

Feasibility of different inert gases for stunning process of rabbit: Impact on meat quality and physiological traits

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Introduction: The stunning of animals prior to slaughter is practiced throughout the world. It is well known that stunning methodology affects animal welfare and carcass, as well as meat quality. Carbon dioxide (CO₂) stunning has some animal welfare disadvantages, as its high concentration of inhalation is aversive and it induces a non-immediate loss of consciousness. To reduce aversion, alternatives to CO₂ stunning, different inert gases (Argon, N₂) can be used. Reduction of aversion during Argon/N₂ inhalation may improve animal welfare. Thus the objective of this study was feasibility of using different inert gases (CO₂, Ar and N₂) in different high concentrations for stunning process of rabbit and its impact on meat quality and physiological traits.

Materials Methods: To conduct of this experiment, seven groups such as T0 (Halal treatment) and remaining was T1 (CO₂ - 85%), T2 (CO₂ - 90%), T3 (Ar - 85%), T4 (Ar - 90%), T5 (N₂ 85%), and T6 (N₂ 90%) were applied. Rabbits were collected from nearest commercial farms. The experiment was carried out at the experimental gas chamber included slaughterhouse of NIAS, RDA. After stunning of animal, animal was slaughtered as quickly as possible, then try to completely bleed out and collect the blood. Loin muscle and small intestine were collected, also. The color of all samples and pH-0h of loin muscle were determined on the same sampling day, while cooking loss, shear force, pH-24h, color of loin muscle were determined in next day. The color were determined using Minolta Chroma Meter CR-400, and color was expressed according to the CIE system. The pH-0h values of loin muscle were determined by using a pH*K 21, and pH-24h of loin were determined by using tristar pH meter. The proximate compositions were determined using Food Scan Lab 78810. The cooking loss and WBSF were measured on a same steak of each loin sample. The WBSF values were obtained using Instron Universal Testing Machine. The GLM and Duncan's multiple range test was performed using SAS version 9.4 program to determine the significance of differences between treatment means.

Results: Color measurement of blood, small intestine, meat -0 h and meat-24 h in different treatment groups are performed. In blood, T0 showed the highest L*, and gradually decreased in N₂, Ar and CO₂ gas using groups, and T2 showed the lowest value (p<0.05). Compare with T0, a* and b* values were gradually increased in N₂, Argon and CO₂ gas using groups, respectively. pH values were decreased in the order of N₂, Argon and CO₂ gas using groups. In small intestine, T0 showed highest L* value and was decreased in N₂, Ar and CO₂ using treatment groups. In case of a* and b*, highest value was showed in 90% CO₂ and lowest in control groups. In loin-0h, L* value was the lowest in T2, redness was significantly higher in T1 and T2 than other gas using groups. In Yellowness, significant differences were found in different gas using groups, too. In loin-24 h, lowest L* value and highest a* and b* value were shown in T1 and T2. In cooking loss and WBSF, T1 and T2 showed lower values than T0. There was no significant difference in moisture, protein, and fat contents (data not shown).

Acknowledgements: This study was supported by "Cooperative Research Program for Agricultural Science & Technology Development (PJ01490102)" National Institute of Animal Science, Rural Development Administration, Republic of Korea.