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Immunization against gonadotropin-releasing factor (IM) in gilts harvested at 24 weeks of age: effects of second immunization timings on pork fat quality and its fatty acid profile.

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Introduction

Immunization against gonadotropin-releasing factor (IM) in market gilts results in predictable secondary effects on growth performance and carcass composition. Feed intake has been shown to be higher after the second week of 2nd application of immunological product (V2), resulting in faster growth and greater carcass fat deposition (1). This research aimed to evaluate the effects of three timings of immunization and two feeding programs on fatty acid profile of gilts.

Materials and Methods

A total 480 cross-bred commercial gilts (PIC Genetics) with 12 weeks of age (84 ± 1 day) were distributed in a randomized block design, 4×2 factorial arrangement, comprising two feeding programs [*ad libitum* (AL) and restrict (RF)] and three immunization timings of V2 (Table 1). Gilts in one group (T1) remained as an untreated control and three groups (T2, T3 and T4) received two doses of Vivax[®] with V2 timing respectively at 4 weeks (T2), 6 weeks (T3) or 8 weeks (T4) prior to harvest at 24 weeks of age. They were housed in 96 pens, 5 animals per pen and 24 pens (replications) per treatment. The gilts were fed with a corn and soya bean-based diets, formulated to meet the Brazilian Nutritional Requirements (2). At 24 weeks of age the gilts were harvested and backfat samples (100g) taken from the neck (collar, C3-C4, 6 samples per treatment), vacuum packed and frozen stored at -20° C. The fatty acid methyl esters of the neck fat samples were analyzed (n=48) according to the American Oil Chemists Society (3). Subsequently, total saturated, monounsaturated, and polyunsaturated fatty acids were calculated (n=6 per treatment). Additionally, the thrombogenic index (IT), defined as the relationship between the pro-thrombogenic (saturated) and the anti-thrombogenic fatty acids (MU-FAs, PUFAs – n6 and PUFAs – n3) was calculated. The results were submitted to ANOVA, and compared by Tukey's Test.

Table 1. Fatty acid profile (g/100g) and thrombogenic index of control and immunized gilts submitted to restricted and *ad libitum* regimen.

	Treatments				Feeding		CV (%)	p-value	
	T1	T2	T3	T4	AL	RF		Treat	Feeding
Saturated (g/100g)	33.8a	33.3ab	32.0b	31.9b	32.8	32.7	6.2	0.0663	0.9575
Monounsaturated (g/100g)	39.3	39.6	39.7	39.8	39.6	39.6	4.1	0.8518	0.9578
n – 3 (g/100g)	1.4	1.443	1.534	1.508	1.4	1.4	7.9	0.1540	0.8307
n – 6 (g/100g)	23.3	23.5	24.4	24.5	23.9	24.0	8.0	0.4274	0.8797
Polyunsaturated (g/100g)	24.7	25.0	25.9	26.0	25.3	25.4	8.1	0.3920	0.9758
n – 6/n – 3	16.2ab	16.3a	15.9b	16.3a	16.1	16.2	2.4	0.0229	0.2512
Thrombogenic index	0,93a	0,91ab	0,85b	0,85b	0,89	0,89	9,3	0,0603	0,9713

^{a,b} - groups with different letters within the same row are statistically different at $p \leq 0.05$ and $p \leq 0.10$ a trend. AL: *ad libitum*; RF: restricted feeding;

Results

No interaction effects between the factors as well as no differences were found among feeding programs. Significant ($p < 0.05$) findings were observed for timing of V2, where T2 and T4 presented higher ratio of n – 6/n – 3 compared to T1 and T3, that showed, respectively, a reduction of -0.6% and 2.4% for this trait. There is a trend ($p > 0.10$) towards saturated fatty acids decreasing according to immunization time, compared to the control group (T1), with percentage values of 1.5%, 5.4% and 5.6% for T2, T3 and T4, respectively. Similarly, IT decreased by 2.0%, 7.9% and 7.9% for treatments T2, T3 and T4, respectively, compared to T1 group ($p < 0.10$).

Discussion and Conclusion

It is known that fat composition is affected by immunization against GnRF in gilts (4). T2 group had the better n-6/n-3 ratio, but still far from the recommended 4:1. This elevated ratio might have been caused by the nutritional program of the gilts based on corn and soybean meal, which have higher concentrations of n-6. Differently from other studies that found an increase of saturated fatty acids in IM females (4,5), our results presented a decreasing trend ($p > 0,01$). On the other hand, the lower content of saturated fatty acids in the fat of IM gilts may be beneficial to health by preventing cardiovascular problems such as coronary heart disease (6). According to these findings in our study, IT, being an important parameter to human health, was improved in IM market gilts harvested at 24 weeks of age.

References

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