

PP 12: The effect of pasteurized milk extracellular vesicles on bacterial growth

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Extracellular vesicles (EVs) are released by cells and have a lipid bilayer structure. EVs harbor various molecules, including proteins, RNAs, and DNAs. Studies of mammalian EVs are increasingly attracting the interest of researchers; however, there are only few studies of nanoparticles in food. Milk-derived EVs can survive high temperatures and digestion process, while retaining their biological activity. This study investigated the effect of pasteurized cows' milk derived EVs on growth of five different bacteria. *Staphylococcus aureus* ATCC 25923, *Escherichia coli* ATCC 53868, *Bacillus subtilis*, *Bacillus cereus* and *Pseudomonas aeruginosa* with a concentration of 1×10^7 CFU/ml were separately co-cultured with pasteurized milk derived EVs (1×10^9 EVs/ μ l) in Muller Hinton broth. The bacterial growth was monitored as absorbance at 620 nm over 24 hours. Bacteria treated with phosphate buffer solution (PBS) were considered negative control throughout the experiment. The percentage bacterial growth difference was

determined with respect to negative control and results expressed as mean \pm standard error of mean. All analyses were performed in three biological triplicates and each biological replicate consisted of three technical replicates. Co-culture of bacteria with milk EVs demonstrated that EVs could decrease the growth of *S. aureus*, *B. subtilis*, *B. cereus* and *P. aeruginosa*. Highest growth inhibition was observed for *B. subtilis* ($33.9\% \pm 2.4$) followed by *B. cereus* ($18.1\% \pm 3.7$) at 6 hours of incubation. *S. aureus* and *P. aeruginosa* growth were inhibited by $12.9\% \pm 1.3$ and $9.9\% \pm 3.5$ respectively after 9 hours incubation. Only the *S. aureus* growth inhibition at 9 hours was statistically significant ($P=0.022$) according to T-test. However, *E. coli* growth was not affected by milk EVs compared to the control. In conclusion, the dietary EVs can be absorbed by bacteria and pasteurized milk derived EVs has a selective inhibitory activity on the growth of some bacteria.