

APPENDICES

Appendix 1: LAB isolates' 16S rRNA gene sequences occurred in NCBI Genbank.

MT163337: *Lactiplantibacillus plantarum* strain BE3

GTGCAATGCGGCGTGCTATACATGCAGTCGTACGAGGCTGCCATTGATTG
GTGCTTGCATCATGAGTTACATTTGAGTGAGTGGCGAACTGGTGAGTGAC
ACGTGGGAAACCTGCCAGAAGCGGGGATAACACCTGGAAACAGATGC
TAATACCGCATAACAACCTTGGACCGCATGGTCCGAGTTTGAAAGATGGCT
TCGGCTATCACTTTTGGATGGTCCC GCGGCGTATTAGCTAGATGGTGGGGT
AACGGCTCACCATGGCAATGATACGTAGCCGACCTGAGAGGGTAATCGGC
CACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAGGCAGCAGTAGG
GAATCTTCCACAATGGACGAAAGTCTGATGGAGCAACGCCGCGTGAGTGA
AGAAGGGTTTCGGCTCGTAAAACCTCTGTTGTTAAAGAAGAACATATCTGA
GAGTAACTGTTT CAGGTATTGACGGTATTTAACCAGAAAGCCACGGCTAAC
TACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATT
TATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGAAAGC
CTTCGGCTCAACCGAAGAAGTGCATCGGAAACTGGGAAACTTGAGTGCAG
AAGAGGACAGTGGAACCTCCATGTGTAGCGGTGAAATGCGTAGATATATGG
AAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCTGACGCTGAGG
CTCGAAAGTATGGGTAGCAAACAGGATTAGATACCCTGGTAGTCCATAACC
GTAAACGATGAATGCTAAGTGTGGAGGGTTTCCGCCCTTCAGTGTCTGCAG
CTAACGCATTAAGCATTCCGCCTGGGGAGTACGGCCGCAAGGCTGAAACT
CAAAGGAATTGACGGGGGCCCCGCACAAGCGGTGGAGCATGTGGTTTAATT
CGAAGCTACGCGAAGAACCTTACCAGGTCTTGACATACTATGCAAATCTA
AGAGATTAGACGTTCCCTTCGGGGACATGGATACAGGTGGTGCATGGTTG
TCGTCAGCTCGTGTCTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAA
CCCTTATTATCAGTTGCCAGCATTAAAGTTGGGGACTCTGGGTGAGACTGCC
GGGGACAAACCGGAGGAAAGGTGGGGAGAAGCTCAAATCTCCTGGCCCC
TATGAACCGG

MT163338: *Lactiplantibacillus plantarum* strain BE7

TGCAAGTCGAACGAACTCTGGTATTGATTGGTGCTTGCATCATGATTTACA
TTTGAGTGAGTGGCGAACTGGTGAGTAACACGTGGGAAACCTGCCAGAA
GCGGGGATAACACCTGCGAAACAGATGCTAATACCGCATAACAACCTTGG
ACCGCATGGTCCGAGTTTGAAAGATGGCTTCGGCTATCACTTTTGGATGGT
CCCGCGGCGTATTAGCTAGATGGTGGGGTAACGGCTCACCATGGCAATGA
TACGTAGCCGACCTGAGAGGGTAATCGGCCACATTGGGACTGAGACACGG
CCCAAACCTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGACGAA
AGTCTGATGGAGCAACGCCGCGTGAGTGAAGAAGGGTTTCGGCTCGTAAA
ACTCTGTTGTTAAAGAAGAACATATCTGAGAGTAACTGTTT CAGGTATTGAC
GGTATTTAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAA
TACGTATGTGGCCAGCGTTGTCCCGATTTGTTGGGCCCC

MT163339: *Lactiplantibacillus plantarum* strain BE16

TACGGCCAGTACGCATGTACACATCATTGCAAGTTCGTACAAGCTTCAAG
CGACGTTGATTGGTGCTTGCATCATGATTTACATTTGAGTGAGTGGCGAAC
TGGTGAGTAACACGTGGGAAACCTGCCCAGAAGCGGGGGATAACACCTG
GAAACAGATGCTAATACCGCATAACAACCTTGGACCGCATGGTCCGAGTTT
GAAAGATGGCTTCGGCTATCACTTTTGGATGGTCCCGCGGCGTATTAGCTA
GATGGTGGGGTAACGGCTCACCATGGCAATGATACGTAGCCGACCTGAGA
GGGTAATCGGCCACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAG
GCAGCAGTAGGGAATCTTCCACAATGGACGAAAGTCTGATGGAGCAACGC
CGCGTGAGTGAAGAAGGGTTTCGGCTCGTAAAACTCTGTTGTTAAAGAAG
AACATATCTGAGAGTAACTGTTTCAGGTATTGACGGTATTTAACCAGAAAG
CCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCG
TTGTCCGGATTTATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAAGTCTG
ATGTGAAAGCCTTCGGCTCAACCGAAGAAGTGCATCGGAAACTGGGAAAC
TTGAGTGCAGAAGAGGACAGTGGAACCTCCATGTGTAGCGGTGAAATGCGT
AGATATATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAAC
GACGCTGAGGCTCGAAAGTATGGGTAGCAAACAGGATTAGATACCCTGGT
AGTCCATACCGTAGACGATGAATGCTAAGTGTGGAGGGTTCCCGCCCTTC
AGTGCTGCAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGGCCGCAA
GGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCAT
GTGGTTTAATTTCGAAGCTACGCGAAGAACCTTACCAGGTCTTGACATACTA
TGCAAATCTAAGAGATTAGACGTTCCCTTCGGGGACATGGATACAGGTGG
TGCATGGTTGTTCGTACGCTCCTGTCCTGAGATGTTGGGTAAAGTCCCGCAA
CCAGCGCAACCCTTATATTAGTTGCAGCATTAAATTGGGCCCTCTGGTGGGA
AATGCCGGGGACAAACCCAGAAAGAAGGGGG

MT163340: *Lactiplantibacillus plantarum* strain BO1

AGATGGCGGCGTGCTATACATGCAGTCGAACGAACTGCTGGTATTGATTG
GTGCTTGCATCATGATTTACATTTGAGTGAGTGGCGAACTGGTGAGTAACA
CGTGGGAAACCTGCCCAGAAGCGGGGGATAACACCTGGAACAGATGCT
AATACCGCATAACAACCTTGGACCGCATGGTCCGAGTTTGAAAGATGGCTT
CGGCTATCACTTTTGGATGGTCCCGCGGCGTATTAGCTAGATGGTGGGGTA
ACGGCTCACCATGGCAATGATACGTAGCCGACCTGAGAGGGTAATCGGCC
ACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAGGCAGCAGTAGG
GAATCTTCCACAATGGACGAAAGTCTGATGGAGCAACGCCGCGTGAGTGA
AGAAGGGTTTCGGCTCGTAAAACTCTGTTGTTAAAGAAGAACATATCTGA
GAGTAACTGTTTCAGGTATTGACGGTATTTAACCAGAAAGCCACGGCTAAC
TACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATT
TATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAAGTCTGATGTGAAAGC
CTTCGGCTCAACCGAAGAAGTGCATCGGAAACTGGGAAACTTGAGTGCAG
AAGAGGACAGTGGAACCTCCATGTGTAGCGGTGAAATGCGTAGATATATGG
AAGAACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCTGACGCTGAGG
CTCGAAAGTATGGGTAGCAAACAGGATTAGATACCCTGGTAGTCCATACC
GTAAACGATGAATGCTAAGTGTGGAGGGTTTCCGCCCTTCAGTGCTGCAG
CTAACGCATTAAGCATTCCGCCTGGGGAGTACGGCCGCAAGGCTGAAACT
CAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATT

CGAAGCTACGCGAAGAACCTTACCAGGTCTTGACATACTATGCAAATCTA
AGAGATTAGACGTTCCCTTCGGGGACATGGATACAGGTGGTGCATGGTTG
TCGTCAGCTCGTGTCTGAGATGTTGGGTAAAGTCCCGCAACGAGCGCAA
CCCTTATTATCAGTTGCCAGCATTAAAGTTGGGCACTCTGGTGAGACTGCCG
GTGACAAACCGGAGGAAAGGGGGGGATGACGTCAAATCTCCTGGCCCCTT
TTGACCGGGGGTAAACCCGGGTAAATGGGAGGGGCAACCAAATTGT

MT163358: *Lactiplantibacillus plantarum* strain BO8

CTCCTGGTATTGATTGGTGCTTGCATCATGATTTACATTTGAGTGAGTGGC
GAACTGGTGAGTAACACGTGGGAAACCTGCCAGAAGCGGGGGATAACA
CCTGGAAACAGATGCTAATACCGCATAACAACCTTGGACCGCATGGTCCGA
GTTTGAAAGATGGCTTCGGCTATCACTTTTGGATGGTCCCGCGGCGTATTA
GCTAGATGGTGGGGTAACGGCTCACCATGGCAATGATACGTAGCCGACCT
GAGAGGGTAATCGGCCACATTGGGACTGAGACACGGCCAAACTCCTACG
GGAGGCAGCAGTAGGGAATCTTCCACAATGGACGAAAGTCTGATGGAGC
AACGCCGCGTGAGTGAAGAAGGGTTTCGGCTCGTAAACTCTGTTGTAA
AGAAGAACATATCTGAGAGTAACTGTTTCAGGTATTGACGGTATTTAACCA
GAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGC
AAGCGTTGTCCGGATTTATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAA
GTCTGATGTGAAAGCCTTCGGCTCAACCGAAGAAGTGCATCGGAAACTGG
GAAACTTGAGTGCAGAAGAGGACAGTGGAACCTCATGTGTAGCGGTGAAA
TGCGTAGATATATGGAAGAACACCAAGTGGCGAAGGCGGCTGTCTGGTCTG
TAACTGACGCTGAGGCTCGAAAGTATGGGTAGCAAACAGGATTAGATACC
CTGGTAGTCCATAACCGTAAACGATGAATGCT

MT163341: *Lactiplantibacillus plantarum* strain BO10

TCGTGACCGGTTAGAAAATACATGCAGTCGTAACAGGTAACCATTGCTTGT
TGCTTGATAATGATTTCAATTTGACTGAGTGGCGGACTGGTGAGTCACACG
TGGGACACCTGCCAGAAGCGGGCGACAACACCTGGAAACAGATGCTAAT
ACCGCGTAACCACTTGGACCGCATGGTCCGAGTTTGAAAGATGGCTTCGG
CTATCACTTTTGGATGGTCCCGCGGCGTATTAGCTAGATGGTGGGGTAACG
GCTCACCATGGCAATGATACGTAGCCGACCTGAGAGGGTAATCGGCCACA
TTGGGACTGAGACACGGCCAAACTCATAACGGGAGGCAGCAGTAGGGAA
TCTTCCACAATGGACGAAAGTCTGATGGAGCAACGCCGCGTGAGTGAAGA
AGGGTTTCGGCTCGTAAACTCTGTTGTTAAAGAAGAACATATCTGAGAG
TAACTGTTTCAGGTATTGACGGTATTTAACAGAAAGCCACGGCTAACTAC
GTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATTTAT
TGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGAAAGCCTT
CGGCTCAACCGAAGAAGTGCATCGGAAACTGGGAAACTTGAGTGCAGAA
GAGGACAGTGGAACTCCATGTGTAGCGGTGAAATGCGTAGATATATGGAA
GAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCTGACGCTGAGGCT
CGAAAGTATGGGTAGCAAACAGGATTAGATACCCTGGTAGTCCATAACCGT
AAACGATGAATGCTAAGTGTGGAGGGTTTCCGCCCTTCAGTGCTGCAGCT
AACGCATTAAGCATTCCGCCTGGGGAGTACGGCCGCAAGGCTGAAACTCA
AAGGAATTGACGGGGGCCCCGCACAAGCGGTGGAGCATGTGGTTTTAATTCC

AAGCTACGCGAAGAACCTTACCAGGTCTTGACATACTATGCAAATCTAAG
AGATTAGACGTTCCCTTCGGGGACATGGATACAGGTGGTGCATGGTTGTC
GTCAGCTCGTGTCGTGAGATGTTGGGTAAAGTCCCGCAACGAGCGCAACC
CTTATTATCAGTTGCCAGCATTAAGTTGGGCACTCTGGTGAGACTGCCGGT
GACAAACCGGAGGAAGGGGGGGATGACGTCAAATCATCATGCCCTTATG
ACCTGGGCTAACACCGTGCTAAAAGGGATGGTACAACGAATTGGGAAACC
CGCGAAAATAAACTAATTTCTTAAAACCCTTTTCCCTTTTCGAATTTGGGG
GGCACCCCCCCC

MT163342: *Lactiplantibacillus plantarum* strain BO16

GTGGAGTACGGCGTGCATATACATGCAAGTCGTACGACGTCATGCGCTAT
TGATTGGTGCTTGCATCATGATTTACATTTGAGTGAGTGGCGAACTGGTGA
GTAACACGTGGGAAACCTGCCAGAAGCGGGGGATAACACCTGGAAACA
GATGCTAATACCGCATAACAACCTGGACCGCATGGTCCGAGTTTGAAAGA
TGGCTTCGGCTATCACTTTTGGATGGTCCCGCGGCGTATTAGCTAGATGGT
GGGGTAACGGCTCACCATGGCAATGATACGTAGCCGACCTGAGAGGGTAA
TCGGCCACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAGGCAGCA
GTAGGGAATCTTCCACAATGGACGAAAGTCTGATGGAGCAACGCCGCGTG
AGTGAAGAAGGGTTTCGGCTCGTAAAACCTCTGTTGTTAAAGAAGAACATA
TCTGAGAGTAACTGTTCAAGGTATTGACGGTATTAAACCAGAAAGCCACGG
CTAACTACGTGCCAGCAGCCGCGTAATACGTAGGTGGCAAGCGTTGTCC
GGATTTATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGA
AAGCCTTCGGCTCAACCGAAGAAGTGCATCGGAAACTGGGAAACTTGAGT
GCAGAAGAGGACAGTGGAACTCCATGTGTAGCGGTGAAATGCGTAGATAT
ATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCTGACGCT
GAGGCTCGAAAGTATGGGTAGCAAACAGGATTAGATACCCTGGTAGTCCA
TACCGTAGACGATGAATGCTAAGTGTGGAGGGTTCCGCCCTTCAGTGCT
GCAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGGCCGCAAGGCTGA
AACTCAAAGGAATTGACGGGGGCCCGCACAAAGCGGTGGAGCATGTGGTTT
AATTCGAAGCTACGCGAAGAACCTTACCAGGTCTTGACATACTATGCAA
TCTAAGAGATTAGACGTTCCCTTCGGGGACATGGATACAGGTGGTGCATG
GTTGTCGTACGCTCGTGCTCTGAGATGTTGGGTAAAGTCCCGCAACGAGCG
CAACCCTTATTATCAGTTGCCAGCATTAAGTTGGGCCCTGGTGAAACTGC
CGTGA

MT163343: *Lacticaseibacillus paracasei* strain BUM5

GGATTACGTTTCATGCGTATGCATGCAAGTCGTACCAGTGTGACGCGCATGAT
GATCGGTGCTTGCACCGAGATTCAACAGGGGAACGAGTGGCGGACGGGG
GAGGAACACGTGGGTAACCTGCCCTTAAGTGGGGGATAACATTTGGAAAC
AGATGCTAATACCGCATAGATCCAAGAACCGCATGGTTCTTGGCTGAAAG
ATGGCGTAAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTAGTTGG
TGAGGTAATGGCTCACCAAGGCGATGATACGTAGCCGAACTGAGAGGTTG
ATCGGCCACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAGGCAGC
AGTAGGGAATCTTCCACAATGGACGCAAGTCTGATGGAGCAACGCCGCGT
GAGTGAAGAAGGCTTTCGGGTCGTAAAACCTCTGTTGTTGGAGAAGAATGG

TCGGCAGAGTAACTGTTGTCGGCGTGACGGTATCCAACCAGAAAGCCACG
GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTATC
CGGATTTATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTG
AAAGCCCTCGGCTTAACCGAGGAAGCGCATCGGAAACTGGGAAACTTGAG
TGCAGAAGAGGACAGTGGA ACTCCATGTGTAGCGGTGAAATGCGTAGATA
TATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTA ACTGACGC
TGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATAACCCTGGTAGTCC
ATGCCGTAAACGATGAATGCTAGGTGTTGGAGGGTTTCCGCTCTTCAGTGC
CGCAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGACCGCAAGGTTG
AAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTT
TAATTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATCTTTTGATCA
CCTGAGAGATCAGGTTTCCCCTTCGGGGGCAAAATGACAGGTGGTGCATG
GTTGTCGTCAGCTCGTGTCTGTGAGATGTTGGGTTAAGTCCC GCAACGAGCG
CAACCCTTATGACTAGTTGCCAGCATTTAGTTGGGCACTCTAGTAAGACTG
CCGGTGACAAACCGGAGAAAGGTGGGGATGACGTCAAATCATCATGCCCC
TTATGACCGGGGCTACCCCGTGCTAAAAGGGGATGGGACAACCAATTTG
CGAAACCCCGAAGTTCAAGCTAATTTCTTTA

MT163344: *Lacticaseibacillus paracasei* strain BUM6

TGCTGAGCGCATGCGTATACATGCAGTCGTAACAGGTACCACAATGATCG
GTGCTTGCACCGAGATTCAACATGGAACGAGTGGCGGACGGGTGAGTAAC
ACGTGGGTAACTGCCCTTAAGTGGGGGATAACATTTGGAAACAGATGCT
AATACCGCATAGATCCAAGAACCGCATGGTTCTTGGCTGAAAGATGGCGT
AAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTAGTTGGTGAGGTA
ATGGCTCACCAAGGCGATGATACGTAGCCGAACTGAGAGGTTGATCGGCC
ACATTGGGACTGAGACACGGCCCAA ACTCCTACGGGAGGCAGCAGTAGG
GAATCTTCCACAATGGACGCAAGTCTGATGGAGCAACGCCGCGTGAGTGA
AGAAGGCTTTCGGGTCGTAAA ACTCTGTTGTTGGAGAAGAATGGTCGGCA
GAGTAACTGTTGTCGGCGTGACGGTATCCAACCAGAAAGCCACGGCTAAC
TACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTATCCGGATT
TATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGAAAGC
CCTCGGCTTAACCGAGGAAGCGCATCGGAAACTGGGAAACTTGAGTGCAG
AAGAGGACAGTGGA ACTCCATGTGTAGCGGTGAAATGCGTAGATATATGG
AAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTA ACTGACGCTGAGG
CTCGAAAGCATGGGTAGCGAACAGGATTAGATAACCCTGGTAGTCCATGCC
GTAAACGATGAATGCTAGGTGTTGGAGGGTTTCCGCTCCTTCAGTGCCGCA
GCTAACGCATTAAGCATTCCGCCTGGGGAGTACGACCGCAAGGTTGCAAC
TCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAAT
TCTAAAGCAACGCGCAGAACCTTACCAGGTCCTGACATCTTTTGATCATCT
GAGAGATCCGGATTTCCCCTTCGGGGGCAAAATGTACAGGTGGTGCATGG
GTGTCGTCAGCTCCTGTCCTGAAAATGTTGGGTTAAGTCCC GCAACGAGCG
CACCCCTTATGACTAGTTGCCAGCCTTTAATGTGGGGCCCTCTAGAAGA ACT
GCCGGTGAACAAACCGCAGGAAGGTGGGGATAACCCAAATTTCTGCCCT
TTTTAACTGGGGTCCACCATTTCCATTGGAGGGAAACAATTTCCG

MT163345: *Lacticaseibacillus paracasei* strain BUM7

TACGACACTCCGCGCCTCTTGATACTGCAAGTCGTAACAGTGTCAACGAA
GGATGATCGGTGCTTGCACCGAGATTCAACAGGGGAACGAGTGGCGGACG
GGTGAGTAACACGTGGGTAACCTGCCCTTAAGTGGGGGATAACATTTGGA
AACAGATGCTAATACCGCATAGATCCAAGAACCGCATGGTTCTTGGCTGA
AAGATGGCGTAAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTAGT
TGGTGAGGTAATGGCTACCAAGGCGATGATACGTAGCCGAACCTGAGAGG
TTGATCGGCCACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAGGC
AGCAGTAGGGAATCTTCCACAATGGACGCAAGTCTGATGGAGCAACGCCG
CGTGAGTGAAGAAGGCTTTCGGGTCGTAAACTCTGTTGTTGGAGAAGAA
TGGTCGGCAGAGTAACTGTTGTCGGCGTGACGGTATCCAACCAGAAAGCC
ACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTT
ATCCGGATTTATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGAT
GTGAAAGCCCTCGGCTTAACCGAGGAAGCGCATCGGAAACTGGGAAACTT
GAGTGCAGAAGAGGACAGTGGAACTCCATGTGTAGCGGTGAAATGCGTAG
ATATATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCTGA
CGCTGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAG
TCCATGCCGTAAACGATGAATGCTAGGTGTTGGAGGGTTTCCGCTCTTCAG
TGCCGCAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGACCGCAAGG
TTGAAACTCAAAGGAATTGACGGGGGCCCCGACAAAGCGGTGGAGCATGTG
GTTTAATTTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATCTTTTGA
TCACCTGAGAGATCAGGTTTCCCCTTCGGGGGCAAATGACAGGTGGTGC
ATGGTTGTTCGTACGCTCGTGTCTGAGATGTTGGGTAAAGTCCCAGCAACGA
GCGCAACCCTTATGACTAGTTGCCAGCATTAGTTGGGCACTCTAGTAAGA
CTGCCGGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAATCATCATGC
CCCTTATGACCTGGGGCTAACCCCGGGCTACAATGGGATGGTCACCGAGT
TGCGAGACCGCGAGGTTCAAGCTAATCTCTT

MT163346: *Lacticaseibacillus paracasei* strain BUM12

TGCAGGCGTCATGCGTATACATGCAAGTCGTAACGAGTGTGCATACGCGAC
TGATGATCGGTGCTTGCACCGAGATTCAACATGGGAACGAGTGGCGGACG
GGTGAGTAACACGTGGGTAACCTGCCCTTAAGTGGGGGATAACATTTGGA
AACAGATGCTAATACCGCATAGATCCAAGAACCGCATGGTTCTTGGCTGA
AAGATGGCGTAAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTAGT
TGGTGAGGTAATGGCTACCAAGGCGATGATACGTAGCCGAACCTGAGAGG
TTGATCGGCCACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAGGC
AGCAGTAGGGAATCTTCCACAATGGACGCAAGTCTGATGGAGCAACGCCG
CGTGAGTGAAGAAGGCTTTCGGGTCGTAAACTCTGTTGTTGGAGAAGAA
TGGTCGGCAGAGTAACTGTTGTCGGCGTGACGGTATCCAACCAGAAAGCC
ACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTT
ATCCGGATTTATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGAT
GTGAAAGCCCTCGGCTTAACCGAGGAAGCGCATCGGAAACTGGGAAACTT
GAGTGCAGAAGAGGACAGTGGAACTCCATGTGTAGCGGTGAAATGCGTAG
ATATATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCTGA
CGCTGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAG
TCCATGCCGTAAACGATGAATGCTAGGTGTTGGAGGGTTTCCGCTCTTCAG

TGCCGCAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGACCGCAAGG
TTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTG
GTTTAATTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATCTTTTGA
TCACCTGAGAGATCAGGTTTCCCCTTCGGGGGCAAAATGACAGGTGGTGC
ATGGTTGTCGTCAGCTCGTGTCTGAGATGTTGGGTAAAGTCCCAGCAACGA
GCGCAACCCTTATGACTAGTTGCCAGCATTTAGTTGGGCACTCTAGTAAGA
CTGCCGGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAATCATCATGC
CCCTTATGACCTGGGCTACCACGTGCTACAAGGGATGG

MT163347: *Lacticaseibacillus paracasei* strain BUM14

TGTACATGGCCGCCTGCCCTATACTTGCAAGTCGTACGAAGTGTCTCCGCT
GTGAAGGATCGGTGCTTGCACCGAGATTCAACATGGAACGAGTGGCGGAC
GGGTGAGTAACACGTGGGTAACCTGCCCTTAAGTGGGGGATAACATTTGG
AAACAGATGCTAATAACGCATAGATCCAAGAACCGCATGGTTCTTGGCTG
AAAGATGGCGTAAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTA
GTTGGTGAGGTAATGGCTCACCAAGGCGATGATACGTAGCCGAACCTGAGA
GGTTGATCGGCCACATTGGGACTGAGACACGGCCAAACTCCTACGGGAG
GCAGCAGTAGGGAATCTTCCACAATGGACGCAAGTCTGATGGAGCAACGC
CGCGTGAGTGAAGAAGGCTTTCGGGTCGTAAAACCTCTGTTGTTGGAGAAG
AATGGTCGGCAGAGTAACCTGTTGTCGGCGTGACGGTATCCAACCAGAAAG
CCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCG
TTATCCGGATTTATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTG
ATGTGAAAGCCCTCGGCTTAACCGAGGAAGCGCATCGGAAACTGGGAAAC
TTGAGTGCAGAAGAGGACAGTGGAACTCCATGTGTAGCGGTGAAATGCGT
AGATATATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCT
GACGCTGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGT
AGTCCATGCCGTAAACGATGAATGCTAGGTGTTTGGAAAGGGTTTCCGCCCT
TCAGTGCCGCAGCTAACGCATTAAGCATTCCGCCTGGGGGAGTACGACCG
CAAGGTTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAG
CATGTGGTTTAATTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGACAT
CTTTTGATCACCTGAGAGATCAGGTTTCCCCTTCGGGGGCAAAATGACAG
GTGGTGCATGGTTGTCTTCAGCTCTTGTCTGAGATGTTGGGTAAATTCCC
GCAACGAGCGCCACCCCTTATGACTAATTTGCCGCCATTTTTATTGGGCC
CTCCTTTTAAAAAATCCCGGTAAAAACCCGGGGGAAAGGGGGGGGGGAA
AGGGAAACAAACATTCCCCCTTTTACGTGGGCTTCCCCTTGGTTTATGGG
TGGTAAAAAATTTGAAAACACCGGGGGGCCTTCTTTAATAATTTTTTT
T

MT163359: *Lacticaseibacillus paracasei* strain BUM15

TAACACGTGGGTAACCTGCCCTTAAGTGGGGGATAACATTTGGAAACAGA
TGCTAATAACGCATAGATCCAAGAACCGCATGGTTCTTGGCTGAAAGATG
GCGTAAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTAGTTGGTGA
GGTAATGGCTCACCAAGGCGATGATACGTAGCCGAACCTGAGAGGTTGATC
GGCCACATTGGGACTGAGACACGGCCAAACTCCTACGGGAGGCAGCAGT
AGGGAATCTTCCACAATGGACGCAAGTCTGATGGAGCAACGCCGCGTGAG

TGAAGAAGGCTTTCGGGTCGTAAAACCTCTGTTGTTGGAGAAGAATGGTCCG
GCAGAGTAACTGTTGTCGGCGTGACGGTATCCAACCAGAAAGCCACGGCT
AACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTATCCGG
ATTTATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGAAA
GCCCTCGGCTTAACCGAGGAAGCGCATCGGAAACTGGGAAACTTGAGTGC
AGAAGAGGACAGTGGAACCTCCATGTGTAGCGGTGAAATGCGTAGATATAT
GGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCTGACGCTGA
GGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTCCATG
CCGTAAACGATGAATGCTAGGTGTTGGAG

MT163348: *Lacticaseibacillus paracasei* strain BUM18

GCTTACCGACATCCTATGATGCAGTCGTACCAGTGTCAACCATGATGATCG
GTGCTTGCACCGAGATTCAACATGGGAACGAGTGGCGGACGGGTGAGTAA
CACGTGGGTAACCTGCCCTTAAGTGGGGGATAACATTTGGAAACAGATGC
TAATACCGCATAGATCCAAGAACCGCATGGTTCTTGGCTGAAAGATGGCG
TAAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTAGTTGGTGAGGT
AATGGCTCACCAAGGCGATGATACGTAGCCGAACTGAGAGGTTGATCGGC
CACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAGGCAGCAGTAGG
GAATCTTCCACAATGGACGCAAGTCTGATGGAGCAACGCCGCGTGAGTGA
AGAAGGCTTTCGGGTCGTAAAACCTCTGTTGTTGGAGAAGAATGGTCCGCA
GAGTAACTGTTGTCGGCGTGACGGTATCCAACCAGAAAGCCACGGCTAAC
TACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTATCCGGATT
TATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGAAAGC
CCTCGGCTTAACCGAGGAAGCGCATCGGAAACTGGGAAACTTGAGTGCAG
AAGAGGACAGTGGAACCTCCATGTGTAGCGGTGAAATGCGTAGATATATGG
AAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCTGACGCTGAGG
CTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTCCATGCC
GTAAACGATGAATGCTAGGTGTTGGAGGGTTTCCGCTCTTCAGTGCCGCAG
CTAACGCATTAAGCATTCCGCCTGGGGAGTACGACCGCAAGGTTGAAACT
CAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATT
CGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATCTTTTGATCACCTG
AGAGATCAGGTTTCCCCTTCGGGGGCAAATGACAGGTGGTGCATGGTTG
TCGTCAGCTCGTGTTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAA
CCCTTATGACTAGTTGCCAGCATTAGTTGGGCACTCTAGTAAGACTGCCG
GTGACAAACCGGAAGAAAGGTGGGGAATGACGTCAAATCATCCTGCCCC
TTATGAACTGGGGCTAACCCCGGCTACAAAGGGAGGGGTAAAACAAATT
GCCAAAACCGCCAG

MT163360: *Lacticaseibacillus paracasei* strain BUM22

CAAGTCGTACGAGTGTACATACGCTTGATGATCGGTGCTTGCACCGAGATTC
AACATGGGAACGAGTGGCGGACGGGTGAGTAACACGTGGGTAACCTGCC
CTTAAGTGGGGGATAACATTTGGAAACAGATGCTAATACCGCATAGATCC
AAGAACCGCATGGTTCTTGGCTGAAAGATGGCGTAAGCTATCGCTTTTGG
ATGGACCCGCGGCGTATTAGCTAGTTGGTGAGGTAATGGCTACCAAGGC
GATGATACGTAGCCGAACTGAGAGGTTGATCGGCCACATTGGGACTGAGA

CACGGCCCAAACCTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGG
ACGCAAGTCTGATGGAGCAACGCCGCGTGAGTGAAGAAGGCTTTCGGGTC
GTAAAACCTCTGTTGTTGGAGAAGAATGGTCGGCAGAGTAACTGTTGTCCG
CGTGACGGTATCCAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCG
CGGTAATACGTAGGTGGCAAGCGTTATCCGGATTTATTGGGCGTAAAGCG
AGCGCAGGCGGTTTTTTAAGTCTGATGTGAAAGCCCTCGGCTTAACCGAG
GAAGCGCATCGGAAACTGGGAAACTTGAGTGCAGAAGAGGACAGTGGAA
CTCCATGTGGAGTAGCGGTGAAATGCGTAGATATATGGAAGAACACCAGT
GGCGAAGGCGGTGGCTGGTCTGTAACCTGACGCTGAGGCTCGAAAGCATGG
GTAGCGAACAGGATTAGATACCCTGGTAGTCCATGCCGTAAACGATGAAT
GCTAGGTGTTGGA

MT163349: *Lacticaseibacillus paracasei* strain BUM23

GGGCTTACGGCGAGCCTATACATGCAAGTCGTACGAGTGTCATCGCATGA
TGATCGGTGCTTGCACCGAGATTCAACATGGGAACGAGTGGCGGACGGGT
GAGTAACACGTGGGTAACCTGCCCTTAAGTGGGGGATAACATTTGGAAAC
AGATGCTAATAACCGCATAGATCCAAGAACCGCATGGTTCTTGGCTGAAAG
ATGGCGTAAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTAGTTGG
TGAGGTAATGGCTCACCAAGGCGATGATACGTAGCCGAACTGAGAGGTTG
ATCGGCCACATTGGGACTGAGACACGGCCCAAACCTCCTACGGGAGGCAGC
AGTAGGGAATCTTCCACAATGGACGCAAGTCTGATGGAGCAACGCCGCGT
GAGTGAAGAAGGCTTTCGGGTCGTAAAACCTCTGTTGTTGGAGAAGAATGG
TCGGCAGAGTAACTGTTGTCGGGCGTGACGGTATCCAACCAGAAAGCCACG
GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTATC
CGGATTTATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTG
AAAGCCCTCGGCTTAACCGAGGAAGCGCATCGGAAACTGGGAAACTTGAG
TGCAGAAGAGGACAGTGGAACTCCATGTGTAGCGGTGAAATGCGTAGATA
TATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCTGACGC
TGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTCC
ATGCCGTAAACGATGAATGCTAGGTGTTGGAGGGTTTCCGCTCTTCAGTGC
CGCAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGACCGCAAGGTTG
AAACTCAAAGGAATTGACGGGGGCCCCGCACAAGCGGTGGAGCATGTGGTT
TAATTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATCTTTTGATCA
CCTGAGAGATCAGGTTTCCCCTTCGGGGGCAAAATGACAGGTGGTGCATG
GTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTAAAGTCCCGCAACGAGCG
CAACCCTTATGACTAGTTGCCAGCATTAGTTGGGCACTCTAGTAAGAATG
GCCGGTGACAAACCGGAGGAAAGGGGGGGAAGAAAGTCAAATCATCTTG
GCCCTTTTGAACCGGGGTTACCCCCGGGCTCCAATGGGAGGGGAAACC
ACGATTTCCGAAAA

MT163350: *Lacticaseibacillus paracasei* strain BUM24

TGAAGGTCGTCGTGCCTTATTACTTGCAAGTTCGTACGAGTGTC AACGAAG
GATGATCGGTGCTTGAACCGAGATTCAACATGGAACGAGTGGCGGACGGG
TGAGTAACACGTGGGTAACCTGCCCTTAAGTGGGGGATAACATTTGGAAA
CAGATGCTAATAACCGCATAGATCCAAGAACCGCATGGTTCTTGGCTGAAA

GATGGCGTAAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTAGTTG
GTGAGGTAATGGCTCACCAAGGCGATGATACGTAGCCGAAGTGGAGGTT
GATCGGCCACATTGGGACTGAGACACGGCCAACTCCTACGGGAGGCAG
CAGTAGGGAATCTTCCACAATGGACGCAAGTCTGATGGAGCAACGCCGCG
TGAGTGAAGAAGGCTTTCGGGTCGTAAAACCTCTGTTGTTGGAGAAGAATG
GTCGGCAGAGTAACTGTTGTCGGCGTGACGGTATCCAACCAGAAAGCCAC
GGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTAT
CCGATTTATTGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGT
GAAAGCCCTCGGCTTAACCGAGGAAGCGCATCGGAAACTGGGAAACTTGA
GTGCAGAAGAGGACAGTGGAACTCCATGTGTAGCGGTGAAATGCGTAGAT
ATATGGAAGAACACCAAGTGGCGAAGGCGGCTGTCTGGTCTGTAACCTGACG
CTGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTC
CATGCCGTAAACGATGAATGCTAGGTGTTGGAGGGTTTCCGCTCTTCAGTG
CCGCAGCTAACGCATTAAGCATTCCGCCTGGGGAGTACGACCGCAAGGTT
GAAACTCAAAGGAATTGACGGGGGCCCGCACAAAGCGGTGGAGCATGTGG
TTAATTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATCTTTGAT
CACCTGAGAGATCAGGTTTCCCCTTCGGGGGCAAATGACAGGTGGTGCA
TGGTTGTCGTCAGCTCGTGTGTCGTGAGATGTTGGGTAAAGTCCCGCAACGAG
CGCAACCCTTATGACTAGTTGCCAGCATTTAGTTGGGCACTCTAGTAAGAA
TGCCGGTGAACAACCGGAGGA

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ISLAMIC SCIENCE UNIVERSITY OF MALAYSIA

Appendix 2: LAB isolates' ITS gene sequences occurred in NCBI Genbank.

MT212063: *Lactiplantibacillus plantarum* strain BE3

CATGAGAGTTTGTAAACACCCAAAGTCGGTGGGGTAAACCTTTTAGGAACCA
GCCGCCTAAGGTGGGACAGATGATTAGGGTGAAGTCGTAACAAGGTAGCC
GTAGGAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAATATTACGGAA
ACCTACACACGCGTCGAAACTTTGTTTAGTTTTGAGAGATTTAACTCTCAA
AACTTGTTCTTTGAAAAGTAGATAATATCAAATATATTTTTTCATAATGAA
ACCGAGAACACCGCGTTTTTTGAGTTTTTTATTGAAGTTTAATTATCGCTA
AACTCATTAATCCCATTACCGTTAGGTAAATGAGGTTAAGTTAACAAGGG
CGCATGGTGAATGCCTTGGCACTAGGAGCCGATGAAGGACGGGACTAACA
CCGATATGCTTCGGGGAGCTGTACGTAAGCTATGATCCGGAGATTTCCGA
ATGGGGCAACCCAGCAGTTTTAATCAACTGGTACCACTAGATGAATTCAT
AGTCTAGTTGGAGGTAAACGCTGTGAACTGAAACATCTCATTAGCAGCAG
GAATATAAAGAAATTTTCGATTCCCTAAGTAGCGGCGAGCGAACGGGGAAAC
AGCCCAAACCAAAGTGCTTGCACCTTTGGGGTTGTAGGACTGAACATTTGA
GTTACCAAAGAAGCTTGATAGTCGAAGGATTTGGGAAAATCCGCCATAGAT
GGTGATAGCCCAGTAGATTAATCAAATTCTCTCAGTTCAGGATCCTGAGT
ACGGCGGAACACGTGAAATTCCGTCGGAATCCGGGAGGACCATCTCCCAA
GGCTAAATACTACCTAGTGACCGATAGTGAACCAGTACCGTGAGAGAAAG
GG

MT212064: *Lactiplantibacillus plantarum* strain BE7

GAGAGTTTGTAAACACCCAAAGTCGGTGGGGTAAACCTTTTAGGAACCAGCC
GCCTAAGGTGGGACAGATGATTAGGGTGAAGTCGTAACAAGGTAGCCGTA
GGAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAATATTACGGAAACC
TACACACGCGTCGAAACTTTGTTTAGTTTTGAGAGATTTAACTCTCAAAC
TTGTTCTTTGAAAAGTAGATAATATCAAATATATTTTTTCATAATGAAACC
GAGAACACCGCGTTTTTTGAGTTTTTTATTGAAGTTTAATTATCGCTAAACT
CATTAATCCCATTACCGTTAGGTAAATGAGGTTAAGTTAACAAGGGCGC
ATGGTGAATGCCTTGGCACTAGGAGCCGATGAAGGACGGGACTAACACCG
ATATGCTTCGGGGAGCTGTACGTAAGCTATGATCCGGAAATTTCCGAATG
GGGCAACCCAGCAGTTTTAATCAACTGGTACCACTAGATGAATTCATAGT
CTAGTTGGAAGTAAACGCTGTGAACTGAAACATCTCATTAGCAGCAGGAA
TATAAAGAAATTTTCGATTCCCTAAGTAGCGGCGAGCGAACGGGGAAACAGC
CCAAACCAAAGTGCTTGCACCTTTGGGGTTGTAGGACTGAACATTTGAGTTA
CCAAAGAACTTGATAGTCGAAGGATTTGGGAAAATCCGCCATAGATGGTG
ATAGCCCAGTAGATTAATCAAATTCTCTCAGTTCAGGATCCTGAGTACGG
CGGAACACGTGAAATTCCGTCGGAATCCGGGAGGACCATCTCCCAAGGCT
AAATACTACCTAGTGACCGATAGTGAACCAGTACCGTGAGGGAAAAGGCG

MT212065: *Lactiplantibacillus plantarum* strain BE16

CAAAGTCGGTGGGGTAACCTTTTAGGAACCAGCCGCCTAAGGTGGGACAG
ATGATTAGGGTGAAGTCGTAACAAGGTAGCCGTAGGAGAACCTGCGGCTG
GATCACCTCCTTTCTAAGGAATATTACGGAAACCTACACACGCGTCGAAA
CTTTGTTTAGTTTTGAGAGATTTAACTCTCAAACTTGTTCTTTGAAAATA
GATAATATCAAATATATTTTTTCATAATGAAACCGAGAACACCGCGTTTTT
TGAGTTTTTTATTGAAGTTTAATTATCGCTAAACTCATTAAATCCCATTACC
GTTAGGTAAATGAGGTTAAGTTAACAAGGGCGCATGGTGAATGCCTTGGC
ACTAGGAGCCGATGAAGGACGGGACTAACACCGATATGCTTCGGGGAGCT
GTACGTAAGCTATGATCCGGAGATTTCCGAATGGGGCAACCCAGCAGTTT
TAATCAACTGGTACCCTAGATGAATTCATAGTCTAGTTGGAGGTAAACG
CTGTGAACTGAAACATCTCATTAGCAGCAGGAATATAAAGAAATTTTCGAT
TCCCTAAGTAGCGGCGAGCGAACGGGGAACAGCCCAAACCAAAGTGCTTG
CACTTTGGGGTTGTAGGACTGAACATTTGAGTTACCAAAGAACTTGATAGT
CCAAGGATTTGGGAAAATCCGCCATAGATGGTGATAGCCCAGTAGATTAA
ATCAAATTCTCTCAGTTCAAGATCCTGAGTACGGCGGAACACGTGAAATT
CCGTCCGAATCCGGCAGGACCATCTCCCAAAGGTAAATACTACC

MT212080: *Lactiplantibacillus plantarum* strain BO1

CGTCAACCATGAGAGTTGTAACACCCAAAGTTCCGGTGGGGTAACCTTTT
AGGAACCAGCCGCCTAAGGTGGGACAGATGATTAGGGTGAAGTCGTAAC
AAGGTAGCCGTAGGAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAAT
ATTACGGAAACCTACACACGCGTCGAAACTTTGTTTAGTTTTGAGAGATTT
AACTCTCAAACTTGTTCTTTGAAAATAAGATAATATCAAATATATTTTTT
CATAATGAAACCGAGAACACCGCGTTTTTTGAGTTTTTTATTGAAGTTTAA
TTATCGCTAAACTCATTAAATCCCATTACCGTTAGGGAAATGAGGTTAAGT
TAACAAGGGCGCATGGTGAATGCCTTGGCACTAGGAGCCGATGAAGGACG
GGACTAACACCGATATGCTTCGGGGAGCTGTACGTAAGCTATGATCCGGA
GATTTCCGAATGGGGCAACCCAGCAGTTTTAATCAACTGGTACCCTAGA
TGAATTCATAGTCTAGTTGGAGGTAAACGCTGTGAACTGAAACATCTCATT
AACAGCAGGAATATAAAGAAATTTTCGATTCCCTAAGTAGCGGCGAGCGAA
CGGGGAACAGCCCAAACCAAAGTGCTTGCACCTTTGGGGTTGTAGGACTGA
ACATTTGAGTTACCAAAGAACTTGATAGTCGAAGGATTTGGGAAAATCCG
CCCTAGATGGTGATAGCCCAGTAGATTAAATCAAATTCTCTCAGTTCAAGA
TCCTGAGTACGGCGGAACACGTGAAATTCCGTCCGAATCCGGGAAGACCA
TCTCCCAAAGGCTAAATACTACCTAGTGACCGATAGTGAACCAGTACCGTG
AGAGAAG

MT212081: *Lactiplantibacillus plantarum* strain BO8

AGAGTTTGTAAACACCCAAAGTCGGTGGGGTAACCTTTTAGGAACCAGCCG
CCTAAGGTGGGACAGATGATTAGGGTGAAGTCGTAACAAGGTAGCCGTAG
GAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAATATTACGGAAACCT
ACACACGCGTCGAAACTTTGTTTAGTTTTGAGAGATTTAACTCTCAAACT
TGTTCTTTGAAAATAAGATAATATCAAATATATTTTTTCATAATGAAACC

GAGAACACCGCGTTTTTTTGAGTTTTTTTATTGAAGTTTAATTATCGCTAAACT
CATTAAATCCCATTTACCGTTAGGTAAATGAGGTTAAGTTAACAAGGGCGC
ATGGTGAATGCCTTGGCACTAGGAGCCGATGAAGGACGGGACTAACACCG
ATATGCTTCGGGGAACTGTACGTAAGCTATGATCCGGAAATTTCCGAATG
GGGCAACCCAGCAGTTTTAATCAACTGGTTACCACTAGATGAATTCATAGT
CTAGTTGGAGGTAAACGCTGTGAACTGAAACATCTCATTAAACAGCAGGAA
TATAAAGAAATTTTCGATTCCCTAAGTAGCGGCGAACGAACGGGGAACAGC
CCAAACCAAAGTGCTTGCACCTTTGGGGTTGTAGGACTGAACATTTGAGTTA
CCAAAGAACTTGATAGTCCAAGGATTTGGGAAAATCCGCCATAGATGGTG
ATAGCCCAGTAGATTAATCAAATTCTCTCAGTTCAGGATCCTGAGTACGG
CGGAACACGTGAAATTCGTCGGAATCCGGGGGAACCATCTCCCAAAGCT
AAATACTACCTAGTGACCAATAATTAACCAGTACCCTGAAAAAAAAAGCCA
A

MT212082: *Lactiplantibacillus plantarum* strain B010

TGAGAGTTTGTAACACCCAAAGTCGGTGGGGTAAACCTTTTAGGAACCAGC
CGCCTAAGGTGGGACAGATGATTAGGGTGAAGTCGTAACAAGGTAGCCGT
AGGAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAATATTACGGAAAC
CTACACACGCGTCGAAACTTTGTTTAGTTTTGAGAGATTTAACTCTCAAAA
CTTGTTCCTTTGAAAACCTAGATAATATCAAATATATTTTTTTCATAATGAAAC
CGAGAACACCGCGTTTTTTTGAGTTTTTTTATTGAAGTTTAATTATCGCTAAA
CTCATTAAATCGCATTTACCGTTAGGTAAATGAGGTTAAGTTAACAAGGGCG
CATGGTGAATGCCTTGGCACTAGGAGCCGATGAAGGACGGGACTAACACC
GATATGCTTCGGGGAGCTGTACGTAAGCTATGATCCGGAGATTTCCGAAT
GGGGCAACCCAGCAGTTTTAATCAACTGGTACCACTAGATGAATTCATAG
TCTAGTTGGAGGTAAACGCTGTGAACTGAAACATCTCATTAGCAGCAGGA
ATATAAAGAAATTTTCGATTCCCTAAGTAGCGGCGAGCGAACGGGGAACAG
CCCAAACCAAAGTGCTTGCACCTTTGGGGTTGTAGGACTGAACATTTGAGTT
ACCAAAGAACTTGATAGTCAAGGATTTGGGAAAATCCGCCATAGATGGT
GATAGCCCAGTAGATTAATCAAATTCTCTCAGTTCAGGATCCTGAGTACG
GCGGAACACGTGAAATTCGTCGGAATCCGGGAGGACCATCTCCCAAAGGC
TAAATACTACCTAGTGACCGATAGTGAACCAGTACCCTGAGAGAAAGGGG
GAAAAA

MT212083: *Lactiplantibacillus plantarum* strain B016

ATGAGAGTTTGTAACACCCAAAGTCGGTGGGGTAAACCTTTTAGGAACCAG
CCGCCTAAGGTGGGACAGATGATTAGGGTGAAGTCGTAACAAGGTAGCCG
TAGGAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAATATTACGGAAA
CCTACACACGCGTCGAAACTTTGTTTAGTTTTGAGAGATTTAACTCTCAA
ACTTGTTCCTTTGAAAACCTAGATAATATCAAATATATTTTTTTCATAATGAAA
CCGAGAACACCGCGTTTTTTTGAGTTTTTTTATTGAAGTTTAATTATCGCTAA
ACTCATTAAATCGCATTTACCGTTAGGTAAATGAGGTTAAGTTAACAAGGGC
GCATGGTGAATGCCTTGGCACTAGGAGCCGATGAAGGACGGGACTAACAC
CGATATGCTTCGGGGAGCTGTACGTAAGCTATGATCCGGAAATTTCCGAAT
GGGGCAACCCAGCAGTTTTAATCAACTGTTACCACTAGATGAATTCATAGT

CTAGTTGGAGGTAAACGCTGTGAACTGAAACATCTCATTAGCAGCAGGAA
TATAAAGAAATTTTCGATTCCCTAAGTAGCGGCGAGCGAACGGGGAACAGC
CCAAACCAAAGTGCTTGCACCTTTGGGGTTGTAGGACTGAACATTTGAGTTA
CCAAAGAACTTGATAGTCGAAGGATTTGGGAAAATCCGCCATAGATGGTG
ATAGCCCAGTAGATTAATCAAATTCTCTCAGTTCAGGATCCTGAGTACGG
CGGAACACGTGAAATTCCGTCGGAATCCGGGAGGACCATCTCCAAGGCT
AAATACTACCTAGTGACCGATAGTGAACCAGTACCGGAAGGAAAAGGGC
AAAA

MT212055: *Lactocaseibacillus paracasei* strain BUM5

ATGAGAGTTTGTAAACACCCGAAGCCGGTGGCGTAACCCTTTTAGGGAGCG
AGCCGTCTAAGGTGGGACAAATGATTAGGGTGAAGTCGTAACAAGGTAGC
CGTAGGAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAAACAGACTGA
AAGTCTGACGGAAACCTGCACACACGAACTTTGTTTAGTTTTGAGGGGA
TCACCCTAAGCACCCCTAACGGGTGCGACTTTGTTCTTTGAAAACCTGGATA
TCATTGTATTAATTGTTTTAAATTGCCGAGAACACAGCGTATTTGTATGAG
TTTCTGAAAAAGAAATTCGCATCGCATAACCGCTGACGCAAGTCAGTACA
GGTTAAGTTACAAAGGGCGCACGGTGGATGCCTTGGCACTAGGAGCCGAT
GAAGGACGGAACATAACCGATATGCTTCGGGGAGCTATAAGTAAGCTTT
GATCCGGAGATTTCCGAATGGGGGAACCCAGTACACATCAGTGTATTGCT
TGTCAGTGAATACATAGCTGGCCGGCGGCAGACGCGGGGAACTGAAACAT
CTCAGTACCCGCAGGAAGAGAAAAGAAAACCTCGATTCCCATAGTAGCGGCG
AGCGAAGTGGGAAGAGCCCAAACCGAGAAGCTTGCTTCTCGGGGTTGTAG
GACTGGACATTGGAGTTACCAAAGTCCGACGTAGTCGAAGTCAGCTGGAA
AGCTGCGCCACAGAAGGTGAAAGCCCTGTAAGCGAAACGTCGAACCCTCC
GTCCAGGATCCTGAGTACGGCGGAACACGTGAAATTCCGTCGGAATCCGG
GAGGACCATCTCGCAAGGCTAAATACTCCCTAGTGACCGATAGTGAACCA
GTACCGTGAGGAAAAGGCGAAA

MT995194: *Lactocaseibacillus paracasei* strain BUM6

ACCCGAAGCCGGTGGCGTAACCCTTTTAGGGAGCGAGCCGTCTAAGGTGG
GACAAATGATTAGGGTGAAGTCGTAACAAGGTAGCCGTAGGAGAACCTGC
GGCTGGATCACCTCCTTTCTAAGGAAACAGACTGAAAGTCTGACGGAAAC
CTGCACACACGAACTTTGTTTAGTTTTGAGGGGATCACCCCTAAGCACCC
TAACGGGTGCGACTTTGTTCTTTGAAAACCTGGATATCATTGTATTAATTGT
TTTAAATTGCCGAGAACACAGCGTATTTGTATGAGTTTCTGAAAAAGAAAT
TCGCATCGCATAACCGCTGACGCAAGTCAGTACAGGTTAAGTTACAAAGG
GCCGACGGTGGATGCCTTGGCACTAGGAGCCGATGAAGGACGGAACATA
ACCGATATGCTTCGGGGAGCTATAAGTAAGCTTTGATCCGGAGATTTCCGA
ATGGGGGAACCCAGTACACATCAGTGTATTGCTTGTGTCAGTGAATACATAG
CTGGCCGGCGGCAGACGCGGGGAACTGAAACATCTCAGTACCCGCAGGA
AGAAAAAGAAAAA

MT212056: *Lacticaseibacillus paracasei* strain BUM7

GAGAGTTTGTACACCCGAAGCCGGTGGCGTAACCCTTTTAGGGAGCGAGC
CGTCTAAGGTGGGACAAATGATTAGGGTGAAGTCGTAACAAGGTAGCCGT
AGGAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAAACAGACTGAAAG
TCTGACGGAAACCTGCACACACGAAACTTTGTTTAGTTTTGAGGGGATCAC
CCTCAAGCACCCCTAACGGGTGCGACTTTGTTCTTTGAAAACCTGGATATCAT
TGTATTAATTGTTTTAAATTGCCGAGAACACAGCGTATTTGTATGAGTTTC
TGAAAAAGAAATTCGCATCGCATAACCGCTGACGCAAGTCAGTACAGGTT
AAGTTACAAAGGGCGCACGGTGGATGCCTTGGCACTAGGAGCCGATGAAG
GACGGAACCTAATACCGATATGCTTCGGGGAGCTATAAGTAAGCTTTGATC
CGGAGATTTCCGAATGGGGGAACCCAGTACACATCAGTGTATTGCTTGTC
AGTGAATACATAGCTGGCCGGCGGCAGACGCGGGGAACTGAAACATCTCA
GTACCCGCAGGAAGAGAAAGAAAACCTCGATTCCCATAGTAGCGGGCAGC
GAAGTGGGAAGAGCCCAAACCGAGAAGCTTGCTTCTCGGGGTGTAGGAC
TGGACATTGGAGTTACCAAAGTCCGACGTAGTCGAAGTCAGCTGGAAAGC
TGCGCCACAGAAGGTGAAAGCCCTGTAAGCGAAACGTCGAACCCCTCCGTC
CAGGATCCTGAGTACGGCGGAACACGTGAGATTCCGTCGGAATCCGGGAG
GACCATCTCCCAAGGCTAAATACTCCCTAGTGACCGATAGTGAACCAGTA
CCGTGAGGAGAAGGCGAAAAAA

MT212057: *Lacticaseibacillus paracasei* strain BUM12

ATGAGAGTTTGTAAACACCCGAAGCCGGTGGCGTAACCCTTTTAGGGAGCG
AGCCGTCTAAGGTGGGACAAATGATTAGGGTGAAGTCGTAACAAGGTAGC
CGTAGGAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAAACAGACTGA
AAGTCTGACGGAAACCTGCACACACGAAACTTTGTTTAGTTTTGAGGGGA
TCACCCTCAAGCACCCCTAACGGGTGCGACTTTGTTCTTTGAAAACCTGGATA
TCATTGTATTAATTGTTTTAAATTGCCGAGAACACAGCGTATTTGTATGAG
TTTCTGAAAAAGAAATTCGCATCGCATAACCGCTGACGCAAGTCAGTACA
GGTTAAGTTACAAAGGGCGCACGGTGGATGCCTTGGCACTAGGAGCCGAT
GAAGGACGGAACCTAATACCGATATGCTTCGGGGAGCTATAAGTAAGCTTT
GATCCGGAGATTTCCGAATGGGGGAACCCAGTACACATCAGTGTATTGCT
TGTCAGTGAATACATAGCTGGCCGGCGGCAGACGCGGGGAACTGAAACAT
CTCAGTACCCGCAGGAAGAGAAAGAAAACCTCGATTCCCATAGTAGCGGGC
AGCGAAGTGGGAAGAGCCCAAACCGAGAAGCTTGCTTCTCGGGGTGTAG
GACTGGACATTGGAGTTACCAAAGTCCGACGTAGTCGAAGTCAGCTGGAA
AGCTGCGCCACAGAAGGTGAAAGCCCTGTAAGCGAAACGTCGAACCCCTCC
GTCCAGGATCCTGAGTACGGCGGAACACGTGAAATTCCGTCGGAATCCGG
GAGGACCATCTCCCAAGGCTAAATACTCCCTAGTGACCGATAGTGAACCA
GTACCGTGAGGGAAAAGGCGAAAA

MT212058: *Lacticaseibacillus paracasei* strain BUM14

ATGAGAGTTTGTACACCCGAAGCCGGTGGCGTAACCCTTTTAGGGAGCGA
GCCGTCTAAGGTGGGACAAATGATTAGGGTGAAGTCGTAACAAGGTAGCC
GTAGGAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAAACAGACTGAA

AGTCTGACGGAAACCTGCACACACGAAACTTTGTTTAGTTTTGAGGGGATC
ACCCTCAAGCACCTAACGGGTGCGACTTTGTTCTTTGAAAACCTGGATATC
ATTGTATTAATTGTTTTAAATTGCCGAGAACACAGCGTATTTGTATGAGTT
TCTGAAAAAGAAATTCGCATCGCATAACCGCTGACGCAAGTCAGTACAGG
TTAAGTTACAAAGGGCGCACGGTGGATGCCTTGGCACTAGGAGCCGATGA
AGGACGGAACCTAATAACCGATATGCTTCGGGGAGCTATAAGTAAGCTTTGA
TCCGGAGATTTCCGAATGGGGGAACCCAGTACACATCAGTGTATTGCTTGT
CAGTGAATACATAGCTGGCCGGCGGCAGACGCGGGGAACTGAAACATCTC
AGTACCCGCAGGAAGAGAAAGAAAACCTCGATTCCCATAGTAGCGGCGAG
CGAAGTGGGAAGAGCCCAAACCGAGAAGCTTGCTTCTCGGGGTTGTAGGA
CTGGACATTGGAGTTACCAAAGTCCGACGTAGTCGAAGTCAGCTGGAAAG
CTGCGCCACAGAAGGTGAAAGCCCTGTAAGCGAAACGTTCGAACCCCTCCGT
CCAGGATCCTGAGTACGGCGGAACACGTGAAATTCCGTCGGAATCCGGGA
GGACCATCTCCCAAGGCTAAATACTCCCTAGTGACCGATAGTGAACCAGT
ACCGTGAGGAAAAAGGCG

MT212059: *Lacticaseibacillus paracasei* strain BUM15

ATGAGAGTTTGTAACACCCGAAGCCGGTGGCGTAACCCTTTTAGGGAGCG
AGCCGTCTAAGGTGGGACAAATGATTAGGGTGAAGTCGTAACAAGGTAGC
CGTAGGAGAACCTGCGGCTGGATCACCTCCTTTCTAAGGAAACAGACTGA
AAGTCTGACGGAAACCTGCACACACGAAACTTTGTTTAGTTTTGAGGGGA
TCACCCTCACGCACCCTAACGGGTGCGACTTTGTTCTTTGAAAACCTGGATA
TCATTGTATTAATTGTTTTAAATTGCCGAGAACACAGCGTATTTGTATGAG
TTTCTGAAAAAGAAATTCGCATCGCATAACCGCTGACGCAAGTCAGTACA
GGTTAAGTTACAAAGGGCGCACGGTGGATGCCTTGGCACTAGGAGCCGAT
GAAGGACGGAACCTAATAACCGATATGCTTCGGGGAGCTATAAGTAAGCTTT
GATCCGGAGATTTCCGAATGGGGGAACCCAGTACACATCAGTGTATTGCT
TGTCAGTGAATACATAGCTGGCCGGCGGCAGACGCGGGGAACTGAAACAT
CTCAGTACCCGCAGGAAGAGAAAGAAAACCTCGATTCCCATAGTAGCGGCG
AGCGAAGTGGGAAGAGCCCAAACCGAGAAGCTTGCTTCTCGGGGTTGTAG
GACTGGACATTGGAGTTACCAAAGTCCGACGTAGTCGAAGTCAGCTGGAA
AGCTGCGCCACAGAAGGTGAAAGCCCTGTAAGCGAAACGTTCGAACCCCTCC
GTCCAGGATCCTGAGTACGGCGGAACACGTGAAATTCCGTCGGAATCCGG
GAGGACCATCTCCCAAGGCTAAATACTCCCTAGTGACCGATAGTGAACCA
GTACCGTGAGGAAAAAGGCG

MT212060: *Lacticaseibacillus paracasei* strain BUM18

CACCCGAAGCCGGTGGCGTAACCCTTTTAGGGAGCGAGCCGTCTAAGGTG
GGACAAATGATTAGGGTGAAGTCGTAACAAGGTAGCCGTAGGAGAACCTG
CGGCTGGATCACCTCCTTTCTAAGGAAACAGACTGAAAGTCTGACGGAAA
CCTGCACACACGAAACTTTGTTTAGTTTTGAGGGGATCACCTCAAGCACC
CTAACGGGTGCGACTTTGTTCTTTGAAAACCTGGATATCATTGTATTAATTG
TTTTAAATTGCCGAGAACACAGCGTATTTGTATGAGTTTCTGAAAAAGAAA
TTCGCATCGCATAACCGCTGACGCAAGTCAGTACAGGTTAAGTTACAAAG
GGCGCACGGTGGATGCCTTGGCACTAGGAGCCGATGAAGGACGGAACCTA

ATACCGATATGCTTCGGGGAGCTATAAGTAAGCTTTGATCCGGAGATTTC
GAATGGGGGAACCCAGTACACATCAGTGTATTGCTTGTCAAGTGAATACAT
AGCTGGCCGGCAGACGCGGGGAACTGAAACATCTCAGTACCCGCAG
GAAGAGAAAGAAAACCTCGATTCCCATAGTAGCGGGCAGCGAAGTGGGAA
GAGCCCAAACCGAGAAGCTTGCTTCTCGGGGTTGTAGGACTGGACATTGG
AGTTACCAAAGTCCGACGTAGTCGAAGTCAGCTGGAAAGCTGCGCCACAG
AAGGTGAAAGCCCTGTAAGCGAAACGTCGAACCCTCCGTCCAGGATCCTG
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MT212061: *Lacticaseibacillus paracasei* strain BUM22

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MT995195: *Lacticaseibacillus paracasei* strain BUM23

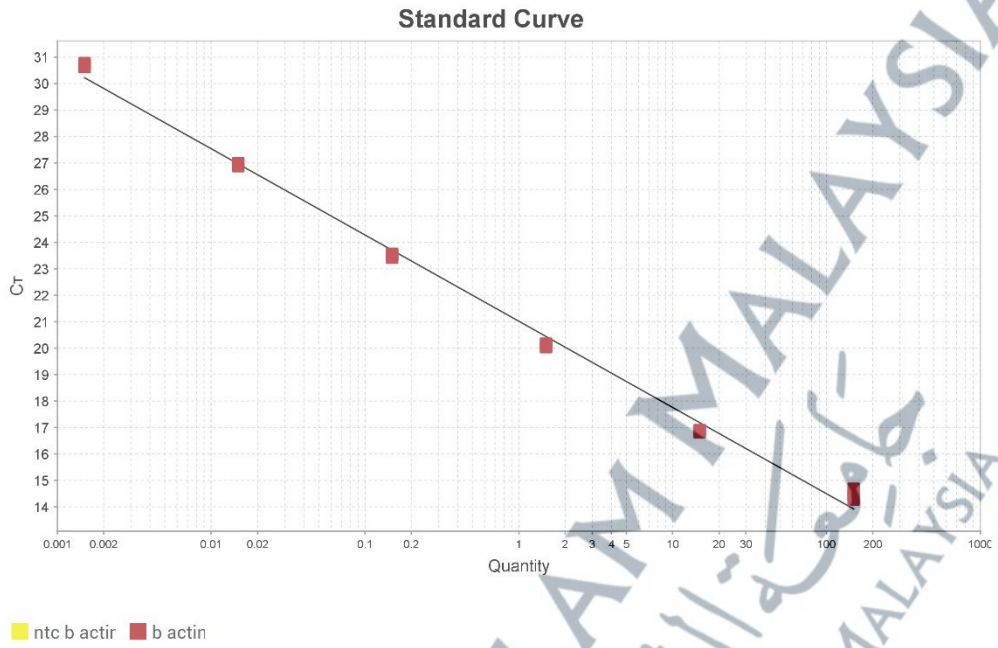
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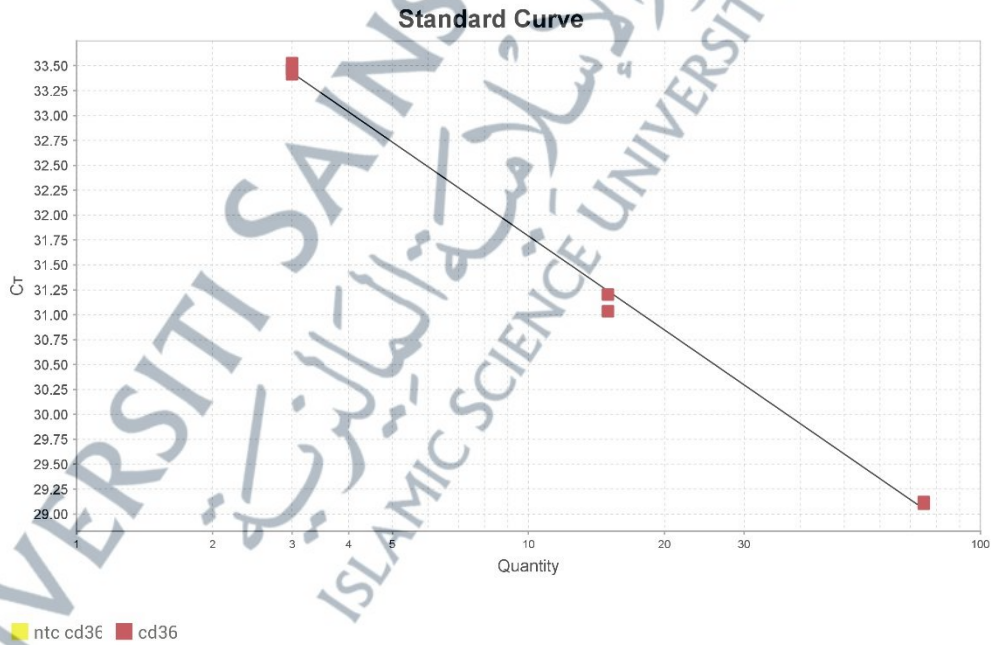
MT212062: *Lacticaseibacillus paracasei* strain BUM24

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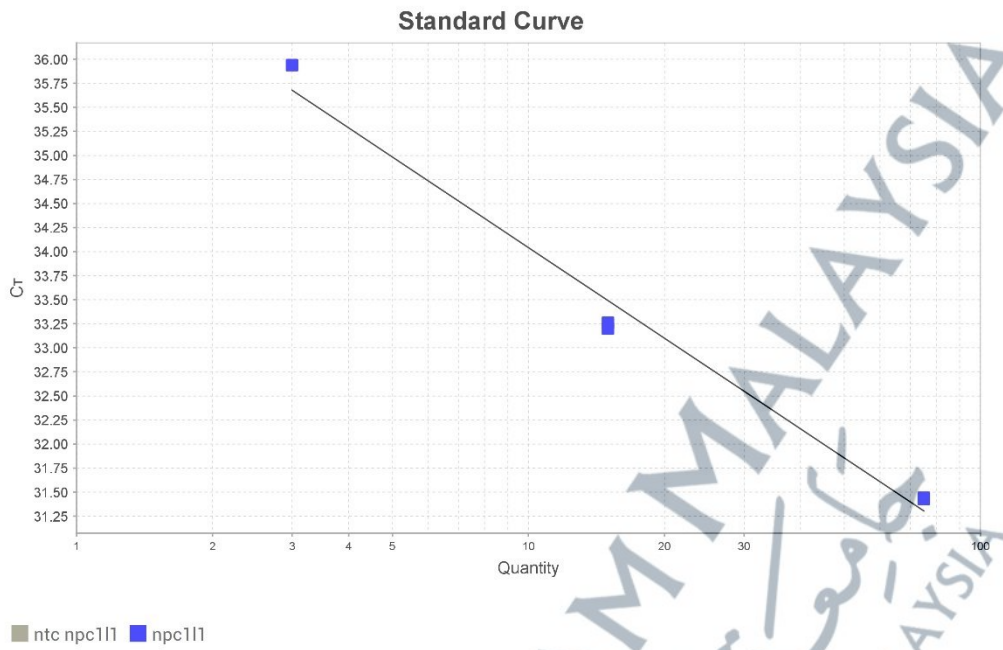
Appendix 3: QPCR standard curve for selected target and reference genes.



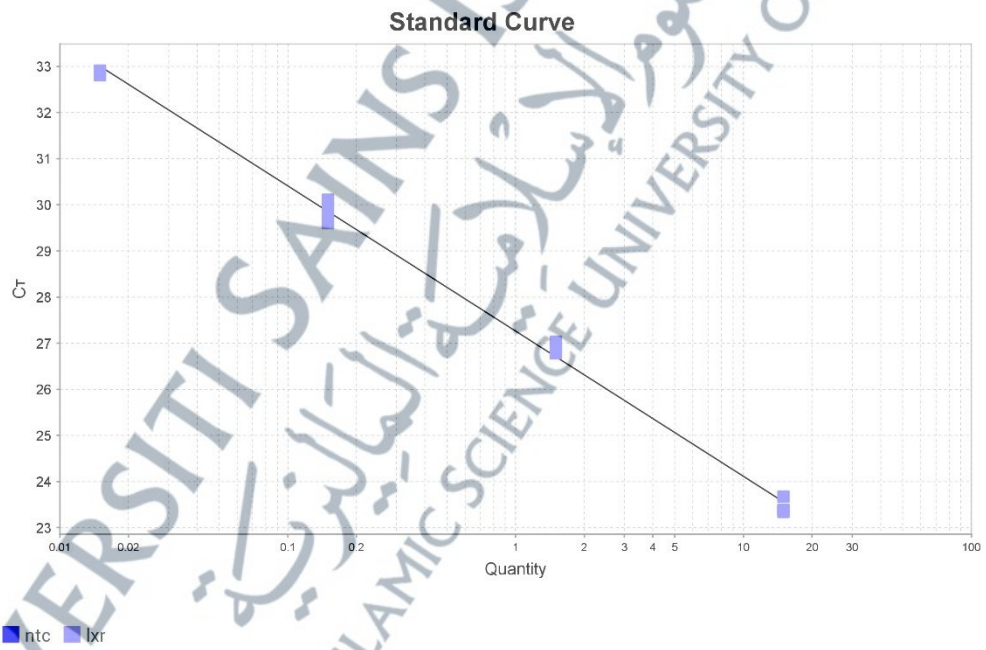
Standard curve for β -actin gene



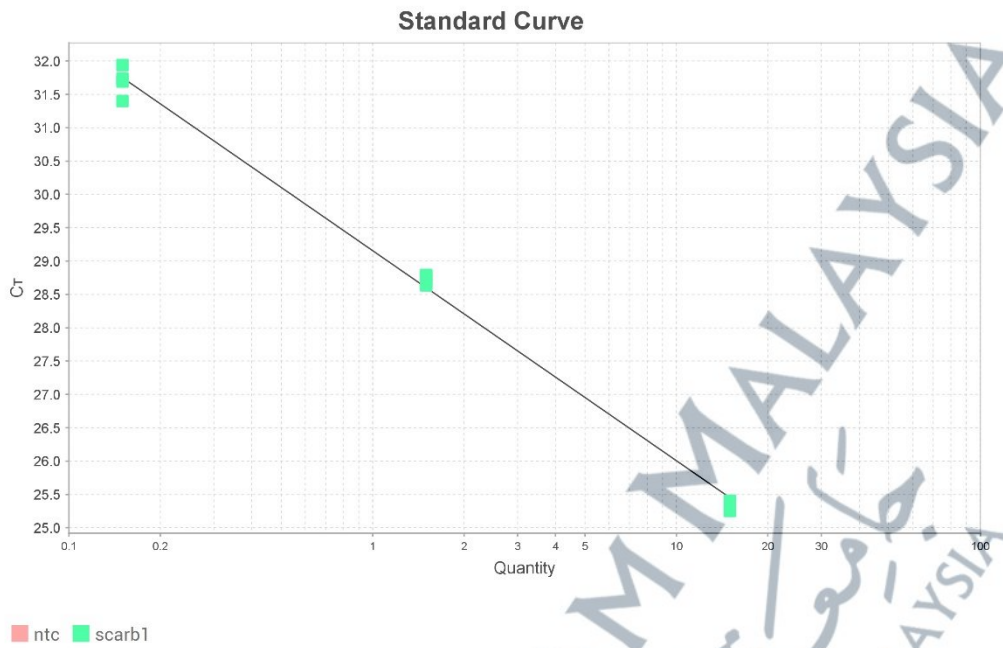
Standard curve for CD36 gene



Standard curve for NPC1L1 gene



Standard curve for LXR gene



Standard curve for SCARB1 gene

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 ISLAMIC SCIENCE UNIVERSITY OF MALAYSIA

Appendix 4: List of publications and presentations.

Publications.

1. **Ilyanie, H.Y.**, Huda-Faujan, N. and Ida Muryany, M.Y. (2020). Comparative proximate composition of Malaysian fermented shrimp products. *Malaysian Applied Biology* 49 (3), 139-144. (SCOPUS INDEXED).
2. **Ilyanie, H.Y.**, Huda-Faujan, N., Ida Muryany, M.Y. and Zuraída, J. (2022). Isolation and characterisation of probiotic lactic acid bacteria from Malaysian fermented fish products budu and bosou. *International Food Research Journal* 29 (2), 338-348. (WOS INDEXED-Q4).
3. **Ilyanie, H.Y.**, Huda-Faujan, N., Ida Muryany, M.Y. and Hasan, Z. Malaysian fermented shrimp paste (belacan): A source of potential probiotic lactic acid bacteria. *ASM Science Journal*. Accepted. (SCOPUS INDEXED).
4. **Ilyanie, H.Y.**, Ida Muryany, M.Y. and Huda-Faujan, N. Species identification of potential probiotic lactic acid bacteria isolated from Malaysian fermented food based on 16S ribosomal RNA (16S rRNA) and Internal Transcribed Spacer (ITS) sequences. *Malaysian Applied Biology*. Reviewed. (SCOPUS INDEXED).
5. **Ilyanie, H.Y.**, Huda-Faujan, N. and Ida Muryany, M.Y. Comparative physicochemical and colourimetric characteristics of bosou and budu, the Malaysian fermented fish products. *Malaysian Journal of Biochemistry and Molecular Biology*. Submitted. (SCOPUS INDEXED).
6. **Ilyanie, H.Y.**, Ida Muryany, M.Y. and Huda-Faujan, N. Optimized sample preparation technique for visualisation of the adherence of Lactobacillaceae to human colorectal adenocarcinoma cell line HT-29 by field emission scanning electron microscope. *Malaysian Journal of Biochemistry and Molecular Biology*. Submitted. (SCOPUS INDEXED).

Presentations.

1. **Ilyanie, H. Y.**, Huda-Faujan, N., and Ida Muryany, M. Y. (2019). Comparative proximate compositions of Malaysian fermented shrimp products. Oral presentation at Postgraduate Seminar Faculty of Science & Technology (KoSiST2019), 6 November 2019, Faculty of Science & Technology, USIM, Nilai, Seremban.
2. **Ilyanie, H. Y.**, Huda-Faujan, N., Ida Muryany, M. Y. and Zaiton, H. (2019). Antagonistic interactions & antibiotic resistance patterns of lactic acid bacteria from Malaysian fermented shrimps. Oral highlight presentation at ASEAN Emerging Research Conference 2019 (ASEAN ERC), 10 December 2019, Sunway University, Selangor.

3. **Ilyanie, H. Y.**, Huda-Faujan, N., & Ida Muryany, M. Y. (2020). Comparative physicochemical and colourimetric characteristics of bosou and budu, the Malaysian fermented fish products. Oral presentation at 6th International Online Conference on Science, Technology, and Interdisciplinary Research (IC-STAR UTM 2020), 8 December 2020, Universiti Teknologi Malaysia (Virtual Conference).
4. **Ilyanie, H. Y.**, Ida Muryany, M. Y. & Huda-Faujan, N. (2021). Species identification of potential probiotic lactic acid bacteria isolated from Malaysian fermented food based on 16s Ribosomal RNA (16s rRNA) and Internal Transcribed Spacer (ITS) sequences. Oral presentation at International Conference On Industry-Academia Initiatives In Biotechnology And Chemistry (iCIABC21), 20 – 21 December 2021, Universiti Malaysia Pahang (Virtual Conference).
5. **Ilyanie, H. Y.**, Ida Muryany, M. Y. & Huda-Faujan, N. (2022). Optimized sample preparation technique for visualisation of the adherence of Lactobacillaceae to human colorectal adenocarcinoma cell line HT-29 by field emission scanning electron microscope. Oral presentation at 1st International BioMECs Symposium (IBS), 16 March 2022, Universiti Teknologi MARA Cawangan Negeri Sembilan, Kuala Pilah Campus.

Appendix 5: Certificate of Acknowledgement from Proofreaders United

Our reference: CERT-110822-03Ilyanie



Proofreaders United

Certificate of Acknowledgement

We certify that the following Thesis/Dissertation (PDF generated from Latex)

**CHARACTERIZATION OF PROBIOTIC LACTIC ACID
BACTERIA ISOLATED FROM MALAYSIAN FERMENTED
FOOD AND THEIR CHOLESTEROL MODULATION
PROPERTIES**

Ilyanie Binti Hj Yaacob

has been edited by an editor from Proofreaders United. The text has been checked for accuracy of language, flow, and overall readability, as well as checking for grammar, spelling, and punctuation.
Document length: 132.5page(s) based on our format (Times New Roman, font size 12, 2.0 line spacing, without figures and tables).

Full details of the editing service can be found at <https://bit.ly/PU-form>.

26 September 2022

Acknowledgement by:

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