Impact of rabbit genotype and farming temperature on meat quality traits

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Introduction: The present experiment studied the effects of rabbit genotype (G) and farming temperature (T) on proximate composition, mineral profile and oxidative status of rabbit hind leg (HL) meat.

Materials and Methods: A total of 90 rabbits were considered, belonging to three genotypes (n=30 rabbits/genotype): Pannon White (PW), Pannon Ka (PKa) and Pannon Large (PL). The PKa is a maternal line selected for number of kits born alive, whereas the other two are paternal lines pre-selected for litter weight (PW) and average daily gain (PL), and then both selected for thigh muscle volume. At weaning (5 weeks of age) rabbits were housed at normal temperature (20 °C; n=15 rabbits/genotype) or at a warmer temperature (28 °C; n=15 rabbits/genotype). Rabbits were placed in wire-mesh cages and fed ad libitum with a commercial diet for growing rabbits. The set photoperiod was 16L:8D. At 11 weeks of age and after overnight fasting, rabbits were slaughtered and carcasses were dissected. From each carcass, one HL was deboned, ground, freeze-dried and analysed for proximate composition, He-iron content, mineral profile and oxidative status (TBARS). Data were analysed with a two-way ANOVA and considered G, T as fixed effects, and their interaction. Differences were considered significant when $P<0.05$.

Results: As expected, rabbit genotype had a strong effect on most of the considered meat quality traits, namely moisture ($P<0.001$), protein ($P<0.001$), lipids ($P<0.01$), and mineral ($P<0.01$) contents, which was attributable to the different selection criteria of these synthetic lines. Also, the oxidative status of rabbit HL meat was affected by rabbit G, with PKa displaying a higher TBARS content than PL group with PW being intermediate ($P<0.05$). High farming temperature confirmed to play a detrimental role on rabbit performance which had a negative effect also on HL meat proximate composition (moisture, protein and lipids; $P<0.05$) and He-iron content ($P<0.001$). Interestingly, the oxidative status of meat was not affected by S treatment, thus probably highlighting an effective defence mechanism of rabbits against the in vivo oxidative stress. The ultimate goal of the present research was, however, to assess if one of the considered rabbit genotypes was the most suitable to be farmed under high temperature. Results highlighted that PKa genotype was the most sensitive to high temperature condition: in fact, HL meat showed a significant reduction in lipids content when rabbits were housed under high temperature (6.39 vs 5.09 g/100 g meat for PKa rabbits farmed at 20 °C and 28 °C, respectively; $P<0.05$). Also in this case, the result was attributable to the genetic background of PKa rabbits, being a maternal line characterized by higher body fat reserves compared to the other two lines. This characteristic can exacerbate the negative effects of high farming temperature, which reflected also on meat nutritional composition.

Conclusions: The present experiment found that, based on the results obtained on the meat quality traits, the PKa maternal line is more sensitive to high farming temperatures, whereas PW and PL seem more suitable to be farmed also in warm climates.

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