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Effect of swine immunocastration on salts and volatile compounds of Teruel dry-cured hams

L. Pérez-Ciria[1], M.A. Sanz[2], M. Blanco[2], G. Ripoll[2], J. Álvarez-Rodríguez[3], F.J. Miana-Mena[1] and M.A. Latorre[1]
[1]Universidad de Zaragoza-IA2, C/ Miguel Servet 177, 50013 Zaragoza, Spain, [2]CITA de Aragón-IA2, Av. Montañana 930, 50059 Zaragoza, Spain, [3]Universitat de Lleida, Av. Rovira Roure 191, 25198 Lleida, Spain; leticiapcgm@gmail.com

Two experiments were carried out to evaluate the effect of immunocastration (immunization against GnRH) on the quality of Teruel dry-cured hams, proceeding from (Landrace × Large White) × Duroc pigs slaughtered around 135 kg. In the first trial, 20 hams from entire and immunocastrated gilts (EG; IG) were compared (n=10) and, in the second one, 14 hams from surgically castrated and immunocastrated males (SCM; ICM) were tested (n=7). All pigs, carcasses and hams had received the same management at farm, slaughterhouse and cellar. Once hams were cured (19 months), concentrations of sodium chloride, potassium nitrate, sodium nitrite, α-tocopherol, γ-tocopherol, δ-tocopherol, retinol, cholesterol and volatile compounds were measured in the *Biceps femoris* muscle. Data were analysed using the GLM procedure of SAS. In the first trial, IG presented greater (P<0.05) sodium chloride and sodium nitrite concentrations than EG, being in all cases normal values for this kind of product. About volatile compounds, IG presented lower (P<0.05) proportion of alcohols and furans, having both groups little influence on ham flavour. However, the 1-octen-3-ol alcohol and the 2-pentylfuran furan were also lower (P<0.05) in IG, which could imply lower mushroom and rancid notes and lower pleasant fruit and flower scents. In the second trial, ICM had lower (P<0.05) potassium nitrate and retinol concentrations than SCM. Also, ICM showed lower (P<0.05) percentage of alcohols (including 1-octen-3-ol) and sulphur compounds than SCM. This last group plays an important role in meat flavour and causes an unpleasant strong odour. Besides, ICM showed higher (P=0.012) proportion of acids, which are associated with fatty and cheesy notes. It can be concluded that immunocastration produced hams with more salt and nitrites in gilts and less nitrates and retinol levels in males. Besides, immunocastration affected some volatile compounds, which could have some influence on ham flavour. Project funded by MINECO (AGL2016-78532-R) and by Gobierno de Aragón (FITE and FEDER).

Effects of immunocastration protocols in the meat quality of female Bísaro pigs

S. Botelho-Fontela[1], S. Ferreira[2], M. Almeida[1], C. Castelo[3], G. Paixão[1], R. Payan-Carreira[4], S. Silva[1], A. Esteves[1] and J. Silva[1]
[1]Animal and Veterinary Research Centre (CECAV), University of Trás-os-Montes e Alto Douro, 5000-801 Vila Real, Portugal, [2]CITAB, University of Trás-os-Montes e Alto Douro, 5000-801 Vila Real, Portugal, [3]Associação de Criadores de Suínos da Raça Bísara, Edifício da Casa do Povo Largo do Toural, 5320-311 Vinhais, Portugal, [4]MED – Mediterranean Institute for Agriculture, Environment and Development, University of Évora, 7006-554 Évora, Portugal; sbotelho@utad.pt

Different immunocastration protocols were tested to determine whether the moment of the first inoculation would impact meat quality. This study used twenty multiparous female Portuguese *Bísaro* pigs (carcass weight, CW, 161.8±29.8 kg), reared in similar conditions, which were selected for culling after weaning. As these females present a marked body condition loss, immunocastration was decided to avoid reproductive function during the post-weaning recovery of body condition. Three protocols were applied, each consisting of two inoculations (Improvac®, Zoetis) four weeks apart. Three protocols were tested that differed in the moment of the Improvac® first inoculation: at the onset of oestrus (BE; n=5; CW 158.5±25.8 kg); one week after the beginning of oestrus (OE; n=5; CW; 158.6±30.3 kg); and in the middle of the suckling period (SP; n=5; CW 167±38,2 kg). A control non-treated group was also included (C; n=5; CW 163.4±33.2 kg). Sows were slaughtered four weeks after the treatment, at a municipal abattoir. After slaughter, various meat quality traits were assessed in the *Longissimus thoracis et lumborum* muscle: pH, measured at 45 min and 24 h *post mortem*; drip loss; L*a*b* meat colour (measured in the fresh-cut and after 60 min of blooming); cooking loss; and shear force. There were no differences between treatments in any of the traits assessed (P>0.05), suggesting that neither protocol tested affected the sow meat quality. This work was supported by the project Icas- Bísaro (reference n°. PDR 2020-101-031029) and the project UIDB/CVT/00772/2020 funded by the Fundação para a Ciência e Tecnologia.

Impact of swine immunocastration on fat quality of Teruel dry-cured hams

L. Pérez-Ciria[1], G. Ripoll[2], M. Blanco[2], J. Álvarez-Rodríguez[3], F.J. Miana-Mena[1] and M.A. Latorre[1]
[1]Universidad de Zaragoza-IA2, C/ Miguel Servet 177, 50013 Zaragoza, Spain, [2]CITA de Aragón-IA2, Av. Montañana 930, 50059 Zaragoza, Spain, [3]Universitat de Lleida, Av. Rovira Roure 191, 25198 Lleida, Spain; leticiapcgm@gmail.com

Two experiments were carried out to evaluate the effect of immunocastration on the quality of Teruel dry-cured hams. It is a Spanish Protected Designation of Origin of hams from (Landrace × Large White) × Duroc pigs slaughtered around 135 kg. In the first trial, 20 hams from entire and immunocastrated gilts (EG; IG) were compared (n=10) and, in the second one, 14 hams from surgically castrated and immunocastrated males (SCM; ICM) were tested (n=7). All pigs, carcasses and hams had received the same management at farm, slaughterhouse and cellar. Once hams were cured (19 months), colour and thickness of the subcutaneous fat and marbling, lipid oxidation and fatty acid profile of the *Biceps femoris* muscle (intramuscular fat) were analysed. Besides, in the hams from males, boar taint compounds (androstenone, skatole and indole) concentration was also determined. Data were analysed using the GLM procedure of SAS. In the first trial, no effect ($P>0.10$) of immunocastration was observed on fat colour traits, marbling, lipid oxidation or fatty acid profile, but subcutaneous fat thickness was thicker ($P<0.05$) in IG than in EG. In the second trial, immunocastration did not influence ($P>0.10$) colour traits and thickness of the subcutaneous fat or marbling, lipid oxidation and intramuscular fat composition; however, ICM showed higher ($P<0.05$) skatole and indole concentrations than SCM, although these levels were under the thresholds above which consumers would negatively react to hams. Besides, androstenone concentration in both treatments was under the quantification limit of the equipment used. Therefore, it can be concluded that immunocastration, both in female and male pigs, had limited effect on fat quality of Teruel dry-cured hams. However, it is worth noting that in females it increased subcutaneous fat thickness, which is a positive aspect for the curing process, and in the case of males it failed to reduce the levels of skatole and indole as much as with surgical castration. Project funded by MINECO (AGL2016-78532-R) and by Gobierno de Aragón (FITE and FEDER).

Assessment of an *in vivo* method for measuring *de novo* lipogenesis using stable isotopes in pigs

H.H. Salgado[1,2], H. Lapierre[2], M.P. Létourneau-Montminy[1] and C. Pomar[2]
[1]University Laval, Animal Science, 2425 rue de l'Agriculture, G1V0A6, Canada, [2]Agriculture Agri-Food Canada, 2000 College Street, J1M1Z7, Canada; hector-hernando.salgado-romero.1@ulaval.ca

The use of radioactive isotopes to measure de novo lipogenesis in pigs has been well established. In contrast to radioactive isotopes, stable isotopes present little or no risk to human and animal subjects. Therefore, the objective of this study was to adapt the bolus injection of glucose labelled with radioactive 14C method to use glucose labelled with stable 13C to estimate de novo lipogenesis in finishing pigs. Five gilts were fed a commercial diet (3.0 kg/day, as is) for 2 weeks; the last 4 d, they received their daily allowance in 6 equal portions. On the 4th day, gilts received an intra-jugular bolus injection of [U-13C] glucose (12 mg/kg BW). Then, blood was sampled at 2, 4, 6, 9, 12, 15, 20, 30, 40, 60, 80, 100, 120, 150, 180, 210, 240 min after the injection to determine plasma glucose isotopic enrichment (IE). The IE of lipids was determined from adipose tissue biopsies collected at 1, 2, and 3 h after the bolus injection, and from adipose tissue collected after pig's euthanasia 4 h after the bolus. Lipogenesis was calculated from the incorporation of 13C into adipose tissue lipids. The rate of disappearance (Rd) of [U-13C] glucose estimated using a double exponential function of glucose IE vs time averaged 5.4±1.4 mmol/min. Results showed that the IE of lipids linearly increased during the 4 hours following the bolus injection ($P<0.05$). The rate of lipogenesis estimated at 4 hours after the bolus injection averaged 9.0±3.4 µg glucose/(min×g of lipids), which is within the range of values reported by previous studies using radioactive isotopes. In conclusion, the *in vivo* method of a bolus injection of [U-13C] glucose allows a successful estimation of de novo lipogenesis in finishing pigs.