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APPENDIX A

Figure 1: Honey samples which were used in this study

Figure 2: Lactic acid bacteria isolates form honey
Figure 1: Growth of pathogenic bacteria after inoculation with LAB supernatants monitored using biophotometer at OD 560 nm within 72h. A: Staphylococcus aureus, B: Staphylococcus epidermis, C: Salmonella typhimurium, D: Serratia marcescens, E: Klebsiella pneumoniae, F: Escherichia coli.
Figure 2: Growth of pathogenic bacteria after inoculation LAB supernatants using bio photometer at optical density 560 nm within 72h. G: *Bacillus subtilis*, H: *Shigella sonnei*, I: *Enterobacter aerogenes*.
APPENDIX C

Figure 1: Growth of pathogenic bacteria after inoculation LAB supernatants after adjusting pH to 3 using bio photometer at optical density 560 nm within 72h. A: *Staphylococcus aureus*, B: *Staphylococcus epidermis*, C: *Salmonella typhimurium*, D: *Serratia marcescens*, E: *Klebsiella pneumoniae*, F: *Escherichia coli*. 
Figure 2: Growth of pathogenic bacteria after inoculation LAB supernatants after adjusting pH to 3 using bio photometer at optical density 560 nm within 72h. G: Bacillus subtilis, H: Shigella sonnei, I: Enterobacter aerogenes.
Appendix D

Figure 1: Growth of pathogenic bacteria after inoculation LAB supernatants after adjusting pH to 5 using bio photometer at optical density 560 nm within 72h. A: *Staphylococcus aureus*, B: *Staphylococcus epidermis*, C: *Salmonella typhimurium*, D: *Serratia marcescens*, E: *Klebsiella pneumoniae*, F: *Escherichia coli*. 
Figure 2: Growth of pathogenic bacteria after inoculation LAB supernatants after adjusting pH to 5 using bio photometer at optical density 560 nm within 72h. G: *Bacillus subtilis*, H: *Shigella sonnei*, I: *Enterobacter aerogenes*. 
Figure 1: Growth of pathogenic bacteria after inoculation LAB supernatants after enzymatic treatment with proteinase K using bio photometer at optical density 560 nm within 72h. A: *Staphylococcus aureus*, B: *Staphylococcus epidermis*, C: *Salmonella typhimurium*, D: *Serratia marcescens*, E: *Klebsiella pneumoniae*, F: *Escherichia coli*. 
Figure 2: Growth of pathogenic bacteria after inoculation LAB supernatants after enzymatic treatment with proteinase K using bio photometer at optical density 560 nm within 72h. G: *Bacillus subtilis*, H: *Shigella sonnei*, I: *Enterobacter aerogenes*. 
Figure 1: Growth of pathogenic bacteria after inoculation LAB supernatants after enzymatic treatment with proteinase K using bio photometer at optical density 560 nm within 72h. A: *Staphylococcus aureus*, B: *Staphylococcus epidermis*, C: *Salmonella typhimurium*, D: *Serratia marcescens*, E: *Klebsiella pneumoniae*, F: *Escherichia coli*. 
Figure 2: Growth of pathogenic bacteria after inoculation LAB supernatants after enzymatic treatment with proteinase K using bio photometer at optical density 560 nm within 72h. G: *Bacillus subtilis*, H: *Shigella sonnei*, I: *Enterobacter aerogenes*.
APPENDIX G

Figure 1: Growth of pathogenic bacteria after inoculation LAB supernatants after heat treatment at 90 °C for 1 h using bio photometer at optical density 560 nm within 72h. A: Staphylococcus aureus, B: Staphylococcus epidermis, C: Salmonella typhimurium, D: Serratia marcescens, E: Klebsiella pneumoniae, F: Escherichia coli.
Figure 2: Growth of pathogenic bacteria after inoculation LAB supernatants after heat treatment at 90 °C for 1 h using bio photometer at optical density 560 nm within 72h. G: Bacillus subtilis, H: Shigella sonnei, I: Enterobacter aerogenes.
Figure 1: Growth of pathogenic bacteria after inoculation LAB supernatants after heat treatment at 121 °C for 1 h using bio photometer at optical density 560 nm within 72h. A: Staphylococcus aureus, B: Staphylococcus epidermis, C: Salmonella typhimurium, D: Serratia marcescens, E: Klebsiella pneumoniae, F: Escherichia coli.
Figure 2: Growth of pathogenic bacteria after inoculation LAB supernatants after heat treatment at 121 °C for 1 h using bio photometer at optical density 560 nm within 72h. G: *Bacillus subtilus*, H: *Shigella sonnei*, I: *Enterobacter aerogenes*. 
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Aween, M. M., Hassan, Z., Muhialdin, B. J., Eljamel, Y. A., Asma Saleh W. Al-mabrok and Nizam Lani. 2012. Antimicrobial activity of Lactobacillus acidophilus strains isolated from honey marketed in Malaysia against gram positive bacteria. Accepted for publication in *Journal of Food Science*.

