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ATTACHMENT 1

Suggested wording for inclusion into Juice HACCP Guidance Document for Dense Phase Carbon Dioxide Processing

5.35 Dense Phase Carbon Dioxide Processing Systems

Dense phase carbon dioxide processing (DCO_2P) has been shown to be effective in reducing vegetative pathogens. In the gas industry, supercritical and liquid carbon dioxide (CO_2) are known collectively as dense-phase CO_2. Continuous processes have been developed using DCO_2 as the major anti-microbial agent. The process is effective under moderate pressures (e.g. 5000 psig). Pathogen challenge tests showed that more than 5 log reductions were achieved on *Eschericia coli* O157:H7, *Salmonella sp.*, and *Listeria monoctyogenes*. Kinetic studies showed that microbial inactivation increases as the CO_2 concentration increases. For these processes, CO_2 concentration is critical to the process. It appears that pressure and residence time may be used to optimize the bactericidal effects of CO_2. In the range of citrus products tested, the effectiveness of the process appears not to be limited by the level of soluble sugars or total solids. Currently, temperature is not monitored as a critical factor as the process is performed under ambient conditions.