Title Effect of lactic acid and lactic acid bacteria on biogenic amine concentration in vacuum-packaged beef

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Abstract

Biogenic amines are nitrogen compounds produced in foods due to amino acid decarboxylation, they are not formed in sterile meat, their concentration increases with decarboxylase producing microflora. Application of lactic acid has been used for meat surface decontamination, reducing decarboxylase-producing microflora. An alternative of using lactic acid is promoting lactic acid is promoting lactic acid fermentation in situ. The objective of this study was to determine the effect of applying lactic acid by a controlled fermentation using lactic acid bacteria strains (LAB), or its chemical form in vacuum-packaged beef stored under refrigeration and temperature abuse conditions. Finely cut meat was inoculated with one spoilage strains (*Pseudomonas flurorescens, Brochothrix thermosphacta* or *Lactobacillus minor*) and one LAB (*Lactobacillus carnis, Lactobacillus pentosus* or *Staphylococcus carnosus*) or treated with lactic acid. Samples were vacuum-packaged and stored at 4 °C and 20 °C (to simulate temperature- abuse conditions) during 12 and 6 d respectively. Biogenic amines (histamine, cadaverine, putrecine and tyramine) concentrations were analyzed by HPLC. All lactic acid treatments reduced histamine concentration when the meat was stored at 20 °C (lactic acid and LAB<0.25 mg/Kg vs. control 4.91 mg/Kg). LAB did not reduce cadaverine, putrecine or tyramine concentration in both storage temperatures. Meat treated with lactic acid had the lowest putrcine concentration (lactic acid 33.62 mg/Kg vs. control 54.78 mg/Kg at 4 °C; lactic acid 124.26 mg/Kg vs. control 245.68 mg/Kg at 20 °C) and tyramine (lactic acid 78.69 mg/Kg vs. control 145.78 mg/Kg at 20 °C). Lactic acid efficiently reduced biogenic amine concentration in vacuum-packaged beef; conversely LAB did not prevent formation of these compounds that result from decarboxylase-producing microorganisms present in the meat.