

**Table S3.** Primers used in this study for the bacterial *16S rRNA* gene and the *Apis mellifera* *COI* gene and standard curve characteristics. LOD refers to the limit of detection of primer sets, expressed as the lowest number of DNA copies detected when standard curves were performed. F: Forward; R: Reverse; P: Probes; Tm: Melting temperature.

| Target                            | Sequence (5' to 3')   | Amplicon size (pb) | Standard curves |                |        |        |           |                          | References |
|-----------------------------------|---|--------------------|-----------------|----------------|--------|--------|-----------|--------------------------|------------|
|                                   |   |                    | Tm (°C)         | Efficiency (%) | Error  | Slope  | Intercept | LOD Cp (copies)          |            |
| <i>Frichella perrara</i>          | F: GGAAGTTATGTGTGGGATAAGC<br>R: CTATTCTCAGGTTGAGCCCG                            | 185                | 84.4            | 1,937 (96.85)  | 0,0514 | -3,482 | 7,629     | 35,75 (10 <sup>2</sup> ) | [23]       |
| <i>Gilliamella apicola</i>        | F: CTTTGTTGCCATCGGTTAGGCC<br>R: CCGCTTGCTCTCGCGAGG                              | 160                | 83.6            | 2,032 (101.6)  | 0,0191 | -3,246 | 5,727     | 39,06 (10 <sup>2</sup> ) | [23]       |
| <i>Snodgrassella alvi</i>         | F: CTTAGAGATAGGAGAGTGCCTT<br>R: AACTTAATGATGGCAACTAATGACAA                      | 132                | 84.6            | 1,926 (96.3)   | 0,0176 | -3,514 | 11,08     | 38,43 (10 <sup>2</sup> ) | [23]       |
| <i>Bifidobacterium asteroides</i> | F: ATGCAAGTCGAACGGGATCC<br>R: CATCCCATGCCGGTAAACCC                              | 174                | 85.8            | 2,013 (100.6)  | 0,0360 | -3,290 | 6,54      | 36,94 (10)               | [23]       |
| <i>Bombilactobacillus</i> spp.    | F: AGTCGAGCGCGGGAAGTCA<br>R: AGCCGTCTTTCAACCAGCACT                              | 169                | 84.5            | 2,043 (102.1)  | 0,0228 | -3,224 | 4,403     | 36,4 (10)                | [23]       |
| <i>Lactobacillus</i> spp.         | F: GCAACCTGCCCTWTAGCTTG<br>R: GCCCATCCTKTAGTGACAGC                              | 118                | 81.3            | 1,964 (98.2)   | 0,0214 | -3,412 | 5,242     | 39,52 (10)               | [23]       |
| <i>Bartonella apis</i>            | F: GTGGGAATCTACCTATTTCTACG<br>R: AACGCGGGCTCATCTATCTC                           | 103                | 76.6            | 2,016 (100.8)  | 0,0255 | -3,285 | 5,333     | 37,78 (10)               | [23]       |
| <i>Bombella apis</i>              | F: CCGAGAGAGGGTTGTGGAATT<br>R: AGATATTGGGAAGAACACCG<br>P: TGTAGA+GG+T+GAA+AT+TC | 65                 | -               | 2,057 (102.8)  | 0,0185 | -3,193 | 5,775     | 38,5 (2)                 | This study |
| <i>Apis mellifera</i>             | F: TCCAAGACCAGGAAGTGGAT<br>R: TTTTCTCTTCATATATCAGGAATTCC                        | 112                | 75.2            | 1,953 (97.7)   | 0,0601 | -3,439 | 12,71     | 34,87 (10 <sup>5</sup> ) | [60]       |