

INACTIVATION OF FOODBORNE PATHOGENS BY FRUIT WINES

Tracy Bish

Dr. Azlin Mustapha, Thesis Supervisor

ABSTRACT

Wines produced from grapes have been found to possess bactericidal properties on a number of pathogens *in vitro*, suggesting possible health benefits that may be derived from microbiological safety. This study investigated the bactericidal effects in wines made from fruits other than grape. The foodborne pathogens *Escherichia coli* O157:H7, *Listeria monocytogenes*, *Salmonella* Typhimurium, *Shigella dysenteriae*, and *Staphylococcus aureus* were treated with fruit wine solutions at varying concentrations for 24 h using blackberry, cherry, peach, and red raspberry wine, and enumerated using a pour plate assay. At 40% fruit wine concentration, numbers of all pathogens tested were significantly reduced compared to a 0% wine solution control ($P < 0.05$). Increasing wine concentrations above 40% showed a greater effect. The bactericidal effect of wine extracts with ethanol removed was also tested, and a significant reduction in number for the pathogens was observed at 60% concentration compared to a control ($P < 0.05$). Correlation strength of the following factors to antibacterial activity of the fruit wines at 40% concentration was in the order of titratable acidity, alcohol content, pH, free sulfite concentration, anthocyanin content, total phenolic content, and tannin content. Scanning and transmission electron microscopic examinations of *E. coli* O157:H7 and *S. Typhimurium* after treatment with peach and cherry wine revealed differences in cellular morphology, specifically reduction in cell size, holes in the cell wall and membrane disruption that appeared to have caused leakage of intracellular contents.