are included in the work of Vaughan *et al.* (1979) as well as by reference to a previous publication (Mundt & Graham, 1968), this name was **validly published** and should have been included on the Approved Lists. Moore *et al.* (1985) make clear reference to the name *Streptococcus casseliflavus* Vaughan *et al.* 1979 and to Rule 24a, Note 1, clearly indicating that they also considered the name to have been **validly published** and included on the Approved Lists. However, this name did not appear in the Approved Lists of Bacterial Names (Amended Edition) (Skerman *et al.*, 1989).

The omission from the Approved Lists of the names *L. enzymogenes* subsp. *enzymogenes*, *L. enzymogenes* subsp. *cookii* and *S. casseliflavus* is clearly not in accordance with Rule 24a, Note 1.

The Bacteriological Code (1990 Revision) Lapage *et al.* (1992) states that no further names will be added to the Approved Lists. However, the wording of Rule 24a, Note 1 is explicit in that it indicates that such names are to be treated as having been included in these Lists. According to Rule 23a Note 4, the Judicial Commission may correct the Approved Lists. Consequently, we request that the Judicial Commission rules that these names are treated as having been

included on the Approved Lists and on the amended edition of the Lists.

The correct citations of these names in the Approved Lists must be as follows:

- L. enzymogenes* subsp. *enzymogenes*** Christensen and Cook 1978
 Christensen, P. and F.D. Cook. 1978. International Journal of Systematic Bacteriology **28**:367–393. **Type strain:** ATCC 29487 = DSM 2043 = LMG 8762 = NCIMB 9924
Description: Christensen, P. and F.D. Cook. 1978. Ibid.
- L. enzymogenes* subsp. *cookii*** Christensen 1978
 Christensen, P. and F.D. Cook. 1978. International Journal of Systematic Bacteriology **28**:367–393. **Type strain:** ATCC 29488
Description: Christensen, P. and F.D. Cook. 1978. Ibid.
- S. casseliflavus*** (Mundt and Graham 1968) Vaughan, Riggsby and Mundt 1978
 Mundt, J.O. and W.F. Graham. 1968. Journal of Bacteriology **95**:2005–2009; Vaughan, D.H., W.S. Riggsby and J.O. Mundt. 1979. International Journal of Systematic Bacteriology **29**: 204–212. **Type strain:** ATCC 25788 = DSM 20680 = NCIMB 11449 = CCM 2478 = CCUG 18657 = LMG 10745 = CIP 103018
Description: Mundt, J.O. and W.F. Graham. 1968. Ibid.

If the Judicial Commission accepts our proposal, the **valid publication** of *S. casseliflavus* (Mundt and Graham 1968) Vaughan *et al.* 1978 will necessitate modifying the date and the authorship of the new combination *Enterococcus casseliflavus*, validly published in 1984 by Collins *et al.* (1984). The correct citation will be *Enterococcus casseliflavus* (Mundt and Graham 1968) Collins *et al.* 1984 comb. nov. and not *Enterococcus casseliflavus* (ex Vaughan *et al.* 1979) Collins *et al.* 1984 nom. rev., comb. nov.

In listing the collections which hold the nomenclatural types of these names, we have attempted to provide a comprehensive list. This is in contrast to the practice used in the Approved Lists where the ICSB and the various Subcommittees on Taxonomy decided to 'list only one designation for each strain and preferably that of the American Type Culture Collection, where available' (Skerman *et al.*, 1980). However, various problems have arisen in the intervening years and we believe it is prudent to document where the nomenclatural types are held as fully as possible.

References

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