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(54) **LACTIC ACID UTILISING BACTERIA AND THEIR THERAPEUTIC USE**

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(57) **ABSTRACT**

There is provided a method of isolating novel lactic acid utilizing bacteria from human faeces, as well as novel strains so obtained. The use of the novel lactic acid utilizing bacteria in therapy, including prophylactic therapy, is described and is of particular relevance for lactic-acidosis, short bowel syndrome and inflammatory bowel disorders such as Crohn's disease and ulcerative colitis. A probiotic comprising the live lactic acid utilizing bacteria is also described.

1 **Figure 1**

2  
 3 Sequence information for five of the lactate utilising  
 4 strains.

5  
 6 **S D6 1L/1**

7 GATGAACGCTGGCGCGTGCCTAACACTGCAAGTCGAACGAAGCACCTTACCTGATTCTTCGGATGAA  
 8 GGTCTGGTGACTGAGTGGCGGACGGGTGAGTAACCGGTGGGTAACCTGCCCTGTACAGGGGGATAACA  
 9 GTTGGAAACGGCTGCTAATACCGCATAAGCGCACGAGAGGACATCCTCTGTGTGAAAACTCCGGTG  
 10 GTACAGGATGGGCCCGCTCTGATTAGCTGGTTGGCAGGGTAACGGCCTACCAAGGCGACGATCAGTA  
 11 GCCGGTCTGAGAGGATGAACGGCCACATTGGAACCTGAGACACGGTCCAACCTCATACGGGAGGCAGCAG  
 12 TGGGGAAATATTGCACAATGGGGAAACCCCTGATGCAGCAACGCCGCTGAGTGAAGAAGTATTTCCGGT  
 13 ATGTAAGACTCTATCAGCAGGGAAGATAATGACGGTACCTGACTAAGAAGCTCCGGCTAAATACGTGC  
 14 CAGCAGCCGCGTAATACGTATGGAGCAAGCGTTATCCGGATTTACTGGGTGTAAGGGTGCCTAGGT  
 15 GGCAGTGAAGTCAGATGTGAAAGCCGGGGCTCAACCCCGGAGCTGCATTTGAACTGCATAGCTAG  
 16 AGTACAGGAGAGGCAGGGCGAATTCCTAGTGTAGCGGTGAAATGCGTAGATATTAGGAGGAACACCAG  
 17 TGGCGAAGGCGCCTGCTGACTGTTACTGACACTGAGGCACGAAAGCGTGGGGAGCAAACAGGATTA  
 18 GATACCTGGTAGTCCACGCCGTAAACGATGAATACTAGGTGTCCGGGCGCTATAGGCTTCCGGTGCCG  
 19 TCGCAAACGCAGTAAGTATTCACCTGGG  
 20 GAGTACGTTTCGAAGAATGAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGAGCATG  
 21 TGGTTAATTCGAAGCAACCGGAAGAACCTTACCAGGTCTTGACATCCTTCTGACCACTCCGTA  
 22 ATGGGAGTCTTCCCTTCGGGACAGAAGAGACAGGTGGTGCATGGTTGTCGTGAGCTCGTGTCTG  
 23 AGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTATCTTCAGTAGCCAGCAGGTAAGGCTG  
 24 GGCACCTCGGAGAGACTGCCAGGGATAACCTGGAGGAAGGTGGGGACGACGTCAAATCATCATG  
 25 CCCCTTATGATCTGGGCGACACACGTGCTACAATGGCGGTCACAAAGTGAGGCGAACCTGCGAG  
 26 GGGGAGCAAACCAAAAAGGCCGCTCCAGTTCGGACTGTAGTCTGCAACCCGACTACACGAAG  
 27 CTGGAATCGCTAGTAATCGGAATCAGAATGTGCGGTGAATACGTTCCCGGGTCTTGTACACA  
 28 CCGCCGTCACACCATGGGAGTCGGAATGCCCGAAGCCAGTGACCCAACCATATGGAGGGAGC  
 29 TGTGGAAGGTGGAGCCGGTAACTGGGGTG

30  
 31 **SM 6/1**

32 GATGAACGCTGGCGCGTGCCTAACACATGCAAGTCGAACGAAGCACCTTACGAGATTCTTCGGATGA  
 33 TCGTTTGGTGACTGAGTGGCGGACGGGTGAGTAACCGGTGGGTAACCTGCCCTGTACAGGGGGATAAC  
 34 AGCTGGAACCGCTGCTAATACCGCATAAGCGCACGAGGAGACATCTCCTAGTGTGAAAACTCCGGT  
 35 GGTACAGGATGGGCCCGCTCTGATTAGCTGGTTGGCAGGGTAACGGCCTACCAAGGCAACGATCAGT  
 36 AGCCGGTCTGAGAGGATGAACGGCCACATTGGAACCTGAGACACGGTCCAACCTCCTACGGGAGGCAGC  
 37 AGTGGGGAAATATTGCACAATGGGGAAACCCCTGATGCAGCAACGCCGCTGAGTGAAGAAGTATTTCCG  
 38 GTATGTAAGACTCTATCAGCAGGGAAGATAATGACGGTACCTGACTAAGAAGCTCCGGCTAAATACGT

1 GCCAGCAGCCGCGTAATAGATATGGAGCAAGCGTTATCCGGATTTACTGGGTGTAAAGGGTGCCTAG  
 2 GTGGCAGTGCAGTCAAGTCAAGTGTGAAAGGCCGGGGCTCAACCCCGAGCTGCATTTGAAACTGCWYRGCT  
 3 AGAGTACAGGAGAGGCAGGCGGAATTCCTAGTGTAGCGGTGAAATGCGTAGATATTAGGAGAACACC  
 4 AGTGGCGAAGGCGGCTGCTGGACTGTTACTGACACTGAGGCACGAAAGCGTGGGGAGCAAACAGGAT  
 5 TAGATACCCTGGTAGTCCACGCCGTAACGATGAATACTAGGTGTTCGGGGCCGTATAGGCTCCGGTGC  
 6 CGCCGCTAACGCAGTAAGTATTCCACCTGGGGAGTACGTTCCGCAAGAATGAAACTCAAAGGAATTGAC  
 7 GGGGACCCGCACAAGCGGTGGAGCATGTGGTTTAATTGCAAGCAACGCGAAGAACCCTTACCAGGTCTT  
 8 GACATCCTTCTGACCGCACCTTAATCGGTGCTTTCCTTCGGGACAGAAGAGACAGGTGGTGCATGGTT  
 9 GTCGTGAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTATCTTCAGTAGC  
 10 CAGCAGGTAAGGCTGGGCACTCTGGAGAGACTGCCAGGGATAACCTGGAGGAAGGTGGGGACGACGTC  
 11 AAATCATCATGCCCTTATGATCTGGGCGACACCGTCTACAATGGCGGTCAAGAGTGGGGCAAC  
 12 CCGCGAGGGGAGCAAACCAAAAAGGCCGTCAGTnCGGACTGTAGTCTGCAACCCGACTACACA  
 13 GAAGCTGGAATCGCTAGTAATCGCGAATCAGAATGTCGCGGTGAATACGTTCCCGGGTCTTGTACACA  
 14 CCGCCGTCACACCATGGGAGTCGGAATGCCCGAAGCCAGTGACCCAACCTTATGAAGGAAGCCnG  
 15 TCCAAGGTTGAACCCGTTAACTGGGGnnTT

16  
 17 **Seq 3/4**

18 GAGTTTGATCCTGGCTCAGGATGAACGCTGGCGGCTGCCTAACACATGCAAGTCGAACGAGGT  
 19 ATATTGAATTGAAGTTTTCGGATGGATTTCAATGATACCGAGTGCGGGACGGGTGAGTAACCGCTGGG  
 20 TAACCTGCCTCATAAGGGGATAACCGTTAGAAATGACTGCTAATACCGCATAAGCGCACA  
 21 GTACCGCATGGTACGGTGTGAAAAATCCGGTGGTATGAGATGGACCCCGCTCTGATTAGCTAG  
 22 TTGGTGGGTTAACGGCCCAAGGCGACGATCAGTAGCCGACTGAGAGGGTGACCGGCCACA  
 23 TTGGGACTGAGACACGGCCAGACTCCTACGGGAGGCAGCAGTGGGGATATTGCACAATGGAG  
 24 GAAACTCTGATGACGCGACGCCGCGTGAAGAGTATTTTCGGTATGTAAAGCTCTATCAGC  
 25 AGGGAAGAAAATGACGGTACCTGACTAAGAAGCCCGGCTAACTACGTGCCAGCAGCCGCGGTA  
 26 ATACGTAGGGGGCAAGCGTTATCCGGATTTACTGGGTGTAAAGGGAGCGTAGACGGCGACGCAA  
 27 GTCTGAAGTGAAATACCCGGCTCAACCTGGGAACGCTTTGGAACTGTGTTGCTAGAGTGCT  
 28 GGAGAGGTAAGCGAATTCCTAGTGTAGCGGTGAAATGCGTAGATATTAGGAAGAACACCAGTG  
 29 CGAAGGCGCTTACTGGACAGTAACGACTGAGGCTCGAAAGCGTGGGGAGCAAACAGGAT  
 30 TAGATACCCTGGTAGTCCACGCCGTAACGATGAATACTAGGTGTTGGTGAGCAAAGCTCATCG  
 31 GTGCCCGCAAACGCAATAAGTATTCACCTGGGGAGTACGTTCCGCAAGAATGAAACTCAAAG  
 32 GAATTGACGGGGACCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAAGAAC  
 33 CTTACCAAATCTGACATCCCTCTGAAAARYCCYTTAATCGGRFTCCTCCTTCGGGACAGAGGT  
 34 GACAGGTGGTGCATGGTTGTCGTGAGTCTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAG  
 35 CGCAACCCCTATGTCAGTAGCCAGCAGGTGAAGCTGGGCACTCTGATGAGACTGCCAGGGATA  
 36 ACCTGGAGGAAGGTGGGGATGACGTCAAATCATCATGCCCTTATGATTTGGGCTACACACGTC  
 37 CTACAATGGCGTAAACAAAGAGAAGCGAGCCTGCGAGGGGGAGCAAATCTCAAAAATAACGTCT  
 38 CAGTTCGGATTTGAGTCTGCAACTCGACTACATGAAGCTGGAATCGCTAGTAATCGCAGATCAG

1 AATGCTGCGGTGAATACGTTCCCGGGTCTTGTACACACCGCCCGTCACACCATGGGAGTCGGAA  
2 ATGCCCGAAGCCAGTGAACCCAATGCGAAAGCAGGGAGCTGTCGAAGGCAGGTCTGATAACTGGGGTG  
3  
4 **Ss2/1 and Ssc/2**  
5 AGAGTTTGATCCTGGCTCAGGATGAACGCTGGCGGCGTGCTTAACACATGCAAGTCGAACGAAA  
6 CACCTTATTTGATTTTCTTCGGAAGTGAAGATTTGGTGATTGAGTGGCGGACGGGTGAGTAACG  
7 CGTGGGTAACCTGCCCTGTACAGGGGGATAACAGTCAGAAATGACTGCTAATACCGCATAAGAC  
8 CACAGCACCGCATGGTGCAGGGGTAAAACTCCGGTGGTACAGGATGGACCCCGCTCTGATTAG  
9 CTGGTTGGTGAGGTAACGGCTCACCAAGGCGACGATCAGTAGCCGGCTTGAGAGAGTGAACGGC  
10 CACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAGGCAGCAGTGGGGAATATTGCACAAT  
11 GGGGAAACCCTGATGCAGCGACGCCCGCTGAGTGAAGAAGTATCTCGGTATGTAAAGCTCTAT  
12 CAGCAGGGAAGAAAATGACGGTACCTGACTAAGAAGCCCCGGCTAACTACGTGCCAGCAGCCGC  
13 GGTAAATACGTAGGGGGCAAGCGTTATCCGGAATTACTGGGTGTAAAGGGTCCGTAGGTGGTATG  
14 GCAAGTCAGAAGTGAAAACCCAGGGCTTAACTCTGGGACTGCTTTTGAAGTGTGACTGGAG  
15 TGCAAGGAGAGGTAAGCGGAATTCCTAGTGTAGCCGGTGAATGCGGTAGATATTAGGAGGAACATC  
16 AGTGGCGAAGGCGGCTTACTGGACTGAACTGACACTGAGGCACGAAAGCGTGGGGAGCAAACA  
17 GGATTAGATACCCCTGGTAGTCCACGCCGTAAACGATGAATACTAGGTGTCGGGGCCGTAGAGGC  
18 TTCGGTGCCGCAGCCAACGCAGTAAGTATTCACCTGGGGAGTACGTTCCGAAGAATGAAC TCA  
19 AAGGAATTGACGGGGACCCGCACAAGCGGTGGAGCATGTGGFTTAATTCGAAGCAACGCGAAGA  
20 ACCTTACCTGGTCTTGACATCCTTCGACCGGTCCTTAACCGACCTTTCCTTCGGGACAGGAG  
21 TGACAGGTGGTGCATGGTTGTGTCAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGA  
22 GCGCAACCCCTATCTTTAGTAGCCAGCATATAAGGTGGGCACTCTAGAGAGACTGCCAGGGATA  
23 ACCTGGAGGAAGGTGGGGACGACGTCAAATCATCATGCCCTTATGACCAGGGCTACACACGTG  
24 CTACAATGGCGTAAACAGAGGGAAGCAGCCTCGTGAGAGTGAGCAAATCCAAAAATAACGTCT  
25 CAGTTCGGATTGTAGTCTGCAACTCGACTACATGAAGCTGGAATCGCTAGTAATCGCGAATCAG  
26 AATGTCGCGGTGAATACGTTCCCGGGTCTTGTACACACCGCCCGTCACACCATGGGAGTCAGTA  
27 ACGCCCCAAGTCAGTGACCCAACCGTAAGGAGGAGCTGCCGAAGCGGGACCGATAACTGGGGTG  
28 AAGTCGTAACCAGGTAGCCGT

29  
30 W = A or T  
31 Y = T or C  
32 R = G or A  
33 N = Unknown

34

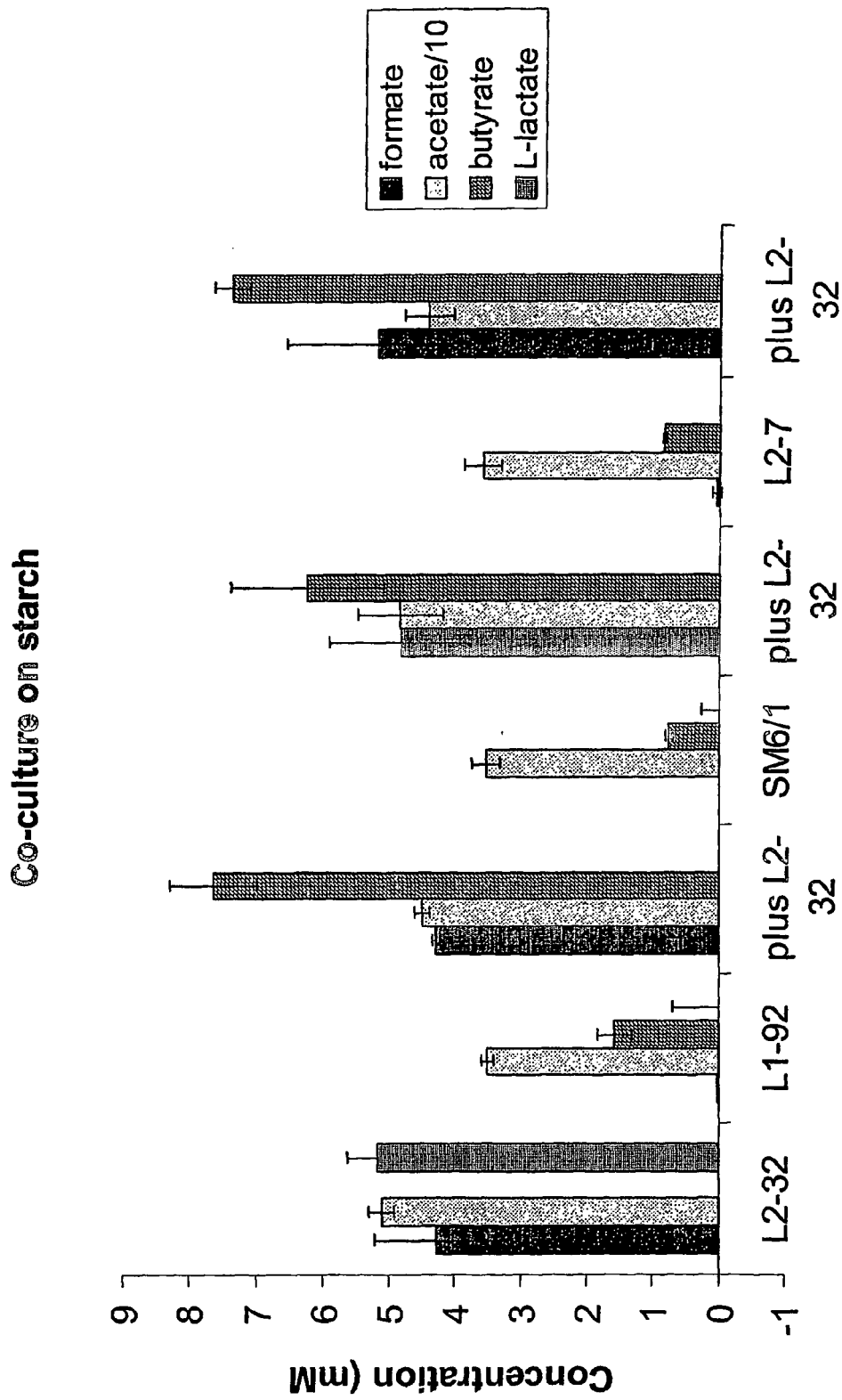


Fig. 2

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