

MYOSIN HEAVY CHAIN ISOFORMS, FATTY ACID COMPOSITION, SENSORY EVALUATION AND QUALITY OF *CINTA SENESE* PIG MEAT

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ABSTRACT

The aims of this study were to examine the effects of myosin heavy chain (MHC) isoforms on Cinta Senese meat and sensory quality. The research was carried out on 65 pigs and muscle samples characteristics such as MHC isoform, meat quality, fatty acid composition, and sensory were evaluated. The results demonstrated that MHC slow isoform content was significantly correlated with pH_{24h} ($r=0.25$, $P<0.05$) and drip loss ($r=-0.31$, $P<0.005$), whereas the content of MHC isoforms was only weakly correlated with fatty acids. Sensory evaluation was done by a trained panel test and the results shown that the MHC fast/slow ratio was correlated with the juiciness ($r=-0.32$, $P<0.005$), off-flavor ($r=0.33$, $P<0.01$), and tenderness attributes ($r=-0.42$ to -0.46). We therefore conclude that the content of MHC isoforms can be one of the most important factors for examination of overall quality of Cinta Senese pigs.

Keywords: fatty acid, fiber, myosin, quality, tenderness

1. INTRODUCTION

To date, studies have demonstrated that muscle fibre composition plays an important role in meat quality traits (DAI, 2009). Skeletal muscle is composed of various types of fibers. Muscle fiber types have different biochemical characteristics, including oxidative and glycolytic capacities, contraction speed, fiber size, myoglobin, and glycogen content (SCHIAFFINO and REGGIANI, 1996). Muscle fiber type I has slow-twitch, oxidative metabolic characteristics, and a low glycogen content. Type IIA is a fast oxidative-glycolytic fiber. On the other hand, type IIB has fast-twitch, glycolytic metabolic characteristics, and high glycogen content (VELOTTO, 2012). Another study has indicated that during postmortem period, some glycolysis enzymes might be the candidate predictors for meat discoloration (Wu *et al.* 2015). Therefore, during the postmortem period, muscle fiber type composition may impress metabolite content (FERNANDEZ, 1995). The composition of type IIB fiber has a positive correlation with meat lightness and drip loss (RYU and KIM, 2006), whereas type IIB fiber has a negative correlation with juiciness and flavor (TAYLOR, 2004). There is a clear relationship between meat quality to consumer satisfaction and flavor, texture, juiciness, tenderness and meat palatability (BEHRENDTS, 2005; CALKINS and HODGEN, 2007). Moisture content in fresh and cooked meat influence on the Juiciness of meat and also intramuscular fat (IMF) content contributes to the perceived juiciness (FORTIN, 2005). Glycolytic rate during the postmortem period is related to myosin heavy chain (MHC) isoforms content, therefore MHC isoforms content can influence ultimate meat quality traits (GIL, 2003). Our objective was to investigate the effects of MHC isoforms to postmortem meat quality traits, fatty acid composition, and sensory evaluation in *Cinta Senese* pigs. The *Cinta Senese* pig has existed for much longer than any of the other white breeds in Northern Europe: the Large White, the Yorkshire and the Landrace. The renewed interest in the breeding of the *Cinta Senese* is quite recent. The battle to safeguard the breed is in progress and is succeeding. Following the line of these perspectives, we aimed the examination of the effects of MHC isoforms on *Cinta Senese* meat and sensory quality.

2. MATERIALS AND METHODS

2.1. Preparation of muscle samples

65 *Cinta Senese* pigs, one year old, (25 gilts and 40 castrated male pigs) were investigated. In order to follow the recommendation of the National Research Council (NRC, 1998), we fed the pigs with a commercial diet. Animals were treated according to the guidelines of the European Community on the treatment of experimental animals (Reg. EC 1/2005). The slaughterhouse had EEC mark with reference to rules 852/853/854/2004; 2076/2005. Pigs were anesthetized by an intramuscular injection of ketamine and sumianxin (rules120/2008/CEE). Samples of longissimus dorsi muscles were recovered from the carcasses at the 7-8th thoracic vertebra, 48 h after slaughter and were prepared for analysis. The slaughtering process was based on a traditional mechanized slaughter line. This method has the processes of vat scalding (62°C), dehairing, singeing/flaming, and polishing. The muscle samples were cut into 0.4×0.4×1.5 cm pieces, frozen in liquid nitrogen and stored at -80°C until analysis for MHC isoforms. The pork loins (the 10-13th thoracic vertebrae) were taken for meat quality assessment after 24 h of chilling at 4°C and then instantly stored at -20°C without chopping until measurements of IMF content, fatty acid composition, and sensory quality were made.

2.2. Myosin heavy chain isoform content

Eight frozen sections of each muscle sample were prepared and placed in 1.5-ml tubes. Myofibrils were prepared according to the proposed method of the Talmadge and Roy (1993), and Bradford's method (BRADFORD, 1976) was used to determination of the protein concentration of each sample. Sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) was used to analyze MHCs (TALMADGE and ROY, 1993) and separated into slow and fast isoforms. The MHC bands were identified by Coomassie Brilliant Blue staining. These findings were evaluated using an image analysis system for quantitative measures (Leica Application Suite Interactive measurement). The percentage of each MHC isoforms was taken from the ratio of the density of each MHC band to the all MHC band densities (slow and fast), and the MHC fast/slow ratio was obtained from the ratio of the density of fast MHC bands to the density of slow MHC bands within each sample (CHOI, 2010).

2.3. Meat quality measurements

Muscle pH was obtained at 24 h postmortem ($\text{pH}_{24\text{h}}$) using a spear-type portable pH meter (Hanna instruments, pH 210). Meat color parameters was assessed after exposing the surface to air at 4°C for 30 min by the lightness (L^*), redness (a^*), and yellowness (b^*) system (C.I.E., 1978) using a Minolta chromameter (CR-300, Minolta Camera Co., Japan). The mean value of three replicates conducted on each sample and also color (1=pale pink is gray to white; 6=dark purplish-red) and marbling (1=1.0% IMF; 10=10% IMF) were assessed visually (NPPC, 2000). Three parameters including, drip loss, filter-paper fluid uptake (FFU), and cooking loss were used to evaluate the Water holding capacity (WHC). According to HONIKEL (1987), driploss was calculated after weighing (70 gr). The sample was placed in a net surrounded and then hung in an inflated plastic bag for 48 h at 4°C. The sample weighed again after 48 h and drip loss was calculated as percent change in weight. in order to measurement of FFU (KAUFFMAN, 1986), filter paper (Whatman #2, 42.5 mm in diameter) was weighed, then putted on the surface of the sample to absorb fluids (<2s) and then was re-weighed. FFU was expressed as milligrams of exudates absorbed by the filter-paper (EIKELNBOOM *et al.*, 1996). This was how we measured the cooking loss. Following 24 h of chilling, loin sections were placed in thin-walled polyethylene bags and were then putted in a continuously heated water bath (80°C). Samples were cooked to 71°C internal temperature that measured using a thermometer with a handheld probe; (TES-1300, TES Electrical Electronic Co., Taiwan) and were then held in ice water for 15 min. finally, the samples were removed from ice water and therefore were taken from the polyethylene bag, blotted dry, and weighed. Cooking loss was expressed as a percentage of the initial sample weight (HONIKEL, 1987). For measurement of Warner-Bratzler shear force (WBS), loin sections were cut into 2 cm thick chops and therefore, cooked meat samples for WBS were prepared as described for cooking loss samples. After cooking we took eight to ten cores (1.25 cm diameter) from the steak parallel to the longitudinal orientation of muscle fibers. WBS was examined by an Instron Universal Testing Machine (Model 1011, Instron Corp., USA) equipped with a Warner-Bratzler shearing device using a crosshead speed of 200 mm/min and a load capacity of 10 kN. Samples were sheared perpendicular to the long axis of the cores.

2.4. Intramuscular fat content and fatty acid composition

IMF content was analysed using the Soxhlet method with a solvent extraction system (AOAC, 2000). For fatty acid composition analysis, the fat was extracted following the

procedure described by FOLCH (1957). Homogenized meat (1.5 gr) was blended with an extraction solvent of chloroform/methanol (2:1, v/v) twice, filtered, and then placed in a separator funnel and mixed with saline solution (0.9% NaCl). After phase separation, chloroform lipid fraction was washed using extraction solvent, whereas the aqueous methanol fraction was discarded. Lipid extracts were concentrated using a rotary evaporator and were then placed in test tubes for subsequent gas chromatographic analysis. Before the gas chromatograph analysis, methylation of lipids was performed by adding 2 ml of sodium methoxide, distilled water, and heptane. Gas chromatograph analysis was carried out using a Gas Chromatography-Mass Selective Detector (GC, Agilent 7890N, USA; MSD, Agilent 5975A, USA) equipped with a HP-INNOWAX column (length of 30m, internal diameter of 0.25mm, film thickness of 0.25 μ m). Operating conditions included a helium flow rate of 0.7 ml/ min, a FID setting of 260°C, a split-splitless injector setting of 220°C with an injection rate of 120 ml/min, and an injection volume of 1 μ l. The temperature program was composed of an initial hold at 140°C for 4 min, ramping to 220°C at 4°C/min. Retention time and area of each peak were computed using Agilent software. Individual fatty acid peaks were identified by comparing the retention times with those of known mixtures of standard fatty acids (FAME, Sigma-Aldrich CO, USA). Fatty acid composition was expressed as the percentage of total methylated fatty acid. Data were initially recorded and listed as the percentage of individual fatty acids in each sample. Total saturated fatty acid (SFA) was computed as the sum of C12:0, C14:0, C16:0, C17:0, and C18:0. Monounsaturated fatty acid (MUFA) included C16:1, C18:1n-9, C18:1n-7, and C20:1n-9, whereas total polyunsaturated fatty acid (PUFA) was calculated as the sum of C18:2n-6, C18:3n-6, C18:3n-3, C20:2n-6, C20:3n-3, C20:4n-6, C20:5n-3, and C22:6n-3. The ratios of MUFA to SFA and PUFA to SFA were then calculated.

2.5. Sensory evaluation

Eleven panelists were selected by standing external descriptive panel. 65 pork samples were evaluated in three replications. The sensory analysis took place in 6 weeks sessions of up to 1.5 h each. According to the American Meat Science Association (AMSA, 1995) and published procedures (MEILGAARD *et al.*, 1991), we performed formal trainings for the panelists. Samples were thawed overnight at 4°C, and then cooked without salt or spice in a humid heat oven (MCS312CF4, Electrolux, Sweden) set at 180°C until they reached an internal temperature of 70°C, which was measured using a thermometer (TES-1300, TES Electrical Electronic Co., Taiwan). They were then immediately sliced into 1.3×1.3×1.3 cm³ pieces. Samples were held in a water bath (54°C) until presented to the panelists simultaneously in a compartmented plate and three-digit codes were used to name them and served one at a time in random order. In order to eliminate the taste from the previous sample, the evaluators were served distilled water (30°C) and about 3 to 5 min elapsed before evaluation of the next samples. Sensory properties including softness, initial tenderness, juiciness, flavor intensity, off-flavor intensity, chewiness, rate of breakdown and amount of perceptible residue were evaluated.

2.6. Statistical analysis

SAS PC software (SAS Institute, 2004) was used to analysis the content of MHC isoforms in terms of means and standard deviations. Means, standard deviations, and overall ranges are presented as results. Correlations among data obtained were calculated using Pearson's correlation coefficient (r).

3. RESULTS AND DISCUSSION

3.1. Myosin heavy chain isoform content in pig muscle

Table 1 illustrates the results of means and standard deviations for MHC isoform contents of the longissimus dorsi muscle in *Cinta Senese* pigs. Mean values of the MHC slow and fast isoforms were 4.88% and 84.02%, respectively, and the fast/slow ratio was 23.21. According to information obtained, differences in the MHC isoform composition were observed among muscles.

Table 1. Content of the Myosin Heavy Chain (MHC) isoforms of the Longissimus Dorsi muscle in Cinta Senese pigs.

Parameter	μ	SD
MHC slow isoform (%)	4.88	2.28
MHC fast isoform (%)	84.02	2.28
MHC fast/slow ratio (%)	23.21	20.30

3.2. Meat quality

Table 2 shows the correlations between the content of MHC isoforms and meat quality measurements. This experiment found a significant correlation between muscle pH_{24h} and content of MHC slow ($r=0.25$, $P<0.05$), fast ($r=-0.25$, $P<0.05$) isoforms and fast/ slow ratios ($r=-0.30$, $P<0.01$). The results showed that the MHC fast/slow ratio indicated a positive correlation with drip loss ($r=0.36$, $P<0.001$) and FFU ($r=0.24$, $P<0.05$). Whereas MHC slow isoforms content had an opposite tendency.

Table 2. Correlation coefficients between the content of myosin heavy chain (MHC) isoforms and meat quality measurements of the Longissimus dorsi muscle in Cinta Senese pigs.

Parameter	MHC isoform		
	Slow isoform	Fast isoform	Fast/slow ratio
Muscle pH _{24h}	0.25 ¹	-0.25 ¹	-0.30 ²
Lightness (L*)	0.04	-0.04	-0.05
Redness (a*)	0.12	-0.12	-0.10
Yellowness (b*)	0.24 ¹	-0.24 ¹	-0.17
Drip loss	-0.31 ²	0.31 ²	0.36 ³
Filter-paper fluid uptake	-0.221	0.22 ¹	0.24 ¹
Cooking loss	0.12	-0.12	-0.9
Warner-Bratzler shear force	0.03	-0.03	-0.03
Color	0.23 ¹	-0.23 ¹	-0.12
Marbling	0.005	-0.005	-0.02

Statistically different values (¹ $P<0.05$; ² $P<0.01$; ³ $P<0.001$).

3.3. Fat content

Table 3 shows the correlation between content of MHC isoforms and fatty acid composition. The results revealed that the MHC isoform contents were not related to lipid content and marbling score. In the present study, limited relationships emerged from the content of MHC isoforms with individual fatty acids (data not shown) as well as SFA, MUFA, PUFA, and ratio of PUFA and SFA.

Table 3. Correlation coefficients between the content of Myosin Heavy Chain (MHC) isoforms, Intramuscular Fat (IMF) and fatty acid composition of the Longissimus dorsi muscle in Cinta Senese pigs.

Parameter	MHC isoform		
	Slow isoform	Fast isoform	Fast/slow ratio
IMF	-0.079	0.079	0.11
SFA	0.17	-0.17	-0.9
MUFA	0.03	-0.03	0.04
PUFA	-0.10	0.10	0.005
MUFA+PUFA	-0.17	0.17	0.9
MUFA: SFA	-0.12	0.12	0.16
PUFA: SFA	-0.12	0.12	0.03

3.4. Sensorial features

Analyzing all quality parameters panelists were asked to leave comments for each attribute if they felt the need. Particularly they found pig meat good for softness and initial tenderness but they didn't consider it excellent. Table 4 illustrates a correlation between the content of MHC isoforms and the sensory quality of cooked pork.

Table 4. Correlation coefficients between the content of Myosin Heavy Chain (MHC) isoforms and sensory evaluation of cooked meat of the Longissimus dorsi muscle in Cinta Senese pigs.

Parameter	MHC isoform		
	Slow isoform	Fast isoform	Fast/slow isoform
Softness	0.25 ¹	-0.25 ¹	-0.46 ³
Initial tenderness	0.25 ¹	-0.25 ¹	-0.43 ³
Juiciness	0.18	-0.18	-0.32 ²
Flavor intensity	0.23 ¹	-0.23 ¹	-0.19
Off-flavor intensity	-0.25 ¹	0.25 ¹	0.33 ²
Chewiness	0.21 ¹	-0.21 ¹	-0.42 ³
Rate of breakdown	0.23 ¹	-0.23 ¹	-0.44 ³
Mouth coating	-0.02	0.02	0.17
Amount of perceptible residue	0.26 ¹	-0.26 ¹	-0.42 ³

Score distributions: softness, soft to hard; initial tenderness, tender to tough; chewiness, tender to chewy; rate of breakdown, fast to slow; juiciness, not juicy to extremely juicy; flavor intensity, no pork flavor to full pork flavor; off-flavor intensity, none to strong off-flavor; mouth coating, none to very much; amount of perceptible residues, none to abundant. .Statistically different values (¹P<0.05; ²P<0.01; ³P<0.001).

In this study, a significant correlation was found between content of MHC isoforms and tenderness attributes including softness, initial tenderness, chewiness, rate of breakdown, and amount of perceptible residue. A positive correlation was shown between the content of MHC slow isoform and tenderness characteristics, whereas a negative correlation was found between the fast/slow ratio and softness ($r=-0.46$, $P<0.001$), initial tenderness ($r=-0.43$, $P<0.001$), chewiness ($r=-0.42$, $P<0.001$), rate of breakdown ($r=-0.44$, $P<0.001$), and amount of perceptible residue ($r=-0.42$, $P<0.001$). The results showed that, there was no significant correlation between juiciness and content of MHC slow and fast isoforms, whereas there was a negative correlation between juiciness and the fast/slow ratio ($r=-0.32$, $P<0.01$). We observed that there are positive and negative correlations between flavor intensity and MHC slow isoform content ($r=0.23$, $P<0.05$) and MHC fast isoform ($r=-0.23$, $P<0.05$), respectively, even if there weren't great differences. On the other hand, off-flavor intensity had inverse relation to flavor and there were positive and negative correlations between off-flavor intensity and MHC fast isoform ($r=0.25$, $P<0.05$) and MHC slow isoform content ($r=-0.25$, $P<0.05$), respectively.

4. DISCUSSION

The aim of this study was to investigate the effects of MHC isoforms to postmortem meat quality traits, fatty acid composition, and sensory evaluation in *Cinta Senese* pigs. According to information obtained, differences in the MHC isoform composition were observed among muscles.

Scientists (SAZILI *et al.*, 2005) detected a higher MHC fast isoform content in the longissimus dorsi and tensor fasciae latae muscles in comparison with the supraspinatus, semitendinosus, and trapezius muscles. However, in crossbred pigs (Yorkshire x Landrace x Duroc), the MHC slow and fast isoform contents of the longissimus dorsi muscle were 6.61% and 93.38%, according to CHOI *et al.* (2006). Differences seen in glycogen content and enzyme activities between muscles may be related to fiber type composition and the physical activity level of the muscle (GRANLUND, 2011). CHOI and KIM (2009) reported that the MHC fast isoform have a fast ATPase and high anaerobic capacity, whereas the MHC slow isoform have a slow ATPase and a high aerobic capacity in single muscle fibers. In contrast with our results MHC 1 isoform content was negatively correlated with the lightness and glycolytic enzyme activity, and was positively correlated with oxidative enzyme activity (CHOI, 2009). These demonstrated how the composition of MHC isoforms leads to a decline in the rate and extent of pH caused by lactate overproduction. Our results show a significant correlation between muscle pH_{24h} and content of MHC slow, fast isoforms and fast/ slow ratios. According to RYU and KIM (2006), muscles harboring a higher percentage of MHC fast isoform tend to show a more rapid pH decline than muscles harboring a higher percentage of MHC slow isoform. Genetic and pre-slaughter factors that influence postmortem rate of glycolysis and pH decline are used to determine the occurrence of PSE (pale, soft, exudative) meat (KAZEMI, 2011). Protein denaturation occurs when in high temperature of the muscle, rapid rate of postmortem glycolysis leads to a rapid pH fall (BENDALL and SWATLAND, 1988; KAUFFMAN *et al.*, 1998). The denaturation of myofibrillar proteins and particularly myosin is related to the low water holding capacity of PSE meat (OFFER and KNIGHT, 1988; OFFER, 1991). Muscles with a higher extent of protein denaturation show a higher percentage of MHC fast isoforms and higher degrees of fluid loss by exudation than muscles with a lower extent of protein denaturation (CHOI, 2010). Our results showed that the MHC fast/slow ratio indicated a positive correlation with drip loss.

According to PETER *et al* (1972), type I fiber contains greater amount of lipid, some of which presumably serves as a source of aerobic metabolic fuel; in contrast, type IIB contains greater amounts of glycogen and glucose (HINTZ *et al.*, 1984), and also glucose uses as fuel (CHOI, 2009). Our results however revealed that the MHC isoform contents were not related to lipid content and marbling score. Lipid composition is one of the main characteristics related to meat quality affected by muscle fiber type. According to LESEIGNEUR-MEYNIER and GANDEMER (1991), total phospholipids (PLs) and PUFA of PLs in pork are influenced by muscle fiber type. Variations in the IMF content are mainly due to changes in the triglyceride content, therefore, high IMF contents imply a high level of triglycerides (RUIZ-CARRASCAL, 2000).

In this study, a significant correlation was found between content of MHC isoforms and tenderness attributes including softness, initial tenderness, chewiness, rate of breakdown, and amount of perceptible residue. A positive correlation was shown between the content of MHC slow isoform and tenderness characteristics, whereas a negative correlation was found between the fast/slow ratio and softness, initial tenderness chewiness, rate of breakdown, and amount of perceptible residue. Proteins and structures that bind and entrap water, specifically the myofibrillar are responsible for the mechanism of water-holding capacity (WHC). It was earlier demonstrated that there is a direct effect of pH, ionic strength, and oxidation on the ability of myofibrillar protein and myofibrils and muscle cells to entrap water (HUFF-LONERGAN, 2005). Glycolysis causes a more rapid pH decline, and muscle contraction, thereby, resulting in a high drip loss (ZELECHOWSKA, 2012). It has also been declared that pH can affect meat tenderness (ZHENG *et al.*, 2017). It is generally accepted that after cooking, muscles with a higher WHC are more tender and juicy meat than muscles with a lower WHC (JEONG, 2010; KANG, 2011). Fiber type composition affects the sensory quality of cooked (KANG, 2011; NAM, 2009). In the present study, a positive correlation exists between content of MHC slow isoform and two parameters including pH and WHC. Moreover a high ratio MHC fast/slow isoforms and a high content of the MHC slow isoform are associated with tough and tender meat, respectively. According to OURY (2009), a positive correlation exists between the content of the MHC slow isoform and the initial tenderness of rectus abdominis muscle from Charolais heifers. In our study we noticed, as previously asserted, that there was a major percentage of fast-twitch glycolytic fibers, so that the WHC was low, consequently *Cinta Senese* pig had high drip loss and low cooking loss. Probably this feature was associated with the muscle chosen. There is a positive correlation between the proportions of type I fibers and sensory assessed tenderness in beef (MALTIN *et al.*, 1998) and pork (OCKERMAN *et al.*, 1984) has been found. It was earlier demonstrated that effect of muscle fibre traits on meat tenderness are not uniform (ORZECHOWSKA, 2008). According to TOTLAND (1988), the superficial regions in bovine semitendinosus muscle contained a high percentage of type IIB fibers and were more tender than the deeper muscle layers, with a high percentage of type I fibers. There is a negative correlation between the percentage of type IIB fibers and toughness in pigs (KARLSSON, 1993), whereas there is a positive correlation between the percentages of type I fibers and meat toughness in bulls. STRYDOM (2000) reported that sensory tenderness shows a positive and negative relationship with the percentage of type I and IIB fibers, respectively.

On the other hand, we demonstrated that, there was no significant correlation between juiciness and content of MHC slow and fast isoforms, whereas there was a negative correlation between juiciness and the fast/slow ratio. According to HUFF-LONERGAN (2002), lipid content can influence the sensory features including texture, tenderness, flavor, and juiciness. Also DALL AASLYNG (2008) reported that water holding capacity (WHC) of the meat might can influence the juiciness. In this study, the higher WHC in muscles with a lower fast/slow ratio compared to muscles with a higher fast/slow ratio

probably explains the relationship between juiciness and content of MHC. Taste and aroma were defined as flavor (MOODY, 1983), which is based on taste-active compounds, flavor enhancers and aroma components with over 880 compounds presently identified in cooked beef alone (MACLEOD, 1998). Tenderness, juiciness and flavor are as components of the palatability of meat (MUCHENJE, 2008). Fatty components cause different flavors among beef, pork, chicken, turkey, and lamb and also fatty tissues give them specific flavor profiles. When the fat acts as one of the flavor agent heated, they are combined with amino acids from proteins and other components and therefore, they release (DINH TRAN NHAT THU, 2006). There is about twice as much phospholipid than glycolytic ones in oxidative muscles. Muscle fiber type composition may influence flavor through the phospholipids (LEFAUCHEUR, 2006) as major determinants of cooked meat flavor (MEYNIER and GANDEMER, 1994). Particularly phospholipids have an important role in the development of flavor intensity (MOTTRAM and EDWARDS, 1983). High content of type I fiber is related to juiciness and flavor, whereas high type IIB fiber content tends to be associated with tougher meat (CHOI and KIM, 2009). According to our results, the off-flavor intensity had inverse relation to flavor and there were positive and negative correlations between off-flavor intensity and MHC fast isoform and also with the MHC slow isoform content respectively.

5. CONCLUSIONS

The present study revealed that the composition of MHC isoforms influences the sensory quality of cooked pork, including tenderness features. A notable point that should be considered is about the type of the MHC isoform; muscles having a higher content of the MHC slow isoform shows good meat quality and tenderness compared to muscles having a higher ratio of MHC fast/slow isoforms. We correlated different parameters to fibers content in order to obtain more information about pig meat quality and particularly the *Cinta Senese* pig. Local breed of pigs shows a high potential for composition and ultrastructure of muscle that could impact pork quality. The results of our study represent the starting point for increasing knowledge about a local breed as *Cinta Senese* pig and the muscle properties that affect meat quality.

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