Title Preventive effect of tannic acid in combination with modified atmospheric packaging on the quality losses of the refrigerated ground beef

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Abstract

Chemical, microbiological and sensorial changes of ground beef treated without and with tannic acid (200 mg/kg) and stored in air and under modified atmosphere packaging (MAP) (80%O_2/20%CO_2 or 10%O_2/20%CO_2/70%N_2) were monitored during 15 days of storage at 4 °C. During the storage, samples treated with tannic acid and kept under all packaging conditions contained lower peroxide value (PV) and thiobarbituric acid-reactive substances (TBARS) with coincidental lower non-haem iron content, compared with non-treated counterparts ($P < 0.05$). The sample packed in high oxygen MAP treated without and with tannic acid had the higher oxymyoglobin and a^* values and received the higher likeness scores for colour, whereas the samples stored in air and under low oxygen MAP showed the lower values, regardless of tannic acid treatment. After 15 days of storage, myosin heavy chain (MHC) and actin of all tannic acid treated samples underwent less degradation than those without tannic acid treatment for all packaging conditions. Degradation of MHC was more pronounced in samples kept under MAP with high oxygen. Psychrophilic bacterial count (PBC) of all tannic acid treated samples was lower, compared with that of non-treated samples ($P < 0.05$), irrespective of packaging condition. Therefore, tannic acid treated samples stored under high oxygen MAP could maintain the red colour and retard lipid oxidation and microbial growth of ground beef during refrigerated storage.