Efficacy of plant-based antimicrobials against foodborne pathogens Salmonella enterica andListeria monocytogenes in vitro

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Foodborne pathogens such as Salmonella enterica and Listeria monocytogenes can cause illnesses such as Salmonella infection (salmonellosis) and listeriosis, due to consumption of contaminated food. Chemical sanitizer treatments have been traditionally used to reduce bacterial contamination on foods, but these treatments usually caused only 1-2 log reductions in pathogen population. Effective control measures are needed for improving food safety. The objective of this study was to evaluate the efficacy of plant-based antimicrobials against Salmonella Newport and L. monocytogenes in vitro. S. Newport or L. monocytogenes culture (10 6 CFU/mL) was mixed with various concentrations of the plant-based antimicrobials (seaweed extract, grapeseed extract, hibiscus extract) and incubated at 35°C overnight. The mixture was serially diluted in 0.1% peptone water, plated on tryptic soy agar and incubated at 35°C overnight. The surviving pathogens were enumerated, and the reductions were calculated for each antimicrobial treatment. On L. monocytogenes, seaweed extract at 0.625% to 5% had log reductions of 7 to 9.5; Grape seed extract at 0.625% to 5% caused 6.5-5.4 log reductions. The log reductions by hibiscus extract at 6.25% to 50% ranged 0.5-6.1 for L. monocytogenes, and the antimicrobial activity of hibiscus was concentration dependent. On Salmonella, seaweed extract at 2.5% and 5% caused 7 and 9 log reductions, respectively; Grapeseed extract at 2.5% and 5% showed 2 and 7 log reductions, respectively. Hibiscus extract at 25% and 50% had log reductions of 3.4 and 8.1, respectively. For low concentrations of antimicrobials, reductions in Salmonella were minimum. Plant-based antimicrobials effectively reduced S. Newport and L. monocytogenes populations in vitro. Antimicrobials were more effective on L. monocytogenes than S. Newport. The seaweed extract was the most effective among the 3 antimicrobials for L. monocytogenes reduction. The findings may provide food industry with potential and novel candidates of plant-based antimicrobials to fight against foodborne pathogens.