Agmatine deiminase pathway genes in Lactobacillus brevis are linked to the tyrosine decarboxylation operon in a putative acid resistance locus

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Published in:
Microbiology-Sgm

DOI:
10.1099/mic.0.2007/006320-0

Publication date:
2007

Genes encoding an agmatine deiminase pathway in *Lactobacillus brevis* are located immediately downstream of the tyrosine decarboxylation operon in a locus proposed to be involved in acid resistance

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Microbiology (2007), **153**, 2221–2230

Table S1. Distribution of AgDI and TDC gene clusters in LAB

PCRs were carried out using genomic DNA of the indicated bacteria as template and three sets of primers matching the *tyrDC* gene (column TDC), the *aguA1* and *arcC* genes (column AgDI) and the *nhaC* and *ptcA* genes (column Link). Plus and minus symbols denote the presence and the absence of amplification products, respectively.

Species*	Strain†	Origin‡	AgDI	TDC	Link
Lb. brevis	ATCC 367	U	+	+	+
Lb. brevis	IOEB 7702	W	–	–	–
Lb. brevis	IOEB 8404	W	–	–	–
Lb. brevis	IOEB 8407	W	+	+	+
Lb. brevis	IOEB 8511	W	+	+	+
Lb. brevis	IOEB 8907	W	+	+	+
Lb. brevis	IOEB 9112	W	+	+	+
Lb. brevis	IOEB 9301	A	–	–	–
Lb. brevis	IOEB 9809	W	+	+	+
Lb. brevis	IOEB 9901	W	+	+	+
Lb. brevis	IOEB 9906	S	+	–	–
Lb. brevis	IOEB 9907	S	+	–	–
Lb. brevis	IOEB 9908	S	+	+	+
Lb. brevis	IOEB 9910	S	+	–	–
Lb. brevis	IOEB 9925	S	+	+	+
Lb. brevis	IOEB 0019	W	+	+	+
Lb. brevis	IOEB 0402	W	+	+	+
Lb. buchneri	LTH 2515	C	–	–	–
Lb. buchneri	LTH 1388	C	–	–	–
Lb. buchneri	DSMZ 5987	C	–	–	–
Lb. buchneri	ATCC 11305	B	–	–	–
Lb. casei	ATCC 334	C	–	–	–
Lb. casei	IOEB 8102	W	–	–	–
Lb. casei	IOEB 8606	W	–	–	–
Lb. casei	IOEB 9104	W	–	–	–
Lb. casei	IOEB 9105	W	–	–	–
Lb. casei	IOEB 9645	W	–	–	–
Lb. casei	IOEB 9914	S	+	+	+
Lb. casei	IOEB 9915	S	–	–	–
Lb. casei	IOEB 9916	S	–	–	–
Lb. casei	IOEB 9919	S	+	+	+
Lb. casei	IOEB 9920	S	–	–	–
Lb. collinoides	ATCC 27612	A	–	–	–
Lb. collinoides	IOEB 9206	A	–	–	–
Lb. collinoides	IOEB 9207	A	–	–	–
Lb. collinoides	IOEB 9208	A	–	–	–
Lb. collinoides	IOEB 9526	A	–	–	–

Lb. collinoides	IOEB 9527	A	–	–	–
Lb. collinoides	IOEB 9528	A	–	–	–
Lb. collinoides	IOEB 9529	A	–	–	–
Lb. collinoides	IOEB 0203	A	–	–	–
Lb. diolivorans	IOEB 0004	W	–	–	–
Lb. diolivorans	IOEB 0005	W	–	–	–
Lb. fermentum	ATCC 9338	U	–	–	–
Lb. fermentum	IOEB 9912	S	–	–	–
Lb. fructivorans	IOEB 865	W	–	–	–
Lb. fructivorans	IOEB 9107	W	+	+	+
Lb. fructivorans	IOEB 9305	W	–	–	–
Lb. fructivorans	IOEB 9501	W	–	–	–
Lb. hilgardii	ATCC 8290	W	–	–	–
Lb. hilgardii	IOEB 720	W	–	–	–
Lb. hilgardii	IOEB 7701	W	+	+	+
Lb. hilgardii	IOEB 7902	W	+	+	+
Lb. hilgardii	IOEB 7903	W	–	–	–
Lb. hilgardii	IOEB 8408	W	–	–	–
Lb. hilgardii	IOEB 8510	W	+	+	+
Lb. hilgardii	IOEB 9101	W	+	+	+
Lb. hilgardii	IOEB 9102	W	+	+	+
Lb. hilgardii	IOEB 9103	W	–	–	–
Lb. hilgardii	IOEB 9109	W	–	–	–
Lb. hilgardii	IOEB 9110	W	+	+	+
Lb. hilgardii	IOEB 9111	W	+	+	+
Lb. hilgardii	IOEB 9202	W	+	+	+
Lb. hilgardii	IOEB 9515	W	–	–	–
Lb. hilgardii	IOEB 9519	W	–	–	–
Lb. hilgardii	IOEB 9522	W	–	–	–
Lb. hilgardii	IOEB 9544	W	–	–	–
Lb. hilgardii	IOEB 9545	W	–	–	–
Lb. hilgardii	IOEB 9546	W	–	–	–
Lb. hilgardii	IOEB 9547	W	–	–	–
Lb. hilgardii	IOEB 9548	W	–	–	–
Lb. hilgardii	IOEB 9549	W	–	–	–
Lb. hilgardii	IOEB 9550	W	+	+	+
Lb. hilgardii	IOEB 9601	W	–	–	–
Lb. hilgardii	IOEB 9602	W	–	–	–
Lb. hilgardii	IOEB 9603	W	–	–	–
Lb. hilgardii	IOEB 9604	W	+	+	+
Lb. hilgardii	IOEB 9606	W	–	–	–
Lb. hilgardii	IOEB 9607	W	–	–	–
Lb. hilgardii	IOEB 9620	W	–	–	–
Lb. hilgardii	IOEB 9621	W	+	+	+
Lb. hilgardii	IOEB 9622	W	–	–	–
Lb. hilgardii	IOEB 9623	W	+	+	+
Lb. hilgardii	IOEB 9644	W	–	–	–
Lb. hilgardii	IOEB 9647	W	+	+	+
Lb. hilgardii	IOEB 9648	W	+	+	+
Lb. hilgardii	IOEB 9649	W	+	+	+
Lb. hilgardii	IOEB 0001	W	–	–	–
Lb. hilgardii	IOEB 0002	W	–	–	–
Lb. hilgardii	IOEB 0003	W	–	–	–
Lb. hilgardii	IOEB 0006	W	–	–	–
Lb. hilgardii	IOEB 0007	W	–	–	–
Lb. hilgardii	IOEB 0008	W	+	+	+
Lb. hilgardii	IOEB 0009	W	–	–	–
Lb. hilgardii	IOEB 0010	W	–	–	–

Lb. hilgardii	IOEB 0011	W	–	–	–
Lb. hilgardii	IOEB 0012	W	–	–	–
Lb. hilgardii	IOEB 0013	W	–	–	–
Lb. hilgardii	IOEB 0014	W	–	–	–
Lb. hilgardii	IOEB 0015	W	–	–	–
Lb. hilgardii	IOEB 0016	W	–	–	–
Lb. hilgardii	IOEB 0017	W	–	–	–
Lb. hilgardii	IOEB 0018	W	+	+	+
Lb. hilgardii	IOEB 0021	W	–	–	–
Lb. hilgardii	IOEB 0022	W	–	–	–
Lb. hilgardii	IOEB 0023	W	–	–	–
Lb. hilgardii	IOEB 0029	W	–	–	–
Lb. hilgardii	IOEB 0204	A	–	–	–
Lb. mali	ATCC 27304	W	–	–	–
Lb. mali	IOEB 0028	A	–	–	–
Lb. paracasei	IOEB 0020	W	–	–	–
Lb. plantarum	ATCC 8014	U	–	–	–
Lb. plantarum	IOEB 8402	W	–	–	–
Lb. plantarum	IOEB 8512	W	–	–	–
Lb. plantarum	IOEB 8603	W	–	–	–
Lb. plantarum	IOEB 8605	W	–	–	–
Lb. plantarum	IOEB 8904	W	–	–	–
Lb. plantarum	IOEB 9106	W	–	–	–
Lb. plantarum	IOEB 9113	W	–	–	–
Lb. plantarum	IOEB 9201	W	–	–	–
Lb. plantarum	IOEB 9532	W	–	–	–
Lb. plantarum	IOEB 9608	W	–	–	–
Lb. plantarum	IOEB 0401	W	–	–	–
Lb. sakei	LTH 2076	K	–	–	–
Lb. sakei	ATCC 15521	R	–	–	–
Lb. sanfranciscensis	ATCC 27651	C	+	+	+
Lactobacillus 30A	ATCC 33222	I	–	–	–
Lb. mesenteroides	ATCC 8293	O	–	–	–
Lb. mesenteroides	IOEB 8607	W	–	–	–
Lb. mesenteroides	IOEB 8902	W	–	–	–
Lb. mesenteroides	IOEB 9642	W	–	–	–
O. oeni	IOEB 8403	W	–	–	–
O. oeni	IOEB 8406	W	–	–	–
O. oeni	IOEB 8413	W	–	–	–
O. oeni	IOEB 8417	W	–	–	–
O. oeni	IOEB 8419	W	–	–	–
O. oeni	IOEB 8802	W	–	–	–
O. oeni	IOEB 8905	W	–	–	–
O. oeni	IOEB 8908	W	–	–	–
O. oeni	IOEB 9115	W	–	–	–
O. oeni	IOEB 9204	W	–	–	–
O. oeni	IOEB 9220	W	–	–	–
O. oeni	IOEB 9221	W	–	–	–
O. oeni	IOEB 9304	A	–	–	–
O. oeni	IOEB 9517	W	–	–	–
O. oeni	IOEB 9523	W	–	–	–
O. oeni	IOEB 9613	W	–	–	–
O. oeni	IOEB 9614	W	–	–	–
O. oeni	IOEB 9624	W	–	–	–
O. oeni	IOEB 9628	W	–	–	–
O. oeni	IOEB 9701	W	–	–	–

O. oeni	IOEB 9801	W	–	–	–
O. oeni	IOEB 9803	W	–	–	–
O. oeni	IOEB 9806	W	–	–	–
O. oeni	IOEB 9808	W	–	–	–
O. oeni	IOEB 0025	W	–	–	–
O. oeni	IOEB 0026	W	–	–	–
O. oeni	IOEB 0027	W	–	–	–
O. oeni	IOEB 0501	W	–	–	–
O. oeni	IOEB 0502	W	–	–	–
O. oeni	IOEB 0503	W	–	–	–
P. acidilactici	ATCC 8042	U	–	–	–
P. damnosus	ATCC 25248	B	–	–	–
P. damnosus	IOEB 0301	W	–	–	–
P. dextrinicus	ATCC 33087	H	–	–	–
P. parvulus	ATCC 19371	H	–	–	–
P. parvulus	IOEB 8415	W	–	–	–
P. parvulus	IOEB 8501	W	–	–	–
P. parvulus	IOEB 8508	W	–	–	–
P. parvulus	IOEB 8514	W	–	–	–
P. parvulus	IOEB 8515	W	–	–	–
P. parvulus	IOEB 8608	W	–	–	–
P. parvulus	IOEB 8801f	W	–	–	–
P. parvulus	IOEB 9114	W	+	+	+
P. parvulus	IOEB 9615	W	–	–	–
P. pentosaceus	ATCC 33316	B	–	–	–
P. pentosaceus	IOEB 7901	W	–	–	–
P. pentosaceus	IOEB 8906	W	–	–	–
P. pentosaceus	IOEB 9904	S	–	–	–
T. muriaticus	LMG 18498	F	–	–	–

**Lb.*, *Lactobacillus*; *Ln.*, *Leuconostoc*; *O.*, *Oenococcus*; *P.*, *Pediococcus*; *T.*, *Tetragenococcus*.

†ATCC, American Type Culture Collection; DSMZ, Deutsche Sammlung von Mikroorganismen und Zelkulturen; IOEB, Faculty of Oenology, University Victor Segalen Bordeaux 2; LMG, Belgian Coordinate Cultures of Micro-organisms; LTH, Institut für Lebensmitteletechnologie, Universität Hohenheim.

‡Origins of the bacteria: A, apple juice or cider; B, beer; C, cheese; F, squid liver sauce; H, silage; I, intestinal tract; K, sauerkraut; O, olive; R, fermented rice; S, sugar cane; U, undetermined; W, wine, grape berries or grape juice.