

RACTOPAMINE HYDROCHLORIDE AND IMMUNOCASTRATION EFFECTS ON ITALIAN COPPA PROPERTIES

LUCAS, D.S.¹; CIPOLLI, K. M. V. A. B.³; PFLANZER, S.B.⁴; SILVEIRA, E.T.F.^{2*}; SILVA, T.J.P.¹

¹ Department of Food Tecnology, Federal Fluminense University, Rua Vital Brazil Filho, 64 - 24230-340, Niterói, RJ

²Meat Technology Centre, Institute of Food technology, Av. Brasil, 2880, 17070-178, Campinas, SP, Brazil

³ Sensory, Physics and Statistic Analysis Reference Laboratory Unit, Food Science and Quality Centre, Institute of Food technology, Av. Brasil, 2880, 17070-178, Campinas, SP, Brazil

⁴ Department of Food Tecnology, State University of Campinas, Rua Monteiro Lobato, Campinas, SP, Brazil.

*Corresponding author (phone: +55-19-3743-1892; fax: +55-19-3743-1882; e-mail: tadeu.s@uol.com.br)

Abstract- The effects of immunocastration and Ractopamine (RAC) feeding require studies to clarify the interaction of these two technologies on quality traits of swine products. The aim of this study was to evaluate the acceptability of coppa obtained of this technology. Ninety swine neck from crossbred (Tempo, male and Topigs 40, female) pigs were processed for preparation of Coppa Italian type. Six group were divided: gilts (FE), male pigs castrated physically (PC) and immunologically (IC), each one with/without (RAC) (7.5mg/Kg during 21 days). Thirty samples of each treatment (half pieces of pork necks = experimental unit (n = 180)) were processed. Samples were assessed by 54 consumers (63% women and 37% men) of coppa using the nine-point structured hedonic scale (1=disliked extremely, 9=like extremely) and five point structured purchase intent scale (1=definitely would not buy; 5=definitely would buy). Test was carried out in the Sensory, Physics and Statistic Analysis Reference Laboratory Unit (LAFISE) of CCQA/ITAL. Samples were presented blind to consumers in a monadic way and in a balanced complete block design. Data was submitted to ANOVA and Tukey test to compare means. Coppa of all treatments were well accepted by consumers and there were no significant differences ($p>0.05$) in the consumer means scores categories for appearance and flavor ("liked moderately (7)" - "liked very much" (8)), texture and overall acceptability ("liked s moderately (7)", among the six treatments. The purchase frequency (60%) shows that all products were certainly/probably likely to buy. The present results for consumer acceptance suggest that immunocastration and Ractopamine (RAC) feeding can be successfully applied for Italian Coppa.

Keywords— Coppa, Affective Test, Immunocastration, Ractopamine Feeding.

I INTRODUCTION

Ractopamine (RAC) is a β -adrenergic, a substance with similar structure of catecholamines, applied in pork production as an additive. It acts as a modifiers of animal metabolism, changing the partition of nutrient by diverting and promoting growth and deposition of lean tissue and reducing fat in the carcass of finishing pigs[1]. Immunocastration is an alternative to the surgical castration, it is a technology that has been developed to reduce boar taint compounds in pork by a temporary suppression of testicular function through vaccination against gonadotrophin realizing hormone (GnRH) [2;3;4]. The effects of immunocastration and ractopamine feeding on pork have been studied recently and it shows positive results of these technologies on feed efficiency and quantity of lean meat, what may result in economic benefits [5;6;7;8;9]. However the industry requires further studies to clarify the interaction of these two technologies on processed pork meat quality traits. The purpose of this study was to carry out a consumer acceptance test to compare the sensory properties of Italian Coppa from animals of six tratament groups (gilts: FE, male pigs castrated physically: PC and immunologically: IC), with/without Ractopamina: RAC (7.5mg/Kg during 21 days).

II MATERIAL AND METHODS.

A Animals.

A total of one hundred ninety seven crossbred (Tempo, male and Topigs 40, female) pigs were penned with a total of 6 treatment groups (15 animals in each group) (gilts: FE, male pigs castrated physically: PC and immunologically: IC), with/without Ractopamina: RAC (7.5mg/Kg during 21 days).

B. Slaughter.

The animals were raised in the same commercial farm. At the end of finishing period pigs were transported approximately 250 km to a commercial pork packing plant (Mondelli, Bauru, SP) where they were electrically stunned and humanely slaughtered in accordance with the Sanitary and Industrial Inspection Regulation for Brazilian Animal Origin Products [10] after a 8-h rest period at the plant.

C. Samples.

After cold storage at 2 °C per 24 h, ninety sides of half carcasses were transported to the pilot plant in the Meat Technology Center of the Institute of Food Technology for deboning, when samples of pork neck were processed for preparation of Coppa Italian type with a total of 6 treatments (gilts, FE, male pigs castrated physically, PC and immunologically, IC, each with and without ractopamine (7.5 mg/Kg during 21 days)

D. Sample preparation

The samples (pork neck) were cleansed and cuted in 2 pieces (the half pieces serving as experimental unit with an n = 180), been thirty samples for each treatment. Samples were cured for 15 days, cleansed and stored at $17 \pm 2^{\circ}\text{C}$ for 56 days. The samples were sliced coded, wrapped in Polyvinyl Chloride (PVC) and in aluminum foil, packed in coolers and transported to the LAFISE for evaluation.

E. Sensory assessment.

Sensory acceptance, evaluated by a group of 54 consumers of Coppa, aged from 21 to 55 years, from social classes A, B and C. The products were evaluated as to overall acceptability, appearance aroma, flavor and texture, using nine point hedonic scales (9 = Like extremely, 5 = Neither like nor dislike, 1 = Dislike extremely) and five point structured purchase intent scale (1=definitely would not buy; 5=definitely would buy) [11]. Test was carried out in the Sensory, Physics and Statistic Analysis Reference Laboratory Unit (LAFISE) of CCQA/ITAL. Samples were presented blind to consumers in a monadic way and in a balanced block design. Data was submitted to ANOVA and Tukey test to compare means.

III RESULTS AND DISCUSSION

The samples of pork neck and the product obtained Coppa - of all treatments presented physics, chemical and microbiological characteristics in accordance with the Brazilian Technical Regulation of Identity and Quality of Coppa [12]. The results from the acceptance study where 54 consumers (63% women and 37% men, 64,8% were between 21 to 35 years), evaluated Coppa. The product of all treatments were well accepted by consumers and there were no significant differences ($p>0.05$) in the consumer means scores categories for aroma, appearance and flavor ("liked **moderately**" (7) - "liked **very much**" (8)), texture and overall acceptability ("liked **moderately**" (7), among the six treatments (Figure 1).

The purchase frequency (60%) shows that all products they definitely/probably would buy (Figure 2).

The results showed similar profiles of products despite differences in raw materials and due to the same manufacturing techniques.

The products showed a dark red color and slightly salty flavor as described in the comments of consumers.

The products developed in this research work through of Coppa production with different raw were considered good.

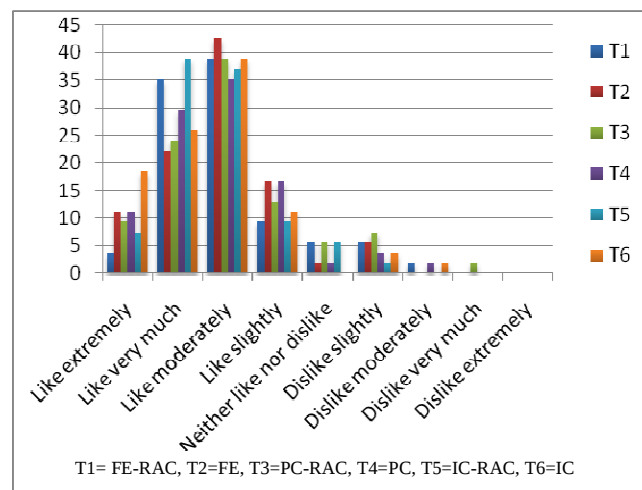


Figure 1 Overall acceptability frequency (%) of Italian Coppa.

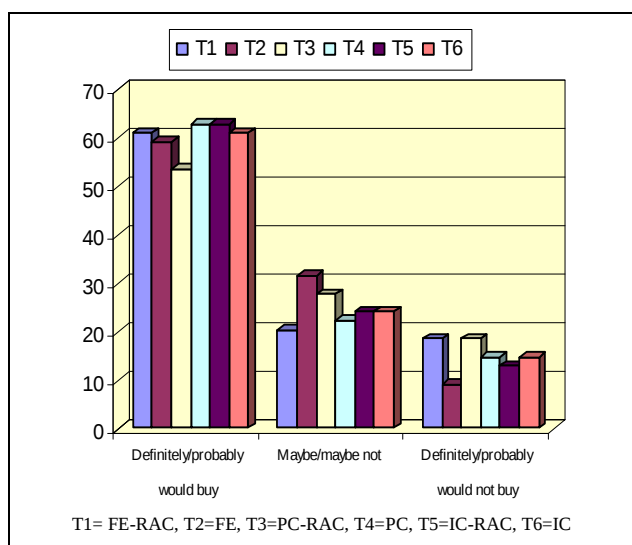


Figure 2 Purchase frequency (%) of Italian Coppa.

V CONCLUSION

The present results for consumer acceptance suggest that immunocastration and Ractopamine feeding can be successfully applied for Italian Coppa.

ACKNOWLEDGMENTS

The authors thank Pfizer Animal Health and Ourofino Agronegócio for the support given to conduct this study.

REFERENCES

1. Bridi, A.M.; Nicolaiewsky, S.; Rubensan, J.M. Efeito do genótipo Halotano e diferentes sistemas de produção na qualidade da carne suína (2003). *Rev Bras Zootecn.* V.32, n.6, p.1362-1370.
2. Pauly, C. ; Spring, P.; O'Doherty, J. V.; Ampuero Kragten, S.; Bee, G. Growth performance, carcass characteristics and meat quality of group-penned surgically castrated, immunocastrated (Improvac_R) and entire male pigs and individually penned entire male pigs (2009). *Animal*, 3:7, pp 1057–1066 & The Animal Consortium 2009.
3. Dunshea, F. R., C. Colantoni, K. Howard, P. Jackson, K. A. Long, S. Lopaticki, E. A. Nugent, J. A. Simons, J. Walker, and D. P. Hennessy. (2001). Vaccination of boars with a GnRH vaccine (Improvac) eliminates boar taint and increases growth performance. *J. of Anim Sci.* 79, 2524–2535.
4. Oliver, W. T., I. McCauley, R. J. Harell, D. Suster, D. J. Kerton, and F. R. Dunshea. (2003). A gonadotropin-releasing factor vaccine (Improvac) and porcine somatotropin have synergistic and additive effects on growth performance in group-housed boars and gilts. *J. of Anim Sci.* 81, 1959–1966.
5. Brumatti, R.C.; Kiefer, C. Simulação técnico-econômica da inclusão de ractopamina em dietas de suínos em terminação (2010). *Arq Bras Med Vet Zoo.*, v.62, n.1, p.163-171.
6. See, M. T., T. A. Armstrong, and W. C. Weldon. 2004. Effect of a ractopamine feeding program on growth performance and carcass composition in finishing pigs. *J. of Anim Sci*, 82, 2474–2480.
7. Uttaro, B. E., R. O. Ball, P. Dick, W. Rae, G. Vessie, and L. E. Jeremiah. (1993). Effect of ractopamine and sex on growth, carcass characteristics, processing yield, and meat quality characteristics of crossbred swine. *J. of Anim Sci.* 71, 2439–2449.
8. Marinho, P. C.; Fontes, O. D.; Silva, F. C. O.; Silva, M. A.; Pereira, F. A.; Arouca, C. L. C. (2007). Efeito da ractopamina e de métodos de formulação de dietas sobre o desempenho e as características de carcaça de suínos machos castrados em terminação. *Rev Bras Zootecn.* 36, p.1061-1068.
9. Weber, T. E., B. T. Richert, M. A. Belury, Y. Gu, K. Enright, and A. P. Schinckel. (2006). Evaluation of the effects of dietary fat, conjugated linoleic acid, and ractopamine on growth performance, pork quality, and fatty acid profiles in genetically lean gilts. *J. of Anim Sci.* 84, 720–732.
10. Brasil (1997). Ministério da Agricultura, Pecuária e Abastecimento, Regulamento de Inspeção Industrial e Sanitária de Produtos de Origem Animal. [Industrial Inspection and Sanitary Regulation of Food of animal Products]. Brasília: Ministério da Agricultura, Pecuária e Abastecimento.
11. Meilgaard, M; Civille, G. V.; Carr, B. T. Sensory evaluation techniques, 4th edition, CRC Press, Inc, Boca Raton, FL, 2006, 448p
12. Brasil (2000). Ministério da Agricultura, Pecuária e Abastecimento. Regulamento Técnico de Identidade e Qualidade de Copa [Technical Regulation of Identity and Quality of Coppa] , in

Instrução Normativa n.º 22, Anexo I. Ministério da
Agricultura e do Abastecimento, Secretaria de
Defesa Agropecuária.