## PE1.56 Meat and carcass quality of hybrid pigs from Eastern Croatia 353.00

*Ivona Djurkin (1) idurkin@pfos.hr, Goran Kusec(1 ), Gordana Kralik , Vladimir Margeta Zlata Maltar Boris Lukic Zarko Radisic*

*(1)Faculty of Agriculture in Osijek*

***Abstract*—the present study was conducted on 120 PIC carcasses divided into two groups according to their genotype (C23 and C23xPIC337). The pigs were slaughtered at approximately 100kg of live weight in east Croatia. At the slaughter line warm carcass weight, carcass length "a" and "b", ham length and circumference, initial pH ($pH_{45}$), muscle thickness and fat thickness by "Two points" method were measured. After 24h of cooling the carcasses $pH_{24}$, $EC_{24}$ and colour of longissimus dorsi muscle (MLD) were measured. Laboratory work included measuring of drip loss, chemical analysis and instrumental tenderness analysis of MLD samples. The results of statistical comparison of two genotypes showed that carcasses from C23xPIC337 genotype were significantly longer than those from C23 genotype. They also had significantly higher backfat thickness, higher $EC_{24}$, drip loss, CIE L*, a*, b* values and higher IMF content. Although there were no statistically significant differences between two genotypes in lean percentage, classification of the carcasses into SEUROP classes showed that more carcasses from C23xPIC337 genotype were classified into classes S and E than those from C23 genotype.**

Ivona Djurkin, Department of Special Zootechnics, Faculty of Agriculture in Osijek, J.J. Strossmayer University of Osijek, Croatia, HR-31 000 Osijek (phone: +385 31 22 42 96; fax: +385 31 20 70 17; e-mail: idurkin@pfos.hr).

Goran Kusec, Department of Special Zootechnics, Faculty of Agriculture in Osijek, J.J. Strossmayer University of Osijek, Croatia, HR-31 000 Osijek (e-mail: gkusec@pfos.hr).

Gordana Kralik, Department of Special Zootechnics, Faculty of Agriculture in Osijek, J.J. Strossmayer University of Osijek, Croatia,

HR-31 000 Osijek (e-mail: gkralik@pfos.hr).

Vladimir Margeta, Department of Special Zootechnics, Faculty of Agriculture in Osijek, J.J. Strossmayer University of Osijek, Croatia,

HR-31 000 Osijek (e-mail: vmargeta@pfos.hr).

Boris Lukic, Department of Special Zootechnics, Faculty of Agriculture in Osijek, J.J. Strossmayer University of Osijek, Croatia, HR-31 000 Osijek (e-mail: boriluki@gmail.hr).

Zarko Radisic, Department of Special Zootechnics, Faculty of Agriculture in Osijek, J.J. Strossmayer University of Osijek, Croatia, HR-31 000 Osijek (e-mail: zradisic@pfos.hr).

***Index Terms*—hybrid pig, carcass, meat quality.**

### I. INTRODUCTION

PIG production in Croatia is becoming more intensified. For that reason pig industry oftentimes uses commercial hybrids selected on more efficient productive and/or meat quality traits. Several authors have proven a severe decline of meat quality traits when breeding is based solely on performance traits [1, 2, 3]. Within this context it is necessary to choose a sire which can improve the carcass and meat quality traits. The aim of this paper was to compare carcass and meat quality traits of PIC C23 (Pig Improvement Company) line and its crosses with PIC337 boar.

### II. MATERIALS AND METHODS

The present study was carried out on 120 PIC (Pig Improvement Company) carcasses equally divided into two groups according to their genotype (C23 and C23xPIC337, respectively). The pigs were housed in the same conditions and fed the same diet during the fattening period. At approximately 100kg of live weight pigs were slaughtered in one slaughterhouse in eastern Croatia. At the slaughter line, the measurements of warm carcass weight as well as carcass lengths from *os pubis* to the 1st rib ("a"); from *os pubis* to *atlas* ("b"), ham length and circumference were taken. Initial pH values ($pH_{45}$) were measured 45 minutes after the exsanguinations. After 24 hours of cooling, backfat and loin eye area ($cm^2$), ultimate pH ($pH_{24}$) values, drip loss and colour of *m. longissimus dorsi (MLD)* were taken. Backfat and muscle areas were measured by geometric procedure [4]; drip loss was measured according to Kauffmann *et al.* [5]. The colour of meat was measured by "Minolta CR-300" device at MLD cut after 15 minutes of blooming and expressed as CIE L*, a* and b* value. The share of fat, moisture, protein and collagen were determined on fresh sample of *Longissimus dorsi* muscle with FoodScan Lab NIT analyser (Foss, Denmark). The lean percentage was calculated on the basis of "Two points" method approved in Croatia [6]. For the measurements of instrumental tenderness a 2.54 thick chops of MLD were sealed in plastic bags and frozen at -20°C. Prior to measurements the MLD chops have been defrosted at 4°C for 24h, cooked at 80°C in a water bath until an internal temperature of 73°C and cooled at 4°C over night. Shear force was measured on four subsamples of each chop and analysed with a TA.XT*plus* Texture Analyser fitted with a 1 mm thick Warner-Bratzler shear attachment. The mean value of maximal strength necessary for cutting of the sample was calculated with a Texture Exponent 4.0 Software (Stable Micro Systems Ltd., UK) and presented as Warner-Bratzler Shear Force (WBS, N). The obtained data were subjected to one-way Analysis of Variance to determine effects of genotype on various attributes of carcass and meat quality. Means which were significantly different were identified using Fisher's LSD test [7].

## III. RESULTS AND DISCUSSION

Table 1. Differences in carcass traits between investigated pig genotypes.

| Carcass traits | Genotype C23 mean± s | Genotype C23xPIC337 mean± s | p |
|---|---|---|---|
| Warm carcass weight, (kg) | 95.12±9.58 | 96.27±8.95 | n.s. |
| Length - a, (cm) | 93.03±2.53 | 95.40±3,86 | < 0.01 |
| Length - b, (cm) | 110.33±3.31 | 112.32±4.56 | < 0.01 |
| Loin eye area, ($cm^2$) | 53.53±7.70 | 51.13±7.62 | n.s. |
| Fat area, ($cm^2$) | 17.57±3.37 | 18.67±5.89 | n.s. |
| Ham length, (cm) | 35.05±1.58 | 35.40±1.94 | n.s. |
| Ham circumference, (cm) | 72.58±3.23 | 71.67±3.42 | n.s. |
| Muscle thickness, M (mm) | 69.44±5.57 | 70.82±5.48 | n.s. |
| Fat thickness, S (mm) | 13.00±2.89 | 15.13±3.79 | < 0.01 |
| Lean meat percentage, (%) | 56.71±7.69 | 56.15±3.46 | n.s. |

*n.s.-not significant

From the table 1 it can be seen noticed that pig carcasses from C23xPIC337 group had significantly longer carcass lengths "a" and "b" than those from group C23. Although there were no statistically significant differences in loin eye and fat area measured geometrically between investigated genotypes, it can be observed that backfat thickness of C23xPIC337 genotype measured by "Two points" method was significantly higher than those of C23 genotype. This can be result of different distribution of fat tissue in investigated pork carcasses. Despite the fact that there were no statistically significant differences in lean percentage between investigated pig genotypes, figure 1 shows that more carcasses from C23xPIC337 genotype were classified into classes S and E than those from C23 genotype. This can be due to the fact that PIC337 boar is a pure line terminal sire selected on maximum weight gain, heavier carcasses, decreased backfat thickness and increased lean growth rate.

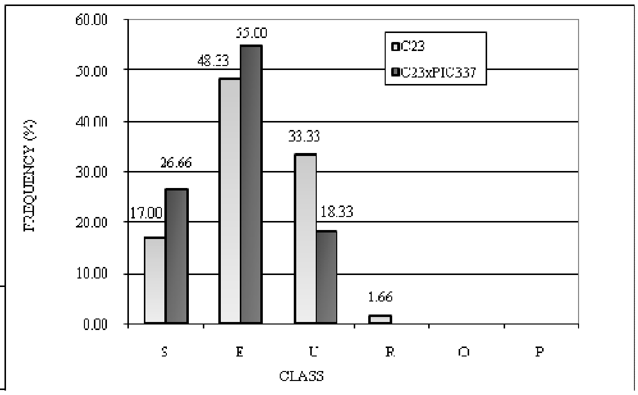


Figure 1. Classification of two genotypes of pig carcasses into SEUROP market classes.

Table 2. Differences in meat quality traits and chemical traits of meat between hybrid pigs of different genotype

| Trait | Genotype C23 mean ± s | Genotype C23xPIC337 mean ± s | p |
|---|---|---|---|
| $pH_{45}$ | 6.28±0.26 | 6.29±0.31 | n.s. |
| $pH_{24}$ | 5.61±0.13 | 5.65±0.10 | n.s. |
| $EC_{45}$, ($mScm^{-1}$) | 4.36±1.50 | 4.40±1.85 | n.s. |
| $EC_{24}$, ($mScm^{-1}$) | 5.14±1.82 | 5.92±2.10 | < 0.05 |
| CIE L* | 51.52±3.34 | 53.06±2.64 | < 0.01 |
| a* | 7.02±0.98 | 7.81±1.51 | < 0.01 |
| b* | 3.15±0.87 | 4.01±1.34 | < 0.01 |
| Drip loss, (%) | 5.93±3.19 | 7.07±2.85 | < 0.05 |
| WBS, (N) | 47.18±7.21 | 44.53±4.88 | < 0.05 |
| IMF, (%) | 2.55±0.56 | 2.87±1.05 | < 0.05 |
| Water, (%) | 73.18±0.66 | 73.05±0.76 | n.s. |
| Proteins, (%) | 23.73±0.46 | 23.57±0.56 | n.s. |
| Collagen, (%) | 1.00±0.20 | 0.96±0.23 | n.s. |

*n.s.-not significant

From the table 2 it can be observed that pigs from C23xPIC337 genotype had significantly higher values of $EC_{24}$ values and drip loss than those from C23 genotype. The colour of their meat was also significantly paler than the meat originating from C23 pigs. Investigations of numerous authors have shown that optimum values of intramuscular fat (IMF) content are within the range between 1.5 and 3% [8, 9]. NIT analysis showed that meat originating from both genotypes had satisfactory IMF content in *longissimus dorsi* muscle, even though pigs of C23xPIC337 genotype had significantly higher mean value for this trait. This could be one of the reasons why instrumental tenderness of pigs from this genotype was lower than those from C23 genotype, i.e. their meat was more tender.

## IV. CONCLUSION

From the results of presented investigation it can be concluded that PIC337 sire enhanced carcass quality traits of C23 dams, namely the lengths of the carcass (“a” and “b”). Even though there were no statistically significant differences in carcasses leanness, more carcasses from C23xPIC337 genotype were classified into S and E market classes than those from C23 genotype. The meat from C23xPIC337 genotype also had higher IMF content and was more tender. However, pigs of C23 genotype showed more favourable technological attributes of meat quality.

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