Pasteurization of food and beverages by high pressure processing (HPP) at room temperature: Inactivation of Staphylococcus aureus, Escherichia coli, Listeria monocytogenes, Salmonella and other microbial pathogens

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Vegetative pathogens are actively growing, metabolizing and dividing cells in foods, and consequently the focus of concern for food industry, food regulators and food control agencies. Foodborne outbreaks continue to be reported around the world, causing illnesses, hospitalizations and in certain cases deaths, together with product recalls and subsequent economic losses. Major bacterial infections from raw and processed foods are caused by the toxigenic *Escherichia coli* serotype O157:H7, *Salmonella enteritidis* and *Listeria monocytogenes*. High pressure processing (HPP) is a non-thermal pasteurization technology which relies on very high pressures (400-600 MPa) to inactivate pathogens, instead of heat, thus causing less negative impact on the food nutrients and quality. It can be used to preserve foods instead of chemical food additives. In this study a review of the effect of HPP treatments on major vegetative bacteria in specific foods was carried out. HPP at 600 MPa, commonly used by the food industry, can achieve the recommended 5-8 log reductions in *E. coli, S. enteritidis, L. monocytogenes* and *Vibrio*. *Staphylococcus aureus* presented the highest resistance among the foodborne vegetative pathogens investigated. Following in resistance to HPP was *E. coli.* More susceptible *L. monocytogenes* and *Salmonella* spp. bacteria were reduced by 6 log at pressures within 500-600 MPa. *Vibrio* spp. (e.g. raw oysters), *Campylobacter jejuni, Yersinia enterocolitica, Citrobacter freundii,* and *Aeromonas hydrophila*, generally required lower pressures (300-400 MPa) for inactivation. Bacterial species and strain, and the food itself with a characteristic composition, affect the microbial inactivation. This review demonstrated HPP is a safe pasteurization technology, able to achieve at least 5 log reductions in major food bacterial pathogens without application of heat.
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