Antonie van Leeuwenhoek 54: 301–323 (1988)

Numerical taxonomy of psychrotrophic lactic acid bacteria from prepacked meat and meat products

ELISABETH BORCH[1] & GÖRAN MOLIN[2]*
[1] *Née Blickstad; Swedish Meat Research Institute, P.O. Box 504, S-244 00 Kävlinge, Sweden;*
[2] *Dept. of Applied Microbiology, Chemical Center, University of Lund, P.O. Box 124, S-221 00 Lund, Sweden; (* requests for offprints)*

Received: 11 August 1987; revised and accepted 5 February 1988

Key words: lactic acid bacteria, numerical taxonomy, meat and meat products

Abstract. Ninety-four strains of lactic acid bateria isolated from refrigerated, prepacked meat and meat products were together with 59 reference strains of *Brochothrix, Lactobacillus, Leuconostoc, Pediococcus* and *Streptococcus* phenotypically classfied, using 96 unit characters. Data were examined using Simple Matching (S_{SM}) or Jaccard coefficient (S_J), and unweighted pair group algorithm with arithmetic averages. Twenty-three clusters with two or more members were defined at the 84% S_{SM}-similarity level which corresponded to the S_J-similarity level of 61%. Based on S_{SM}, most field strains were included in nine clusters, and with three unsignificant exceptions these contained no reference strains. The field clusters were designated *Carnobacterium piscicola* (cluster 1; 5% of field isolates), *Carnobacterium divergens*(cluster 2; 9% of field isolates), *Leuconostoc* (cluster 9; 18% of field isolates) and *Lactobacillus* (cluster 4, 10, 11, 12, 13 and 14; together 60% of field isolates). The *Lactobacillus* clusters had many features in common with cluster II of Shaw & Harding (1984). Phenotypical characteristics of major clusters are given. The S_{SM} and S_J based classifications basically coincided for the field strains; the exception was cluster 4 which now were split in two parts. Fourteen clusters were made up of mainly reference strains (S_{SM}). Most of them included more than one type strain on species level; exceptions were *Brochothrix thermosphacta* (cluster 3), *Lactobacillus salivarius* (cluster 17) and *Leuconostoc mesenteroides* (cluster 18). Several rearrangements were seen amongst the clusters of the reference strains when S_J, instead of S_{SM}, was used for clustering.

Introduction

The microflora of refrigerated, prepacked meat and meat products are often dominated by lactic acid bacteria (Kitchell & Shaw 1975), the majority of which have not been identified to species level (Cavett 1963; Mol et al. 1971; Reuter 1975; Hitchener et al. 1982). However, in a numerical classification of lactic acid bacteria isolated from refrigerated vacuum packed meat and bacon, Shaw & Harding (1984) divided their isolates into two major *Lactobacillus* groups and one *Leuconostoc* group. In a subsequent study they concluded that one of their major clusters contained two taxa which they designated *Lactoba-*