

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Boiling alone for 1 h is insufficient to reduce APC and ASC, which occur in very high numbers on fresh bovine tripe. These aerobic bacteria and aerobic spores show heat resistance and they proliferate rapidly to cause early spoilage of 0 kGy RTE bovine tripe.

Gamma irradiation at a target dose of 9 kGy may considerably improve the microbiological safety and quality of RTE bovine tripe and consequently increase its shelf life to at least 14 days (Phase 1) under aerobic conditions or to at least 7 days (Phase 2) under anaerobic conditions when stored at appropriate refrigeration temperatures (≤ 5 °C). Gamma irradiation of RTE bovine tripe at a target dose of 9 kGy is sufficient to reduce inoculated *C. perfringens* ATCC 13124 spores to non-detectable levels throughout storage (7 days) in an anaerobic environment irrespective of the temperature at which the irradiated RTE tripe is stored (5 or 15 °C). Gamma irradiation also reduces APC (in an anaerobic environment) to below $2 \log_{10}$ cfu/g, throughout 7 days of storage regardless of storage temperature. Gamma irradiation at a target dose of 9 kGy is however insufficient to reduce the aerobic spores on RTE bovine tripe to acceptable levels under aerobic conditions. Therefore, it may be unsafe for consumption when *sous-vide* method is used to process RTE bovine tripe.

Transmission electron micrographs show that irradiation inhibition of *C. perfringens* ATCC 13124 spores is manifested in their post-germination system.

Heat sensitisation of aerobic bacteria and aerobic spores to gamma irradiation is minimal in an aerobic environment as evidenced by the relatively high counts of APC and ASC that survive boiling and gamma irradiation. However, these entities lose their ability to proliferate rapidly during storage at both 5 and 15 °C. Therefore, the synergistic effect of boiling in combination with gamma irradiation is probable although it might not be very effective when used on bacterial strains that show high resistance to both heat and irradiation. Boiling prior to gamma irradiation has a synergistic effect on a pure *C. perfringens* ATCC 13124 spore culture as seen by loss of spore material, in the absence