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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 GGTCTGGTGACTGAGTGGCGGACGGGTGAGTAACGCGTGGGTAACTGCCCTGTACAGGGGGATAACA
9 GTTGGAAACGGCTGCTAATACCGCATAAGCGCACGAGAGGACATCCTCTGTGTGAAAACTCCGGTG
10 GTACAGGATGGGCCCGCTCTGATTAGCTGGTTGGCAGGGTAACGGCCTACCAAGGCGACGATCAGTA
11 GCCGGTCTGAGAGGATGAACGGCCACATTGGAACCTGAGACACGGTCCAACCTCATACGGGAGGCAGCAG
12 TGGGGAAATATTGCACAATGGGGAAACCCCTGATGCAGCAACGCCGCTGAGTGAAGAAGTATTTCCGGT
13 ATGTAAGACTCTATCAGCAGGGAAGATAATGACGGTACCTGACTAAGAAGCTCCGGCTAAATACGTGC
14 CAGCAGCCGCGTAATACGTATGGAGCAAGCGTTATCCGGATTACTGGGTGTAAGGGTGCCTAGGT
15 GGCAGTGAAGTCAAGTCAAGTGTGAAAGCCGGGGCTCAACCCCGGAGCTGCATTTGAACTGCATAGCTAG
16 AGTACAGGAGAGGCAGGGCGAATTCCTAGTGTAGCGGTGAAATGCGTAGATATTAGGAGGAACACCAG
17 TGGCGAAGGCGCCTGCTGACTGTTACTGACACTGAGGCACGAAAGCGTGGGGAGCAAACAGGATTA
18 GATACCTGGTAGTCCACGCCGTAACGATGAATACTAGGTGTCCGGGCGCTATAGGCTTCCGGTGCCG
19 TCGCAAACGCAGTAAGTATTCACCTGGG
20 GAGTACGTTTCGCAAGAATGAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGAGCATG
21 TGGTTTAATTGGAAGCAACCGGAAGAACCTTACCAGGTCTTGACATCCTTCTGACCACTCCGTA
22 ATGGGAGTCTTCCCTTCGGGACAGAAGAGACAGGTGGTGCATGGTTGTCGTGAGCTCGTGTCTGTG
23 AGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTATCTTCAGTAGCCAGCAGGTAAGGCTG
24 GGCACCTCTGGAGAGACTGCCAGGGATAACCTGGAGGAAGGTGGGGACGACGTCAAATCATCATG
25 CCCCTTATGATCTGGGCGACACACGTGCTACAATGGCGGTCACAAAGTGAGGCGAACCTGCGAG
26 GGGGAGCAAACCAAAAAGGCCGTCAGTTCGGACTGTAGTCTGCAACCCGACTACACGAAG
27 CTGGAATCGCTAGTAATCGGAATCAGAATGTGCGGTGAATACGTTCCCGGGTCTTGTACACA
28 CCGCCGTCACACCATGGGAGTCGGAATGCCCGAAGCCAGTGACCAACCATATGGAGGGAGC
29 TGTGCAAGGTGGAGCCGGTAACTGGGGTG

30
31 **SM 6/1**

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

1 GCCAGCAGCCGCGTAATAGATATGGAGCAAGCGTTATCCGGATTTACTGGGTGTAAAGGGTGCCTAG
 2 GTGGCAGTGCAGTCAAGTCAAGTGTGAAAGGCCGGGGCTCAACCCCGAGCTGCATTTGAAACTGCWYRGCT
 3 AGAGTACAGGAGAGGCAGGCGGAATTCCTAGTGTAGCGGTGAAATGCGTAGATATTAGGAGAACACC
 4 AGTGGCGAAGGCGGCTGCTGGACTGTTACTGACACTGAGGCACGAAAGCGTGGGGAGCAAACAGGAT
 5 TAGATACCCTGGTAGTCCACGCCGTAACAGATGAATACTAGGTGTTCGGGGCCGTATAGGCTCCGGTGC
 6 CGCCGCTAACGCAGTAAGTATTCCACCTGGGGAGTACGTTCCGCAAGAATGAAACTCAAAGGAATTGAC
 7 GGGGACCCGCACAAGCGGTGGAGCATGTGGTTTAATTGCAAGCAACGCGAAGAACCTTACCAGGTCTT
 8 GACATCCTTCTGACCGCACCTTAATCGGTGCTTTCCTTCGGGACAGAAGAGACAGGTGGTGCATGGTT
 9 GTCGTGAGCTCGTGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCCTATCTTCAGTAGC
 10 CAGCAGGTAAGGCTGGGCACTCTGGAGAGACTGCCAGGGATAACCTGGAGGAAGGTGGGGACGACGTC
 11 AAATCATCATGCCCTTATGATCTGGGCGACACCGTGTACAATGGCGGTCAAGAGTGGGGCAAC
 12 CCGCGAGGGGAGCAAACCAAAAAGGCCGTCCAGTnCGGACTGTAGTCTGCAACCCGACTACACA
 13 GAAGCTGGAATCGCTAGTAATCGCGAATCAGAATGTCGCGGTGAATACGTTCCCGGGTCTTGTACACA
 14 CCGCCGTCACACCATGGGAGTCGGAATGCCCGAAGCCAGTGACCCAACCTTATGAAGGAAGCCnG
 15 TCCAAGGTTGAACCCGTTAACTGGGGnnTT

16
 17 **Seq 3/4**

18 GAGTTTGATCCTGGCTCAGGATGAACGCTGGCGGCGTGCCTAACACATGCAAGTCGAACGAGGT
 19 ATATTGAATTGAAGTTTTCGGATGGATTTCAATGATACCGAGTGGCGGACGGGTGAGTAACCGCTGGG
 20 TAACCTGCCTCATAAGGGGATAACCGTTAGAAATGACTGCTAATACCGCATAAGCGCACA
 21 GTACCGCATGGTACGGTGTGAAAAATCCGGTGGTATGAGATGGACCCCGCTCTGATTAGCTAG
 22 TTGGTGGGGTAACGGCCCAAGGCGACGATCAGTAGCCGACCTGAGAGGGTGACCGGCCACA
 23 TTGGGACTGAGACACGGCCAGACTCCTACGGGAGGCAGCAGTGGGGATATTGCACAATGGAG
 24 GAAACTCTGATGCAGCGACGCCGCGTGAAGAGTATTTTCGGTATGTAAAGCTCTATCAGC
 25 AGGGAAGAAAATGACGGTACCTGACTAAGAAGCCCGGCTAACTACGTGCCAGCAGCCGCGGTA
 26 ATACGTAGGGGGCAAGCGTTATCCGGATTTACTGGGTGTAAAGGGAGCGTAGACGGCGACGCAA
 27 GTCTGAAGTGAAATACCCGGCTCAACCTGGGAACGCTTTGGAACTGTGTTGCTAGAGTGCT
 28 GGAGAGGTAAGCGGAATTCCTAGTGTAGCGGTGAAATGCGTAGATATTAGGAAGAACACCAGTG
 29 CGAAGGCGCTTACTGGACAGTAACGACGTTGAGGCTCGAAAGCGTGGGGAGCAAACAGGAT
 30 TAGATACCCTGGTAGTCCACGCCGTAACAGATGAATACTAGGTGTTGGTGAGCAAAGCTCATCG
 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 CTGGTTGGTGAGGTAACGGCTCACCAAGGCACGATCAGTAGCCGGCTTGAGAGAGTGAACGGC
 10 CACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAGGCAGCAGTGGGGAATATTGCACAAT
 11 GGGGAAACCCTGATGCAGCGACGCCCGCTGAGTGAAGAAGTATCTCGGTATGTAAAGCTCTAT
 12 CAGCAGGGAAGAAAATGACGGTACCTGACTAAGAAGCCCCGGCTAACTACGTGCCAGCAGCCGC
 13 GGTAAATACGTAGGGGGCAAGCGTTATCCGGAATTACTGGGTGTAAAGGGTCCGTAGGTGGTATG
 14 GCAAGTCAGAAGTGAAAACCCAGGGCTTAACTCTGGGACTGCTTTTGAAGTGTGACTGGAG
 15 TGCAAGGAGAGGTAAGCGGAATTCCTAGTGTAGCCGGTGAATGCGGTAGATATTAGGAGGAACATC
 16 AGTGGCGAAGGCGGCTTACTGGACTGAAACTGACACTGAGGCACGAAAGCGTGGGGAGCAAACA
 17 GGATTAGATACCCCTGGTAGTCCACGCCGTAAACGATGAATACTAGGTGTGGGGCCGTAGAGGC
 18 TTCGGTGCCGCAGCCAACGCAGTAAGTATTCACCTGGGGAGTACGTTCCGAAGAATGAAC TCA
 19 AAGGAATTGACGGGGACCCGCACAAGCGGTGGAGCATGTGGFTTAATTCCAAGCAACGCGAAGA
 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

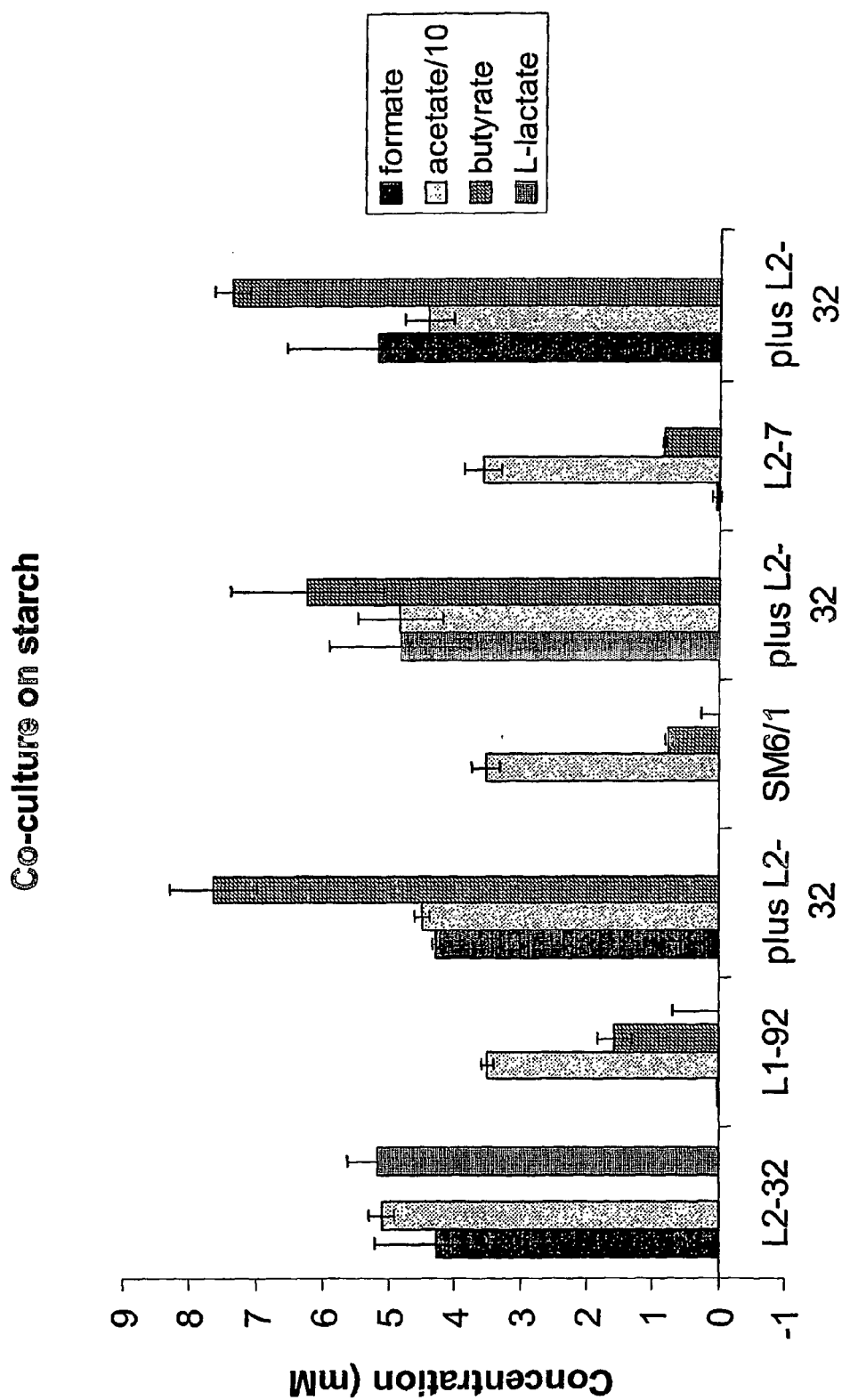


Fig. 2

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