

## High voltage electric stimulation effect on shear force of meat from Nelore cattle

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The high voltage electric stimulation consists on a passage of an electric current by the carcass in the end of the slaughter process. This current should cause violent muscular contractions in order to accelerate the anaerobic glycolysis, favor the pH reduction and consequently reduce the period necessary to establish the post mortem rigor. The electric stimulation also can activate the proteolytic enzymes by the environment acidification and cause the physical rupture of muscular myofibrils due the strength of the muscular contractions; this process can have as consequence the reduction of the meat's shear force. The objective from this study was evaluating the effects of use high voltage electric stimulation on the shear force of two different muscles from Nelore animals. In a commercial slaughterhouse there were collected 32 *Longissimus Dorsi* muscles, 16 from carcasses submitted to electric stimulation (ES) and 16 from no stimulated carcasses (NES) and 32 *Semitendinosus* muscles divided in the same way, all were Nelore animals, with around 24 months of age and a medium carcass weight of 300 kg. The electric stimulation protocol was 800 V, during 90 seconds with 1 or 2 pulses by second. After the cooling process the left half carcasses were sectioned between the 12<sup>nd</sup> and the 13<sup>rd</sup> rib (from tail to head way) and a 10cm sample from the two muscles were collected, packed and frozen in order to posterior analysis. The samples were prepared in a pre-heated oven with a temperature of 180°C until reach an intern temperature of 72°C, after the cooking process the samples were stored during 24hs in a temperature of 4 ± 2°C. From each sample there were collected 6 cylindrical sub samples and the shear force was measured in a perpendicular way in relation to the muscular fibers using a Warner-Bratzler blade adapted in the Stable Mycro Systems TA-XT2i. The speed used was 5mm/s on pre and posttest and 2mm/s on test. The experimental design was completely randomized; the data was submitted to analysis of variance using the statistic software SAEG. The electric stimulation effect on the shear force was significant (P<0.05) for the *Longissimus dorsi* muscle, the result show a reduction of 13.8% (NES = 5.29 kgF e ES = 4.56 kgF). However, for the *Semitendinosus* muscle there was no significant difference observed between the treatments (NES = 4.18 kgF e ES = 4.06 kgF), although the values for the shear force found for this muscle are considered as satisfactory tenderness. The different result for the two evaluated muscles can be due the anatomic position because the electric stimulus is stronger on the thoracic region e reduced on the back region where is the *Semitendinosus*. The use of electric stimulation, on this study conditions, was efficient to reduce the shear force from *Longissimus dorsi* muscle from de Nelore bovine carcasses.

**Keywords:** bovine, electric stimulation, *longissimus dorsi*, *semitendinosus*, tenderness

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