



Convegno ASIC

Villa Bolasco, Castelfranco Veneto

14 settembre 2022

1222-2022
800 ANNI



UNIVERSITÀ
DEGLI STUDI
DI PADOVA



Inviati speciali a Nantes

Dott. Simone Mancini

Dipartimento di Scienze Veterinarie

Università di Pisa

Session QUALITY of PRODUCTS



- [Leroy F.](#), Petracci M. (Belgium, Italy) - Rabbit meat: a valuable source of nutrition or too-cute-to-eat ? (invited paper). Communication Q-00 - [VIDEO](#)
- [Almeida M.](#), Silva S., Garcia-Santos S., Guedes C.M., Ferreira L.M., Dominguez, R., Trindade H., Lorenzo J.M., Pinheiro V. (Portugal) - Effect of total replacement of soybean meal by lupine seeds (*L. albus* and *L. luteus*) on carcass characteristics and meat fatty acids composition of growing rabbits. Communication Q-04 - [VIDEO](#)
- [Bouzaida M.D.E.](#), Resconi V.C., Romero J.V., Gimeno D., Olleta J.L., Miranda-de la Lama G.C., Asenjo B., María G.A. (Spain) - Can the inclusion of pomegranate pomace in rabbits diets improve the fatty acid profile of their meat ? Communication Q-06.
- [Colin M.](#), Lebas F., Delarue J., Caillaud L., Van Lissum M., Prigent A.Y. (France) - Meat from rabbits fed vegetable DHA can be an important part of a DHA-oriented human diet. Communication Q-08 - [VIDEO](#) common presentation for communications Q-08 & Q-14, performed by M. Colin
- [Cullere M.](#), Szendrő Zs., Kasza R., Gerencsér, Zs., Dalle Zotte A. (Italy, Hungary) - Impact of heat stress on the meat quality of rabbits divergently selected for total body fat content. Communication Q-09 - [VIDEO](#)
- [Dalle Zotte A.](#), Szendrő Zs., Kasza R., Matics Zs., Cullere M. (Italy, Hungary) - Rabbit divergent selection for total body fat content : effect on proximate composition and fatty acid profile of meat. Communication Q-10 - [VIDEO](#)
- [María G.A.](#), Resconi V., Bouzaida M., Fernández-Bautista M., Olleta J.L., Asenjo B., Vieira Romero J., Miranda-de la Lama G. (Spain) - Use of non-medicated feed with the addition of pomegranate by-products in commercial rabbit fattening. Communication Q-11.
- [Laghuaouta H.](#), Zubiri-Gaitán A., Sosa-Madrid B.S., Blasco A., Hernández P. (Spain) - Changes in fatty acid composition due to selection for intramuscular fat. Communication Q-13 - [VIDEO](#)
- [Lebas F.](#), Colin M., Delarue J., Caillaud L., Van Lissum M., Prigent A.Y. (France) - Rabbit is particularly interesting to deposit DHA in its meat, without effects on meat's organoleptic quality - A review. Communication Q-14.
- [Luis-Chincoya H.](#), Herrera-Haro J.G., Pró-Martínez A., Santacruz-Varela A., Jerez-Salas M.P. (Mexico) - The effect of dietary supplementation zinc source and level on growing performance, mineral deposition and meat quality. Communication Q-15 - [VIDEO](#)
- [Mancini S.](#), Mattioli S., Dal Bosco A., Paci G. (Italy) - Effects of garlic powder and salt as ingredients in rabbit meat burgers. Communication Q-16 - [VIDEO](#)
- [Matics Zs.](#), Szendrő Zs., Dalle Zotte A., Cullere M., Radnai I., Kasza R., Gerencsér Zs. (Hungary, Italy) - Production performance and carcass traits of three rabbit breeds reared at different temperatures. Communication Q-17 - [VIDEO](#)
- [Ribeiro J.](#), Andrade E., Monteiro D., Pinheiro V. (Portugal) - Effect of a feed restriction and gender on the performance and characteristics of the rabbit carcass in the fattening period. Communication Q-18.
- [Soglia F.](#), Baldi G., Petracci M. (Italy) - Relationship between protein and lipid oxidation in rabbit hind leg meat. Communication Q-19 - [VIDEO](#)



- [Leroy F.](#), Petracci M. (Belgium, Italy) - Rabbit meat: a valuable source of nutrition or too-cute-to-eat ? (invited paper). Communication Q-00 - [VIDEO](#)
- [Almeida M.](#), Silva S., Garcia-Santos S., Guedes C.M., Ferreira L.M., Dominguez, R., Trindade H., Lorenzo J.M., Pinheiro V. (Portugal) - Effect of total replacement of soybean meal by lupine seeds (*L. albus* and *L. luteus*) on carcass characteristics and meat fatty acids composition of growing rabbits. Communication Q-04 - [VIDEO](#)
- [Bouzaida M.D.E.](#), Resconi V.C., Romero J.V., Gimeno D., Olleta J.L., Miranda-de la Lama G.C., Asenjo B., María G.A. (Spain) - Can the inclusion of pomegranate pomace in rabbits diets improve the fatty acid profile of their meat ? Communication Q-06.
- [Colin M.](#), Lebas F., Delarue J., Caillaud L., Van Lissum M., Prigent A.Y. (France) - Meat from rabbits fed vegetable DHA can be an important part of a DHA-oriented human diet. Communication Q-08 - [VIDEO](#) common presentation for communications Q-08 & Q-14, performed by M. Colin
- [Cullere M.](#), Szendrő Zs., Kasza R., Gerencsér, Zs., Dalle Zotte A. (Italy, Hungary) - Impact of heat stress on the meat quality of rabbits divergently selected for total body fat content. Communication Q-09 - [VIDEO](#)
- [Dalle Zotte A.](#), Szendrő Zs., Kasza R., Matics Zs., Cullere M. (Italy, Hungary) - Rabbit divergent selection for total body fat content : effect on proximate composition and fatty acid profile of meat. Communication Q-10 - [VIDEO](#)
- [María G.A.](#), Resconi V., Bouzaida M., Fernández-Bautista M., Olleta J.L., Asenjo B., Vieira Romero J., Miranda-de la Lama G. (Spain) - Use of non-medicated feed with the addition of pomegranate by-products in commercial rabbit fattening. Communication Q-11.
- [Laghuaouta H.](#), Zubiri-Gaitán A., Sosa-Madrid B.S., Blasco A., Hernández P. (Spain) - Changes in fatty acid composition due to selection for intramuscular fat. Communication Q-13 - [VIDEO](#)
- [Lebas F.](#), Colin M., Delarue J., Caillaud L., Van Lissum M., Prigent A.Y. (France) - Rabbit is particularly interesting to deposit DHA in its meat, without effects on meat's organoleptic quality - A review. Communication Q-14.
- [Luis-Chincoya H.](#), Herrera-Haro J.G., Pró-Martínez A., Santacruz-Varela A., Jerez-Salas M.P. (Mexico) - The effect of dietary supplementation zinc source and level on growing performance, mineral deposition and meat quality. Communication Q-15 - [VIDEO](#)
- [Mancini S.](#), Mattioli S., Dal Bosco A., Paci G. (Italy) - Effects of garlic powder and salt as ingredients in rabbit meat burgers. Communication Q-16 - [VIDEO](#)
- [Matics Zs.](#), Szendrő Zs., Dalle Zotte A., Cullere M., Radnai I., Kasza R., Gerencsér Zs. (Hungary, Italy) - Production performance and carcass traits of three rabbit breeds reared at different temperatures. Communication Q-17 - [VIDEO](#)
- [Ribeiro J.](#), Andrade E., Monteiro D., Pinheiro V. (Portugal) - Effect of a feed restriction and gender on the performance and characteristics of the rabbit carcass in the fattening period. Communication Q-18.
- [Soglia F.](#), Baldi G., Petracci M. (Italy) - Relationship between protein and lipid oxidation in rabbit hind leg meat. Communication Q-19 - [VIDEO](#)



Rabbit meat Valuable nutrition or too cute-to-eat?



VRIJE
UNIVERSITEIT
BRUSSEL



Research Group of
Industrial Microbiology
and Food Biotechnology



@fleroy1974

frederic.leroy@vub.be

Prof. dr. ir. Frédéric LEROY



Convegno ASIC - Inviati speciali a Nantes

14 settembre 2022

Session QUALITY of PRODUCTS

DHA DEPOSITION in RABBIT MEAT and other TERRESTRIAL ANIMAL PRODUCTS a REVIEW

- LEBAS F., Cuniculture, Corrèze – Toulouse
- COLIN M., Copri, Ploudalmézeau – Bretagne
- DELARUE J., Medical School UBO, Brest - Bretagne
- CAILLAUD L., Copri, Ploudalmézeau – Bretagne
- Van LISSUM M., Copri, Ploudalmézeau – Bretagne
- PRIGENT A.Y., Earl 3L, Ploudalmézeau – Bretagne



12th World Rabbit Congress – Nantes – 3-5 Nov. 2021

-Raccomandazione assunzione 250 mg/giorno di DHA (C22:6 ω 3, acido docosaesaenoico) (attualmente assunto circa la metà, 137 mg/giorno in Francia)

-Incremento nelle carni tramite microalghe *Schizochytrium* spp. (contenuto 18% su fresco, 28% su ss)

Maximum dietary level of microalgae in animal's diet to avoid a production sensory alterations

Animal product	% of diet
- Beef (steer, heifer)	< 0.5%
- Broiler chicken	3.7%
- Goat (young kids)	5.0%
- Pork	0.8%
- Rabbit	1.5%
- Trout	6.2%
- Dairy milk	5.0%
- Chicken egg	4.8%

-Problemi palatabilità nei mangimi (max 1.5% microalghe per conigli)

-L'inclusione di altri ω 3 può diminuire la capacità di deposizione

-Il coniglio presenta le migliori potenzialità (DHA derivato dalle microalghe pari al 40%; 31% uova; 18% carne avicoli; 15% carne suini; 10% latte; 6% carne manzo; 3% filetto trote)

Rate of fixation of the dietary DHA from MA
in various animal products

Production	DHA in diet	Rate of fixation
- Rabbit meat	0.15%	39 %
- Chicken eggs	0.15%	31 %
- Chicken meat	0.15%	18 %
- Pork meat	0.60%	15 %
- Dairy cow milk	28 g/d	10 %
- Beef meat	18 g/d	6 %
- Trout fillet	1.4%	3 %

Final DHA content in animal products

with DHA incorporation levels in the diets as indicated in previous table

Product	DHA in edible product mg/ 100g
- Chicken eggs	210
- Rabbit meat	200
- Trout fillet	170
- Chicken meat	70
- Pork meat	60
- Beef meat	18
- Dairy milk	12





Convegno ASIC - Inviati speciali a Nantes

14 settembre 2022

Session QUALITY of PRODUCTS



MEAT FROM RABBITS FED VEGETABLE DHA CAN BE
AN IMPORTANT PART OF A DHA-ORIENTED HUMAN DIET (CO-OR)
Colin M., Lebas F., Delarue J., Caillaud L., Van Lissum M., Prigent A.Y.



**MEAT FROM RABBITS FED VEGETABLE DHA CAN BE
AN IMPORTANT PART OF A DHA-ORIENTED HUMAN DIET**
Colin M.^{1*}, Lebas F.², Delarue J.³, Caillaud L., Van Lissum M.¹,
Prigent A.Y.⁴

¹ COPRI, 2 Coat Izella, 29830, Ploudalmézeau, France.

² Cuniculture, 87A chemin de Lasserre, 31450 Corrèze - France

³ Université de Bretagne occidentale - Laboratoire Régional de Nutrition Humaine, Faculté
de Médecine, Hôpital de la Cavale Blanche - Boulevard Tanguy Prigent, 29200 Brest, France

⁴ EARL 3L, 4 Coat Izella, 29830, Ploudalmézeau, France

* Correspondant : michel.colin@coprisarl.com



Le site du lapin



Université de Bretagne Occidentale



1

- Per raggiungere la raccomandazione di assunzione pari a 250 mg/giorno di DHA (1750 mg/settimana), partendo dagli attuali 137 mg/giorno (960 mg/settimana) si propongono:
 - sostituzione 150 g di carne di maiale o manzo con 150 g di carne di coniglio arricchita di DHA
 - sostituzione di 3 uova (settimana) con 3 uova arricchite di DHA
 - sostituzione carne pollo (365 g) con carne di pollo arricchita di DHA
 - consumo di 50 g di patè di coniglio (carne o fegato arricchiti di DHA)
- Porterebbe ad un aumento del consumo di carne di coniglio pari a 7,5 Kg/persona/anno



Dott. Simone Mancini

UNIVERSITÀ DI PISA





Effect of Total Replacement of Soybean Meal by Lupine Seeds (*L. albus* and *L. luteus*) on Carcass Characteristics and Meat Fatty Acids Composition of Growing Rabbits

Almeida M., Silva S., Garcia-Santos S., Guedes C.M., Ferreira L.M., Dominguez, R., Trindade H., Lorenzo J.M., Pinheiro V.



Conclusions

It is possible to replace soybean meal for lupine seeds in rabbits feed with small differences in carcass characteristics.

The replacement affected the fatty acid profile of fattening growing rabbits and cholesterol levels.

Further the impact of including *L. luteus* in rabbit feed.

Future studies: prebiotic, villi health and cecal microbiota.



Completa sostituzione farina proteica di soia con farina di semi di lupino

NS

-rese di macellazione, grasso intramuscolare, pH e colore

$P < 0.05$

-diminuzione peso alla macellazione dieta *Lupinus albus* cv. Nacional

-diminuzione SFA

-incremento PUFA

-miglior PUFA n-6/n-3 dieta *Lupinus albus*

-diminuizione colesterolo dieta *Lupinus luteus*



Convegno ASIC - Inviati speciali a Nantes

14 settembre 2022

Session QUALITY of PRODUCTS



Luis-Chincoya H.*
Herrera-Haro J. G.
Pro-Martínez A.
Santacruz-Varela A.
Jerez-Salas M. P.

THE EFFECT OF SOURCE AND CONCENTRATION
OF ZINC ON GROWTH PERFORMANCE, MEAT
QUALITY AND MINERAL RETENTION IN NEW
ZEALAND RABBITS

-Testate 4 diete:

T1= A basal diet (BD) zinc-free,

T2= BD+ 25 ppm Zn (ZnSO_4),

T3= BD+ 75 ppm Zn (ZnSO_4),

T4= BD+ 25 ppm Zn (Zn-Methionine),

T5= BD+ 75 ppm Zn (Zn-Methionine).

NS

-performance crescita

-modifiche colore, collagene e proteine nelle cosce

$P < 0.05$

-modifica colore lombi (diminuzione L^* e b^*) nelle diete con metionato di Zn

-le concentrazioni più basse di Zn hanno portato a maggior valori di Zn nel siero e nei lombi

Probabile che la biodisponibilità fosse diversa

Probabile che il livello di Zn nelle diete con 75 ppm fosse vicino alla soglia tossica

Probabile azione chelante della Zn nei confronti di Fe





Convegno ASIC - Inviati speciali a Nantes

14 settembre 2022

Session QUALITY of PRODUCTS



Changes in fatty acid composition due to selection for intramuscular fat

Laghouaouta, H., Zubiri-Gaitán, A., Sosa-Madrid, B.S.,
Blasco, A., Hernández, P.

Pilar Hernández
phernan@dca.upv.es



-La linea con alto contenuto di grasso intramuscolare dimostrava essere maggiormente correlata con il contenuto di SFA e MUFA, benché mostrasse valori più bassi di acido stearico

-PUFA NS tra le linee

-C18:2 n6, acido linoleico, maggiore in linea alto contenuto

-PUFA C20-C22 maggiori nella linea a basso contenuto

-Selezione divergente per il contenuto di grasso intramuscolare nel *Longissimus thoracis et lumborum*

-9° generazione

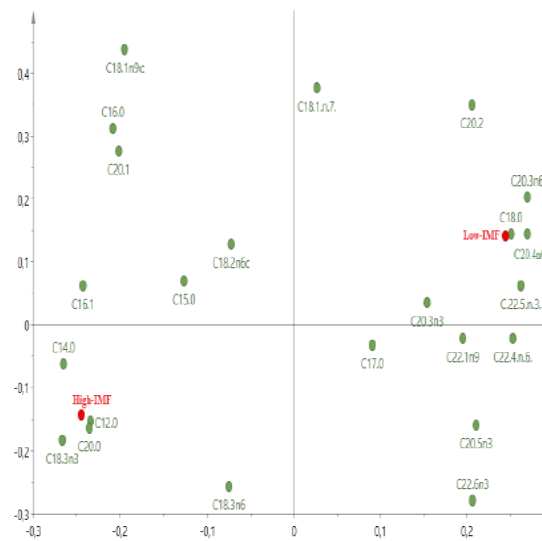


Figure 2: Loading plot of PLS-DA. Colours: green, predictors (fatty acids); red, response (line).





Convegno ASIC - Inviati speciali a Nantes

14 settembre 2022

Session QUALITY of PRODUCTS

RABBIT DIVERGENT SELECTION FOR TOTAL BODY FAT CONTENT:

EFFECT ON PROXIMATE COMPOSITION AND FATTY ACID PROFILE OF MEAT

Dalle Zotte A.¹, Szendrő Zs.², Matics Zs.², Cullere M.¹

¹Department of Animal Medicine, Production and Health – MAPS, University of Padova, Italy

²Hungarian University of Agriculture and Life Sciences, Kaposvár Campus, Kaposvár, Hungary



12th World Rabbit Congress, 3-5 November 2021, Nantes, France



UNIVERSITÀ
DEGLI STUDI
DI PADOVA



Department of Animal
Medicine,
Production and Health



SZENT ISTVÁN
UNIVERSITY
Kaposvár



-Analisi cosce animali di 11 settimane dalla 1° alla 4° generazione (Lean vs Fat lines)

-NS analisi centesimali nella 1° generazione

-P<0.01 per umidità, lipidi e proteine nella 2° generazione

-P<0.01 per umidità e lipidi nella 3° generazione

-P<0.001 per umidità e lipidi nella 4° generazione

-NS SFA

-Fat line > MUFA (palmitoleico, oleico)

→ -Lean line > PUFA e PUFA n-6

(arachidonico)

-NS PUFA n-3

-Lean line > n-6/n-3 e PI

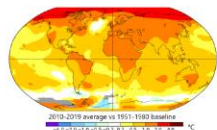
-Selezione divergente tramite tomografia computerizzata

-Già le prime due generazioni hanno evidenziato una modifica significativa nella deposizione di grasso nella carcassa (Lean vs Fat lines)



Possibilità di utilizzare la linea Lean per la produzione di carne e la linea Fat per linea materna riproduttori o per alimenti per bambini





Impact of heat stress on the meat quality of rabbits divergently selected for total body fat content

Cullere M.^{1*}, Szendrő Zs.², Kasza R.², Gerencsér, Zs.², Dalle Zotte A.¹

¹Department of Animal Medicine, Production and Health - MAPS, University of Padua, viale dell'Università 16, 35020, Legnaro (PD), Italy

²Faculty of Agricultural and Environmental Sciences, Kaposvár University, Guba S. Str. 40, H-7400, Kaposvár, Hungary



12th World Rabbit Congress, 3-5 November 2021, Nantes, France



-NS interazione linea genetica x temperatura per analisi centesimali, Fe eme, TBARs e composizione acidi grassi

-NS contenuto proteine in relazione a linea genetica o temperatura di allevamento

-La temperatura più alta (28 °C) induce un aumento del Fe eme, del contenuto di acqua (diminuzione lipidi), un aumento dei PUFA e diminuzione dei MUFA.

-Fat line ha dimostrato maggior contenuto di lipidi, ceneri, Fe eme e minor TBARs.

-Lean line ha dimostrato avere maggior contenuto di PUFA

La condizione di stress non ha alterato la qualità della carne di coniglio, compreso il suo stato ossidativo.

Non sono state evidenziate capacità differenti di adattamento allo stress in base alla selezione divergente.





PRODUCTION PERFORMANCE AND CARCASS TRAITS OF THREE RABBIT BREEDS REARED AT DIFFERENT TEMPERATURES

Matics Zs.^{1*}, Szendrő Zs.¹, Dalle Zotte A.², Cullere M.², Radnai I.¹, Kasza R.¹, Gerencsér Zs.¹

¹Hungarian University of Agriculture and Life Sciences, Kaposvár Campus, Hungary

²Department of Animal Medicine, Production and Health, University of Padova, Italy



UNIVERSITÀ
DEGLI STUDI
DI PADOVA

12th World Rabbit Congress

Nantes (France)
3-5 November 2021

-alla temperatura di stress il consumo di mangime e l'incremento di peso peggiorano, mentre l'indice di conversione migliora

-le 3 razze hanno dimostrato diverse rese di produzione (PL>PW>Pka)

-PL consumavano più cibo ad entrambe le temperature con un miglior indice di conversione

-Significatività dell'interazione razza x temperatura per incremento di peso, indice di conversione, peso alla macellazione e peso della carcassa refrigerata.



Diversa adattabilità delle 3 razze alla temperatura di stress (PL e PW > Pka) probabilmente dovuto ai maggior depositi di grasso





Convegno ASIC - Inviati speciali a Nantes

14 settembre 2022

Session QUALITY of PRODUCTS

EFFECTS OF GARLIC POWDER AND SALT AS INGREDIENTS IN RABBIT MEAT BURGERS

Simone Mancini⁽¹⁾ – Simona Mattioli⁽²⁾ –
Alessandro Dal Bosco⁽²⁾ – Gisella Paci⁽¹⁾

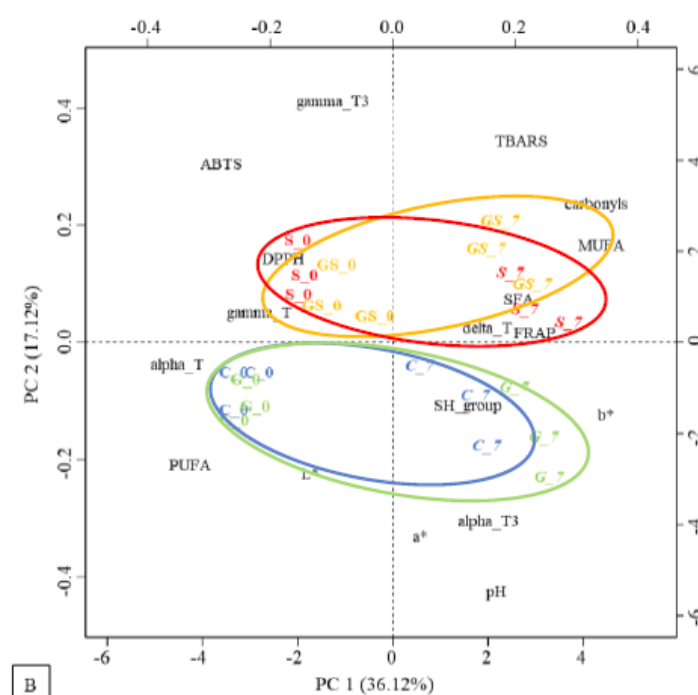
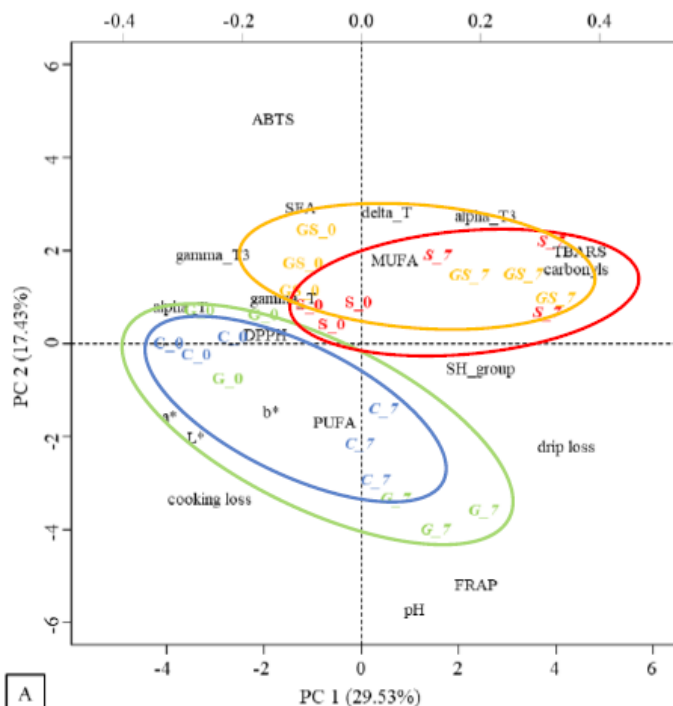
⁽¹⁾Dept. of Veterinary Sciences, University of Pisa, Viale delle Piagge 2, 56124, Pisa, Italy
⁽²⁾Dept. of Agricultural, Food and Environmental Science, University of Perugia, Borgo XX Giugno
74, 06100, Perugia, Italy



Dr. Simone Mancini, PhD
University of Pisa – Department Veterinary Sciences
simone.mancini@unipi.it



- effetto polvere di aglio e sale sulla qualità dei burger:
 - controllo
 - 0.25 % polvere di aglio
 - 1% sale
 - 0.25 % polvere di aglio + 1% sale
- burger refrigerati a 4 °C per 0, 4 e 7 giorni





Use of non-medicated feed with the addition of pomegranate by-products in commercial rabbit fattening

María G.A.¹, Resconi V.C.^{**}, Bouzaida M.D.^{*}, Fernández-Bautista M., Olleta J.L., Asenjo B., Romero J.V., Miranda-de la Lama G.
Email¹: levrino@unizar.es



Context and objectives:

Following the tendency to minimize the use of medical products in animal production, this study tested whether fattening commercial rabbits with non-medicated feed, with 20% addition of three different pomegranate by-products affected production traits and meat quality compared to a conventional strategy.

Results:

Least square means for the performance, carcass and meat quality according finishing diets

Variable	Seed	Shell	Pomace	Industrial
LW at slaughter (kg) (#)	12.50	12.10	13.03	13.31
Conversion index (#)	3.56	4.09	2.94	2.96
Carcass weight (kg) (#)	7.74	7.06	7.80	7.77
Carcass yield (%) (#)	61.88	58.36	59.86	60.61
Carcass weight (g)	1301 a	1177 b	1300 a	1299 a
pH (24 h post mortem)	5.75	5.74	5.75	5.70
Thawing lossess (%)	12.28 b	10.76 b	9.98 a	10.92 ab
Cooking losses (%)	16.63 ab	17.66 b	19.09 b	14.18 a
WB shear force (Kgf)	2.20 b	2.18 b	1.86 b	2.63 a
L* (lightness)	51.86 b	53.72 a	54.57 a	53.53 a
a* (redness)	-1.26 a	-1.59 b	-1.34 ab	-1.08 a
b* (yellowness)	5.18 c	9.78 b	9.79 b	6.77 a

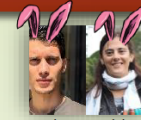
(#) Group data (n=6). Significant differences $P \leq 0.05$

Take home message: Industrial concentrate can be replaced by non-medicated feeding with 20% of pomegranate by-products, obtaining similar productive and meat quality results.



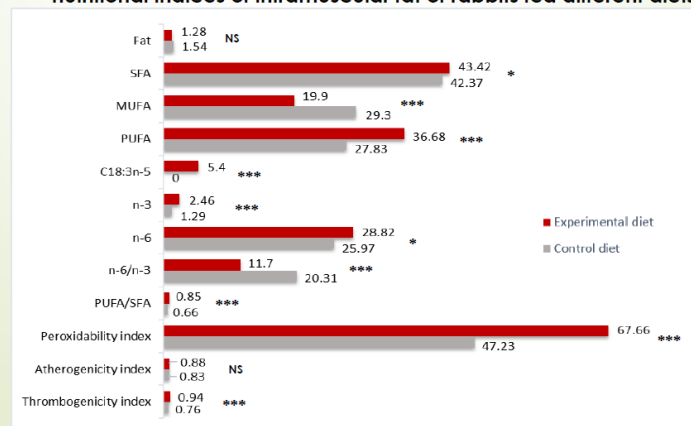
Can the inclusion of pomegranate pomace in rabbits diets improve the fatty acid profile of their meat?

Bouzaida M.D.^{*}, Resconi V.C.^{**}, Romero J.V., Gimeno D., Olleta J.L., Miranda-de la Lama G.C., Asenjo B., María G.A.
Email: **resconi@unizar.es



Results

Fat percentage, fatty acid (FA) profile (% of total FA), FA ratios and nutritional indices of intramuscular fat of rabbits fed different diets

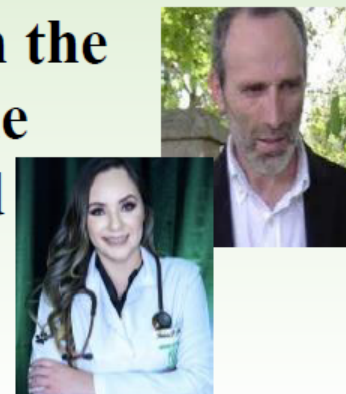


Take home message: Pomegranate pomace is a suitable ingredient for use in fattening rabbit diets which can modify the fatty acid profile of their meat



Effect of a feed restriction and gender on the performance and characteristics of the rabbit carcass in the fattening period

Ribeiro, J., Andrade, E., Monteiro, D., Pinheiro, V.
E-mail: jessica_paie@hotmail.com



CONTEXT: The present work aimed to analyse the effects of a rabbit gender and feed restriction on the characteristics of the carcass at the end of fattening period.