

# MODIFICIRANJE SADRŽAJA n-3 POLINEZASIĆENIH MASNIH KISELINA U MIŠIĆNOM TKIVU SVINJA

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## SAŽECI DOKTORSKIH DISERTACIJA – *Doctoral thesis summaries*

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### MODIFICIRANJE SADRŽAJA N-3 POLINEZASIĆENIH MASNIH KISELINA U MIŠIĆNOM TKIVU SVINJA

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#### *Disertacija (2)*

Cilj ovog istraživanja bio je pronaći koje kombinacije ulja daju poželjan učinak na modificiranje sadržaja i povećanje ukupnih vrijednosti n-3 PUFA u mesu svinja, a da pri tome nema negativnoga utjecaja na svojstva tova te kvalitetu trupova i mesa. Standardni dnevni obrok svinja u tovu obogaćen je kombinacijama ribljega, lanenoga i repičinoga ulja. Kontrolna skupina (A) imala je u obroku 3% animalne (svinjske) masti, dok su u 4 pokusne skupine dodavane sljedeće kombinacije ulja: riblje 0,5% + repičino 2,5% (B); riblje 0,5% + laneno 2,5% (C); riblje 1,0% + repičino 2,0% (D) i riblje 1,0% + laneno 2,0% (E). Pokus je proveden u zadnja 4 tjedna tova. Slučajni uzorak veličine 50 svinja (durok x švedski landras x pietren) raspodijeljen je u 5 skupina veličine 10 svinja s jednakim omjerima spola. Dobivenim rezultatima utvrđeno je da tretman i spol nisu statistički značajno utjecali na dnevne priraste, dok je interakcija tretmana i spola imala značajan utjecaj ( $p < 0,05$ ). Utvrđen je statistički značajan utjecaj tretman i spola za debljinu leđne slanine ( $p < 0,05$ ) i debljinu slabinskoga mišića ( $p < 0,05$ ) te visoko značajan utjecaj spola za % mišićnoga tkiva u trupu ( $p < 0,001$ ). Za masu trupa, dužinu polovicu (A i B) te za mjere buta (dužinu i opseg) nisu utvrđene statistički značajne razlike između skupina. Također je utvrđeno da nema statistički značajnoga utjecaja različitih tretmana na pH<sub>24</sub> buta i MLD-a, boju mesa CIE L\* te na kalo kuhanja. Međutim, utvrđen je visoko značajan utjecaj spola kod boje mesa a\* i WBSF ( $p < 0,001$ ) te utjecaj tretmana na gubitak mesnoga soka ( $p < 0,001$ ). Za boju mesa a\* i b\*, gubitak mesnoga soka, kao i za WBSF, utvrđen je i značajan utjecaj ( $p < 0,05$ ) interakcije tretmana i spola. Isto tako, utvrđen je značajan utjecaj spola i interakcije tretmana i spola ( $p < 0,05$ ) na udio masti. Spol i tretman nisu statistički značajno utjecali na sadržaj n-6 PUFA u MLD-u svinja. Na sadržaj n-3 PUFA ( $\alpha$ -LNA, EPA i DHA) tretman je imao statistički visoko značajan utjecaj ( $p < 0,01$ ), osim na udio DPA ( $p = 0,122$ ). Najveći sadržaj  $\alpha$ -LNA imale su skupine svinja oba spola hranjene obrocima koji su

sadržavali laneno ulje (tretmani C i E). Između sadržaja DHA u MLD-u svinja kod tretmana A, B i C nije bilo statistički značajne razlike ( $p > 0,05$ ). Povećanjem sadržaja ribljega ulja u obrocima s 0,5% na 1% (tretmani D i E) dobiveno je statistički značajno ( $p < 0,05$ ) povećanje sadržaja DHA u odnosu na ostale skupine (A, B i C). Dodatak repičinoga (2%) i ribljega ulja (1%) u obroke za svinje (tretman D) utjecao je na značajno veće odlaganje n-3 PUFA u MLD u odnosu na svinje koje su hranjene s dodatkom 3% animalne masti (tretman A). Na omjer n-6/n-3 PUFA u MLD-u hranidbeni tretmani imali su statistički vrlo visoko značajan utjecaj ( $p < 0,001$ ). Omjer n-6/n-3 PUFA bio je od 4,65:1 (kastrati tretmana C) do 20,14:1 (kastrati tretmana A). Najbolji omjer n-6/n-3 PUFA imali su tovljenici obaju spolova iz tretmana C (5,00:1). Tovljenici hranjeni kombinacijom lanenoga i ribljega ulja (tretmani C i E) imali su bolji omjer n-6/n-3 PUFA u MLD-u ( $p < 0,05$ , 5,00:1 i 6,33:1) u odnosu na tovljenike koji su hranjeni kombinacijom repičinoga i ribljega ulja (12,84:1 i 10,04:1).

Ključne riječi: svinje, meso, kiseline, ulja, n-3 PUFA, n-6 PUFA,  $\alpha$ -LNA, EPA, DHA, kvaliteta

### MODIFICATION OF THE N-3 POLYUNSATURATED FATTY ACIDS CONTENT IN MUSCLE TISSUE OF PIGS

#### *Doctoral thesis*

The objective of the research was to find out which combinations of oils give a desirable effect on n-3 PUFA content modification and total values increase in pigs' meat without negative effects on fattening characteristics and carcass and meat quality of. The standard daily fattening pigs' diet was supplemented with combinations of fish, linseed and rapeseed oils. The control group (A) received 3% of animal (pork) fat in their diet while 4 experimental groups received the following oil combinations: fish oil 0.5% + rapeseed oil 2.5% (B); fish oil 0.5% + linseed oil 2.5% (C); fish oil 1.0% + rapeseed oil 2.0% (D), and fish oil 1.0% + linseed oil 2.0% (E). The experiment was carried out in the last 4 weeks of fattening. A random sample of 50 pigs (Duroc x Swedish Landrace

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x Pietrain) was divided into 5 groups with 10 pigs each of the equal ratio of both sexes. The results showed that the treatment and the sex statistically did not significantly influence daily gains whereas the interaction of the treatment and the sex did have a significant influence ( $p < 0.05$ ). Statistically significant influence of the treatment and the sex was observed on the loin muscle thickness ( $p < 0.05$ ) as well as a highly significant influence of the sex on the carcass muscle tissue ( $p < 0.001$ ). Statistically significant influences between groups were not observed for carcass weight, carcass length (A and B) or the ham measures (length and perimeter). It was also found that there were no significant influences of different treatments on ham and MLD pH<sub>24</sub>, CIE L\* meat colour or cooking loss. However, a highly significant influence of the sex on the colour of meat a\* and WBSF ( $p < 0.001$ ) as well as the influence of the treatment on meat juice loss were found. For the colour of meat a\* and b\*, the loss of meat juice, as well as WBSF a significant influence ( $p < 0.05$ ) of the treatment/sex interaction was found. It was also found that the sex and the interaction between the treatment and the sex significantly influenced the fat content ( $p < 0.05$ ). The sex and the treatment did not significantly influence the content of n-6 PUFA in the pigs' MLD. A statistically high influence of treatment was noted on the content of n-3 PUFA ( $\alpha$ -LNA, EPA and DHA) ( $p < 0.01$ ), except

on the content of DPA ( $p = 0.122$ ). The pigs groups of both sexes fed linseed oil (treatments C and E) had the highest content of  $\alpha$ -LNA. Statistically, there were no significant differences ( $p > 0.05$ ) between the content of DHA in MLD in treatments A, B, and C. Increasing the content of fish oil in meals from 0.5% to 1% (treatments D and E) produced a statistically significant increase of the DHA content compared to other groups (A, B, and C). The supplement of rapeseed oil (2%) and fish oil (1%) in pigs' meals (treatment D) influenced significantly higher disposal of n-3 PUFA in MLD compared to pigs fed with the supplement of 3% animal fat (treatment A). The ratio n-6/n-3 PUFA u MLD was statistically highly influenced ( $p < 0.001$ ) by the feeding treatment. The n-6/n-3 PUFA ratio ranged from 4.65:1 (barrows in treatment C) to 20.14:1 (barrows in treatment A). The best n-6/n-3 PUFA ratio was observed in fattening pigs of both sexes from treatment C (5.00:1). Fattening pigs fed the combination of linseed oil and fish oil (treatments C and E) had a better n-6/n-3 PUFA ratio in MLD ( $p < 0.05$ , 5.00:1 and 6.33:1) compared to the fattening pigs fed the combination of rapeseed oil and fish oil (12.84:1 and 10.04:1).

Key-words: pigs, meat, acids, oils, n-3 PUFA, n-6 PUFA,  $\alpha$ -LNA, EPA, DHA, quality