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Lactobacillus jensenii sp.nov., a New Representative of the Subgenus *Thermobacterium*

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SUMMARY

Seven strains of homofermentative Lactobacillus newly isolated from human sources were found to possess all of the usual phenotypic characters of *Lactobacillus leichmannii*. However, a subsequent comparative study of the electrophoretic mobilities of their lactic dehydrogenases showed that these seven newly isolated strains were markedly different from collection strains of *L. leichmannii*. Determination of the mean DNA base composition of a representative sample of the new isolates (36·1 ± 1·2 moles % G+C) clearly indicates that they cannot be considered as *L. leichmannii* (50·8 ± 0·5 moles % G+C). The newly isolated strains have been assigned to a new species, *L. jensenii*.

EXPERIMENTAL AND DISCUSSION

Seven strains of homofermentative lactobacilli isolated from human sources (62F, 62G, 63A, 63AA, 63AN and 60E from vaginal discharge; 66A from a blood clot) were initially assigned to *Lactobacillus leichmannii* on the basis of a phenotypic comparison with the type strain ATCC 4797 (Hansen, 1968) and four other strains (ATCC 7830, ATCC 7831, NCDO LE 1, NCDO LE 7) classified as *L. leichmannii*. With respect to the properties examined, the two groups of strains were indistinguishable (Table 1) and fitted the description of *L. leichmannii* (Rogosa & Sharpe, 1959).

However, in the course of a subsequent comparative study of the lactic dehydrogenases of lactobacilli by gel electrophoresis, reported in an accompanying paper (Gasser, 1970), we observed that these two groups of strains had quite different lactic dehydrogenase patterns. Since most Lactobacillus species share a well-defined species-specific pattern of lactic dehydrogenases, the observed differences suggested that the new isolates might have been incorrectly assigned to *Lactobacillus leichmannii*.

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This was confirmed by determinations of the mean base composition of the DNA isolated from two authentic strains of *L. leichmannii* and four of the new isolates (Table 2). In the subgenus *Thermobacterium*, DNA base compositions have a markedly

Table 1. *Phenotypic characters of authentic strains of L. leichmannii and of newly isolated strains of L. jensenii (initially identified as Lactobacillus leichmannii)*

Table also includes the characters given by Rogosa & Sharpe (1959) for *L. leichmannii*, *L. acidophilus* and *L. jugurti*. For techniques of identification, see Rogosa, Franklin & Perry (1961) and Gasser (1964).

	L. leichmannii ATCC 4797, ATCC 7830, ATCC 7831, NCDO LE1, NCDO LE7	*L. jensenii* 62F, 62G, 63A, 63AA, 63AN, 66A, 60E	Data from Rogosa & Sharpe (1959)		
			L. leichmannii	*L. acidophilus*	*L. jugurti*
Growth at 15°	−	−	−	−	−
45°	+	+	+	+	+
Lactate isomer produced	D(−)	D(−)	D(−)	DL	DL
Arginine hydrolysis	+	+	±	−	−
Fermentation of:					
Galactose	−	−*	−	+	+
Lactose	+	−	±	+	+
Melibiose	−	−	−	±	−
Trehalose	+	+	+	+	±
Cellobiose	+	+	+	+	−
Saccharose	+	+	+	+	−
Maltose	+	+	+	+	±
Raffinose	−	−	−	±	−
Melezitose	−	−	−	−	−
Amygdalin	+	+	+	+	−
Esculin	+	+	+	+	−
Salicin	+	+	+	+	−
Mannitol	−	−	−	−	−
Sorbitol	−	−	−	−	−
Arabinose	−	−	−	−	−
Xylose	−	−	−	−	−
Nutritional requirements†					
Thiamine	−	−	−	−	−
Riboflavin	−	−	−	+	+
Pyridoxal	−	+	−	−	+
Folic acid	+	+	+	+	−
Vitamin B_{12}	±	−	±	±	−
Nicotinic acid	+	+	+	+	+
Ca pantothenate	+	+	+	+	+
Biotin	−	−	−	−	−
Para-amino benzoate	−	−	−	−	−

* Two strains fermented galactose slowly.

† + Indicates requirement; − indicates no exogenous requirement; ± indicates variable result, depending on strain.

bimodal distribution: *L. leichmannii*, *L. delbrueckii*, *L. lactis* and *L. bulgaricus* have DNA that contains about 50·5 moles % guanine+cytosine (G+C), whereas *L. acidophilus* and *L. jugurti* have DNA that contains about 36 to 39 moles % G+C (Gasser & Mandel, 1968). The average value for the new isolates examined (36·1 ± 1·2 moles %G+C) clearly puts them near the *L. acidophilus–L. jugurti* group with respect

to this character, even though they resemble *L. leichmannii* much more closely in phenotypic respects. Since they can be readily distinguished from both *L. acidophilus* and *L. jugurti* by virtue of such characters as the isomer of lactic acid produced, arginine hydrolysis and lactose-fermenting ability (Table 1) it seems appropriate to recognize them as a new species, for which we propose the name *L. jensenii*, in honour of S. Orla Jensen.

Table 2. *Guanine+cystosine contents of DNA isolated from authentic strains of Lactobacillus leichmannii* (*) *and from the newly isolated strains*

Base composition of DNA determined by ultracentrifugation in CsCl density gradient (Mandel, 1966).

Strain no.	Density (g./cm.^{3}) each analysis	Mean value and standard deviation	G+C (moles %) and standard deviation
ATCC 4797*	1·709 1·710	1·7098±0·0005	50·8±0·5
ATCC 7830*	1·710 1·710		
60E	1·696 1·697	1·6954±0·0012	36·1±1·2
66A	1·697 1·695		
62G	1·696 1·695		
63AN	1·693 1·693		
	1·697		

Lactobacillus jensenii sp.nov.

Description

Homofermentative, producing D(−) lactic acid.

Mean DNA base composition: 36·1 ± 1·2 moles % G+C.

Growth at 45° but not at 15°.

Arginine hydrolysed.

Cellobiose, sucrose, maltose amygdalin, esculin and salicin fermented; galactose, melibiose and raffinose fermented by a few strains; lactose, melezitose, mannitol, sorbitol, arabinose and xylose not fermented.

Folic acid, vitamin B_{12}, nicotinic acid and calcium pantothenate required for growth.

The type strain, 62G, has been deposited in the American Type Culture Collection as strain no. 25258 and in the Collection de l'Institut Pasteur, Paris, as strain no. 6917.

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