



Influence of ultrasound bath on lamb meat tenderness

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Studies reported potential uses of high-intensity ultrasound (UAI) in fresh meat, mainly in the muscles of cattle, but not yet in sheep muscles; sometimes this effect is positive (softening and water retention), and other times it is negative (hardening and water release). In this sense, further studies on the subject and using meat cuts from other species are auspicious. The aim of this study, approved by the ethics committee for the use of animals in research at the Federal University of Paraná (protocol number 050/2023), was to evaluate the tenderness of lamb meat subjected to high-intensity ultrasound treatment. Six loins and six flat were used from the carcass of 120-day-old lambs that were finished in confinement and slaughtered with 38 ± 2 kg of body weight. The lambs came from the same property, were offspring of the same ram and were subjected to the same nutritional management. After being removed from the carcass, the cuts were cleaned to remove subcutaneous fat and connective tissue and were vacuum packed and frozen (-18°C) until analysis was carried out. Subsequently, the cuts thawed in a BOD incubator for 12 hours at 4°C , vacuum packed and then subjected to three times in the ultrasound bath: time zero (without ultrasound bath), 5 and 10 minutes. The ultrasound bath (usc-2800a, Unique) used worked at a frequency of 40kHz and a power of 100 W, representing high intensity ultrasound ($10 - 1000 \text{ Wcm}^{-2}$) and low frequency (20 – 100kHz). After ultrasound treatment, the cuts were aged for 0, 7, 14, 21 e 28 days in a BOD at 4°C . To measure the shear force (SF) sample from each cut, cuts were placed to bake on a grill until the internal temperature reached 70°C . The cooked samples were cut into cylinders (three cylinders by sample) and subjected to cutting in the transverse direction of the muscle fibers using the Texture Analyzer device, coupled to the Warner-Bratzler blade, with the values expressed in kgf. The design was completely randomized in a $2 \times 3 \times 5$ factorial scheme, two cuts (loin and flat), three ultrasound times (0, 5 or 10 minutes) and five aging times (0, 7, 14, 21 or 28 days). The means were compared using the Tukey test at 5% significance, and the Minitab 18.0[®] program was used for statistical analysis. There was no interaction ($p \geq 0.05$) between cut, ultrasound bath and aging for SF, but there was ($p \leq 0.05$) between cut and aging time, where aging for up to 28 days left the meat more tender. The SF values were 3.7 kgf to 1.7 kgf in the loin and 2.7 kgf to 1.6 kgf in the flat, on 0 and 28 days of aging, respectively. The ultrasound bath had no effect on the tenderness of lamb meat ($p \geq 0.05$); the SF values were 1.9 kgf at time 0 and 5 minutes and 1.8 kgf at time 10 minutes of ultrasound bath. In the experimental conditions used in the present study, the ultrasound bath did not influence the tenderness of lamb meat.

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