

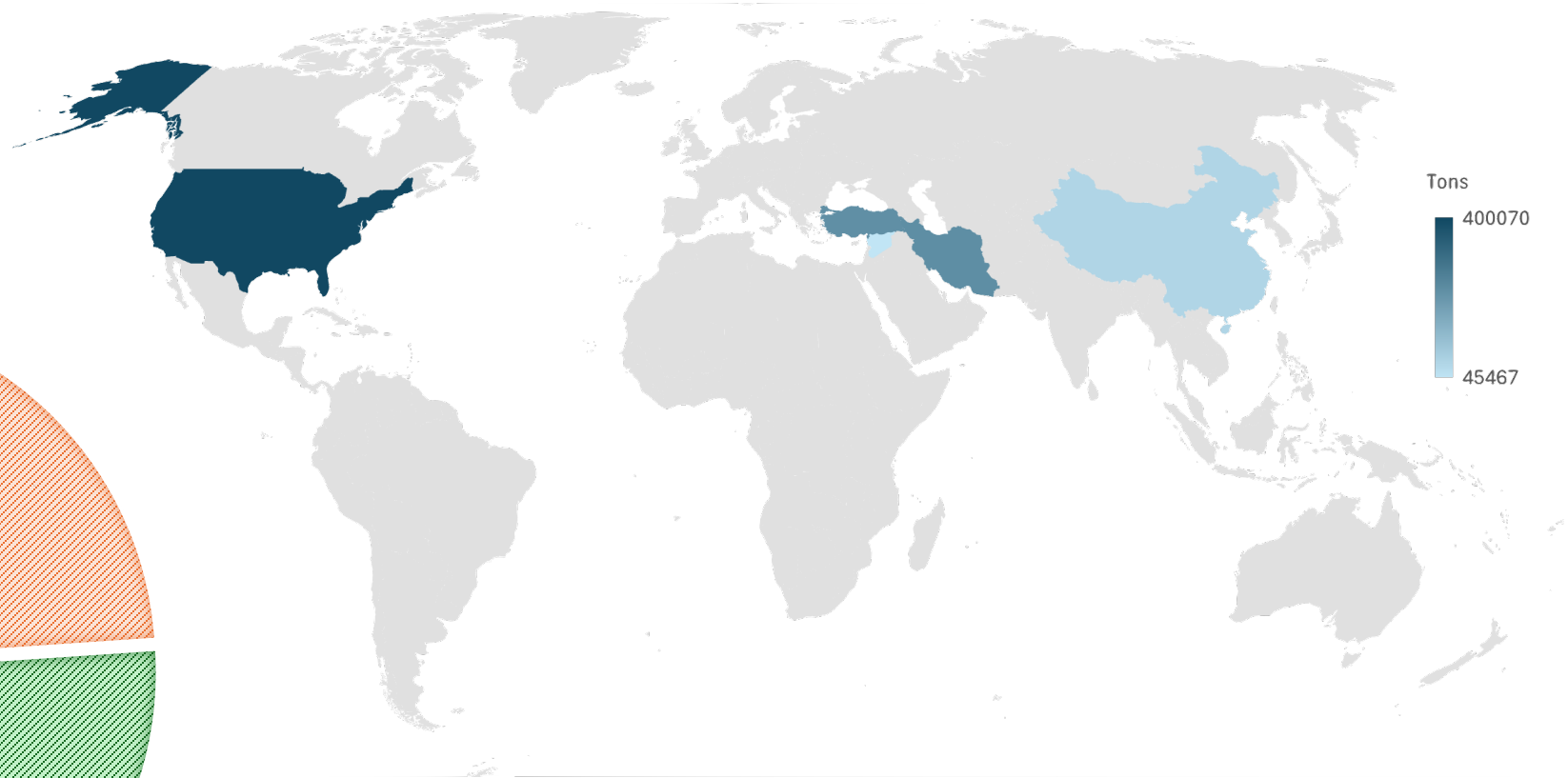
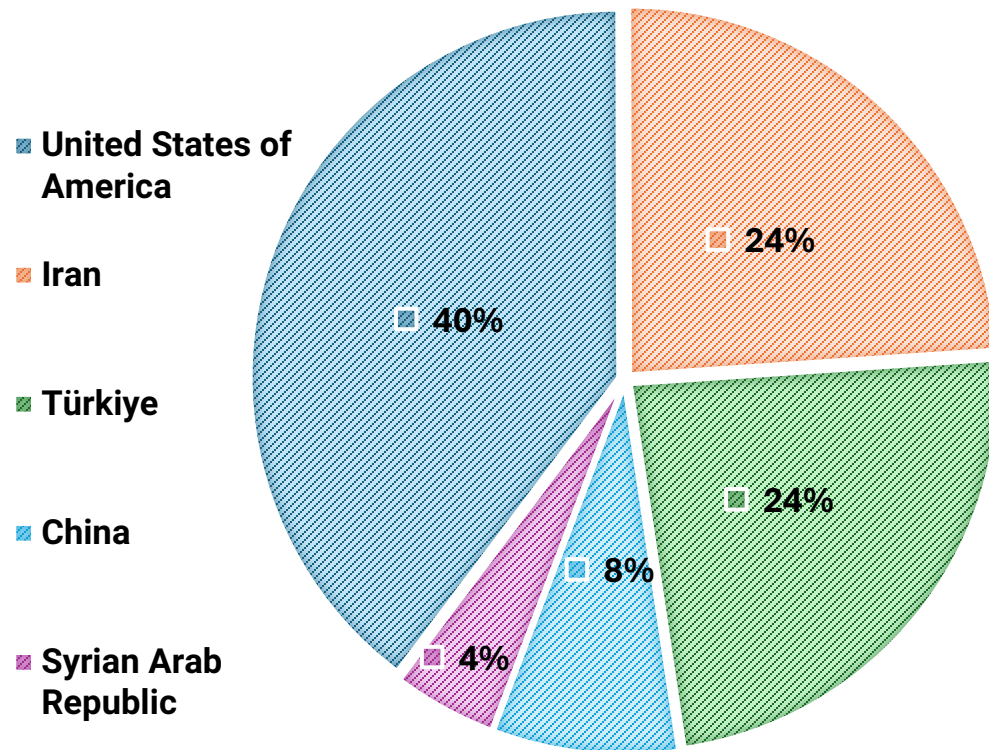
Dietary pistachio skin improves lipid profile and lipid oxidation in livestock farming systems

F. Mangano*, M. Musati, A. Bertino, M. S. Cannone, L. Biondi, M. Lanza, A. Natalello, A. Priolo, G. Luciano



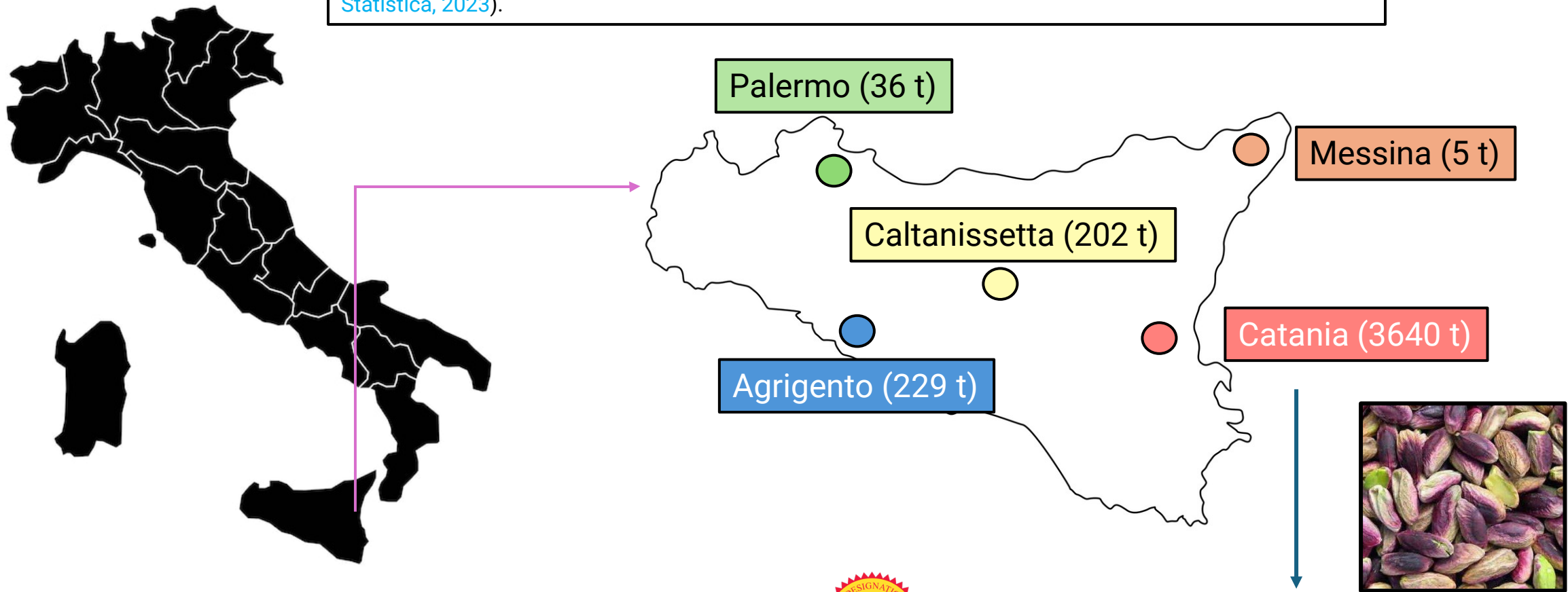
75th EAAP Annual Meeting
1/5 September 2024 - Florence,
Italy

Production of Pistachio seed (*Pistacia vera* L.) in the world in the year 2022 (FAOSTAT, 2022).



Total annual production in the year 2022, 1.026.803
tons (FAOSTAT, 2022).

In Italy, pistachio production is centred in southern regions, with Sicily considered the primary Italian producer ([Istituto Nazionale di Statistica, 2023](#)).



Green Pistachio of Bronte

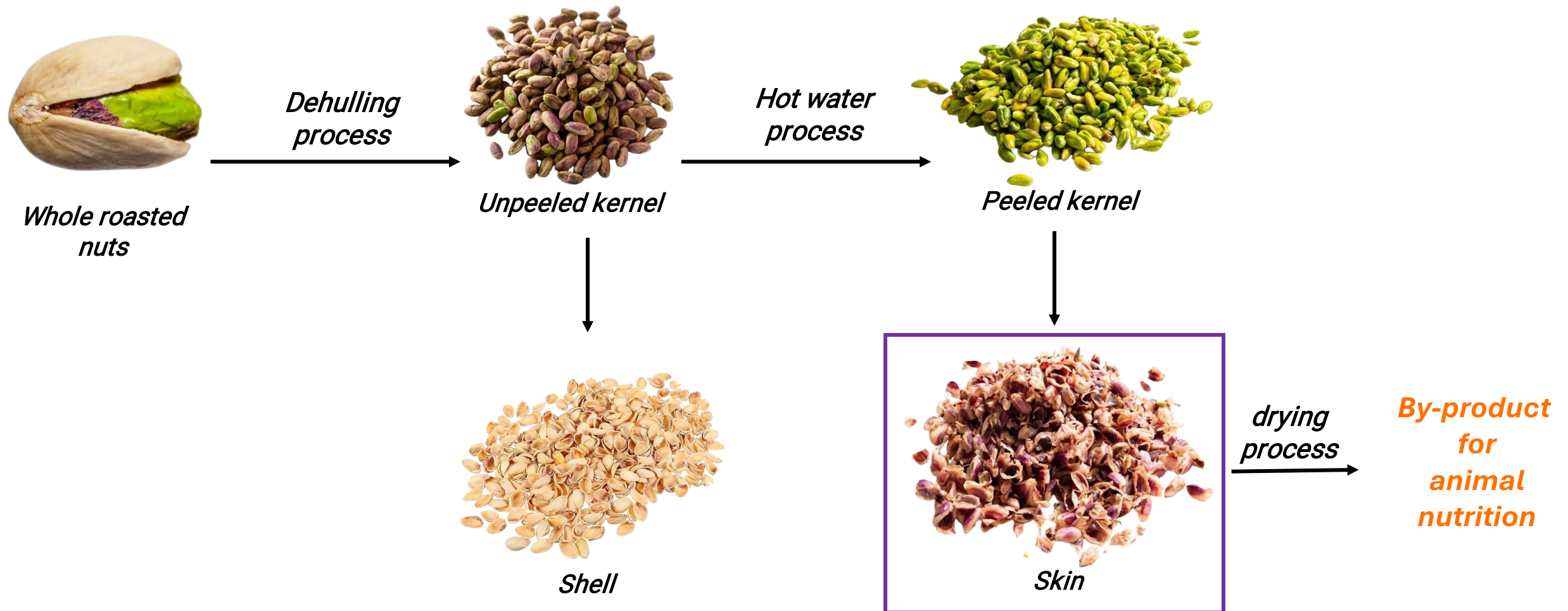
Botany

- The pistachio fruit is a drupe that ripens in dense clusters ([Musati et al., 2023](#)).
- Pistachio trees are small to medium size and can grow to 12 m ([Kashaninejad et al., 2011](#)).



- Widely cultivated in the low mountains and foothills of the semi-desert region ([Hormaza and Wunsch 2007](#)).

Simplifying process of raw product and by-product of pistachio (Özdikicierler and Öztürk-Kerimoğlu, 2023)



Phenolic compounds

(Alalwan et al., 2022)

Antioxidant activity

(Tomaino et al., 2010)

Tannins

(Naserian et al., 2015)



***Pistachio skin
composition***

Anthocyanins

(USDA 2018)

PUFA and MUFA

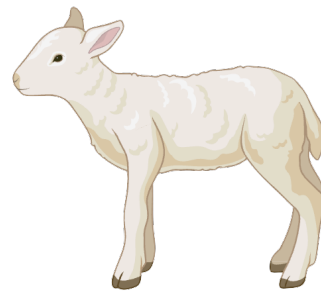
(Alalwan et al., 2022)

Hypothesis

Could pistachio skin improve fatty acids profile and reduce the oxidation of meat?

Aim of the study

Investigate the effect of feeding lambs with pistachio skin by-products on the meat quality.



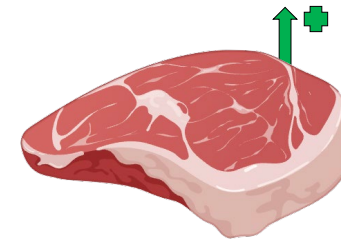
Lambs

+



Pistachio skin

=



Improvement meat quality

Planning in vivo trials

Two different diets

1° CON



*Common typical Sicilian ovine
diet*

2° PIS 12%



CON diet with 12% of pistachio skin



Materials and Method

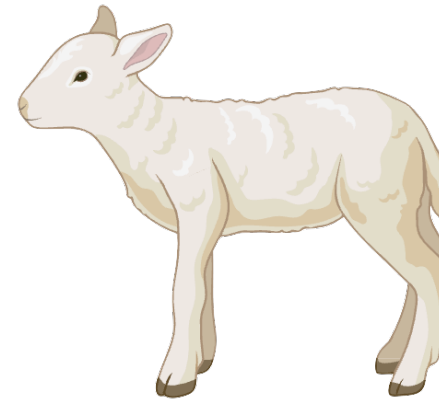
	Pistachio skin	Diets	
		Control	Pistachio
Chemical composition (g/kg DM)			
Dry matter (g/kg FM)	935	908	902
Ash	38.5	78.3	67.8
Crude protein	165	166	165
NDF	255	225	234
ADF	165	113	117
Lignin	39.2	20.9	20.7
Ether extract	289	35.8	53.4
Phenolic compounds (mg TANeq/g DM)	141	5.2	15.5
Total tannins (mg TANeq/g DM)	97.7	1.7	9.08

Materials and Method

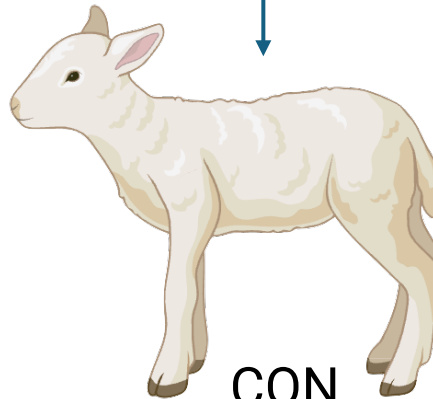
Animals raised for 60 days

Randomized in single pen

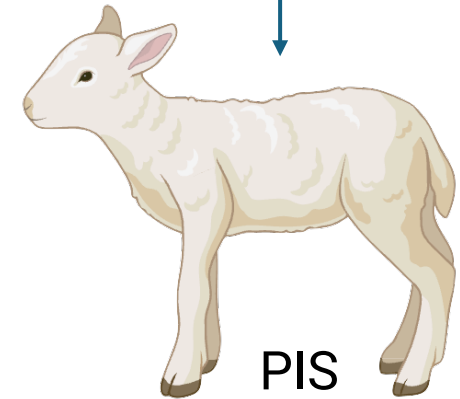
Feed and water ad libitum



Valle del Belice x Comisana
n.20

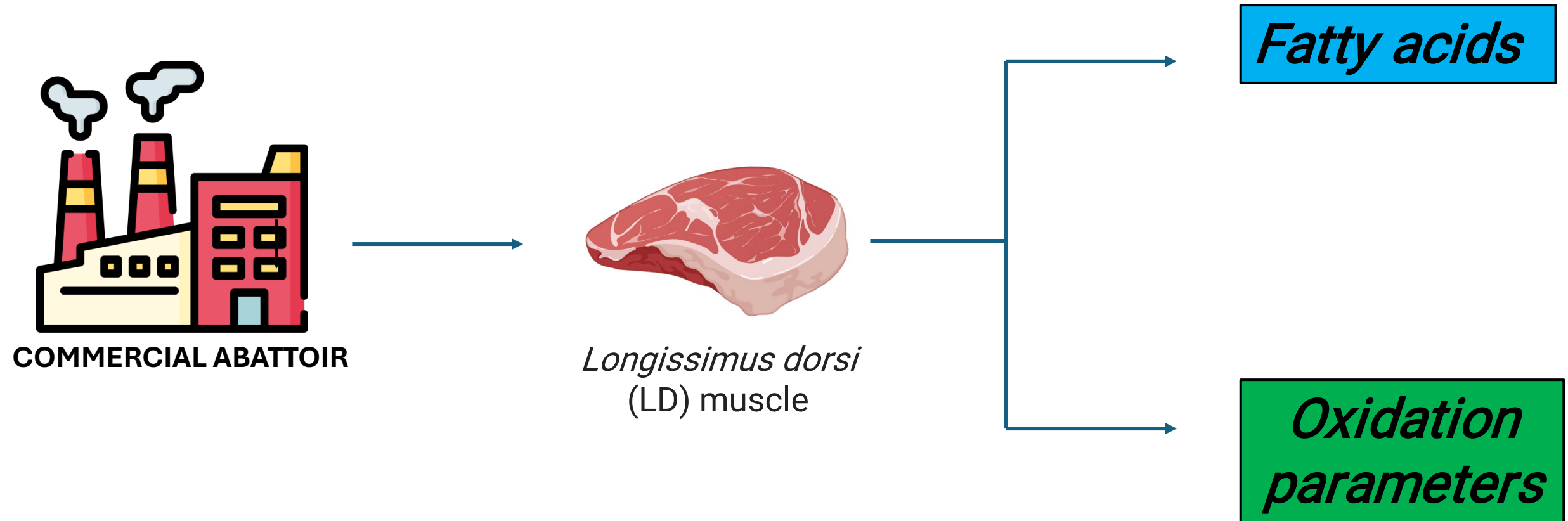


CON
n.10



PIS
n.10

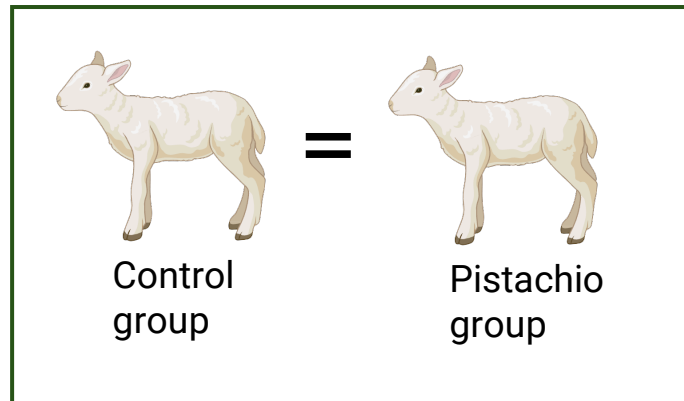
After the in-vivo trials



Results



1. Growth performance and
rumen fermentation
parameters

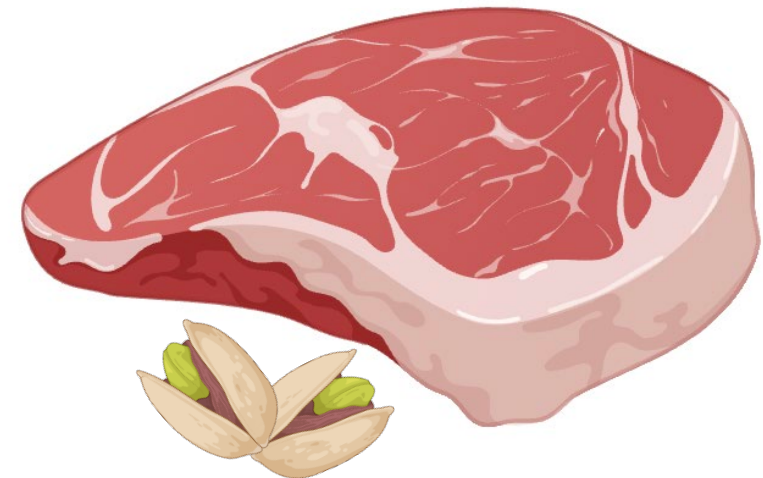


	Diets		SED	P-value
	Control	Pistachio		
DMI (g)	819	772	57	0.419
Initial BW (kg)	17.5	17	1.1	0.668
Final BW (kg)	30.3	28.4	1.6	0.244
Weight gain (kg)	12.8	11.4	1.2	0.24
ADG (g/d) by REG	225	186	20.7	0.072
Total feed consumption (kg)	54.1	51.4	3.8	0.478
Feed conversion ratio (FCR)	4.25	4.85	0.37	0.12
Carcass weight (kg)	13.7	12.8	0.9	0.342
Intramuscular FAT (g/100 g muscle)	2.34	2.31	0.19	0.879

Results → 2. Fatty acid profile of muscle (g/100g FA)

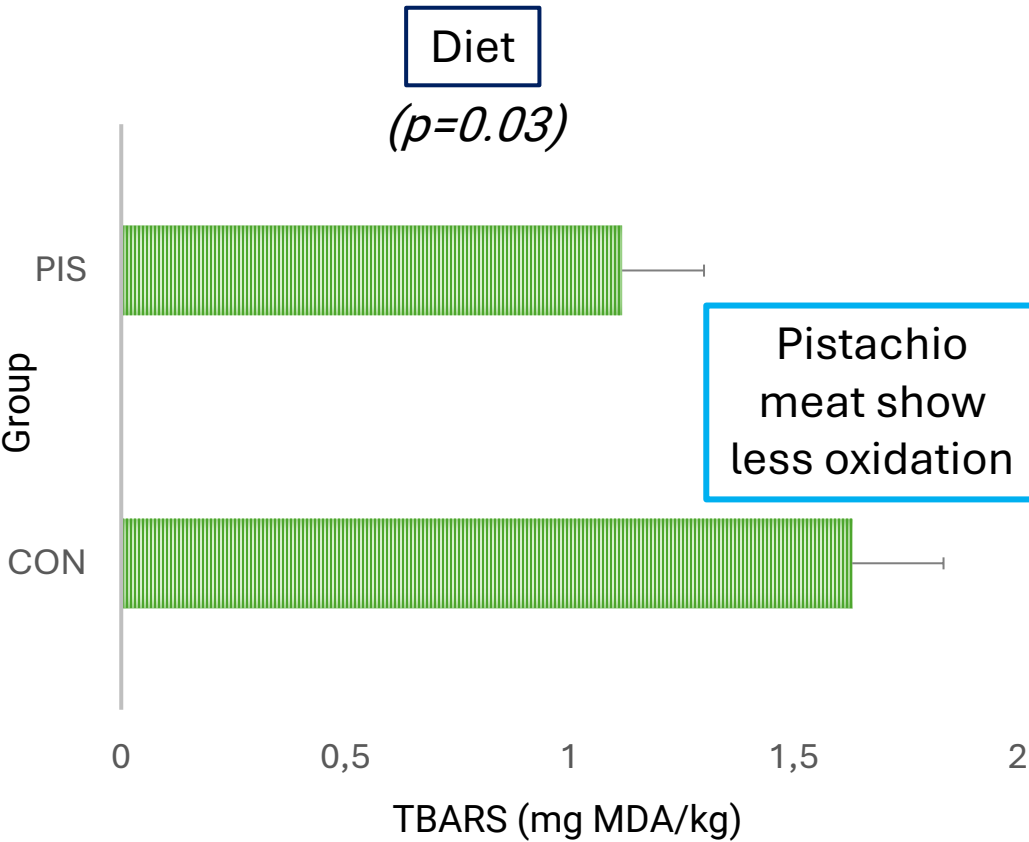
	Diets		SED	P-value
	CON	PIS		
C18:1 <i>t</i> 6+ <i>t</i> 7+ <i>t</i> 8	2.24	4.45	0.547	<0.001
C18:1 <i>t</i> 9	4.81	6.97	0.744	<0.01
C18:1 <i>t</i> 11	6.59	10.46	1.908	0.053
C19:1 <i>t</i> 7	2.04	3.00	0.316	0.006
C18:2 <i>c</i>9 <i>c</i>12	109.74	123.39	5.995	0.032
PUFA	139.29	154.38	7.211	0.047
n-6	119.4	133.28	6.435	0.041
n-6/n-3	8.33	9.66	0.572	0.029

*Increasing of
MUFA and PUFA*

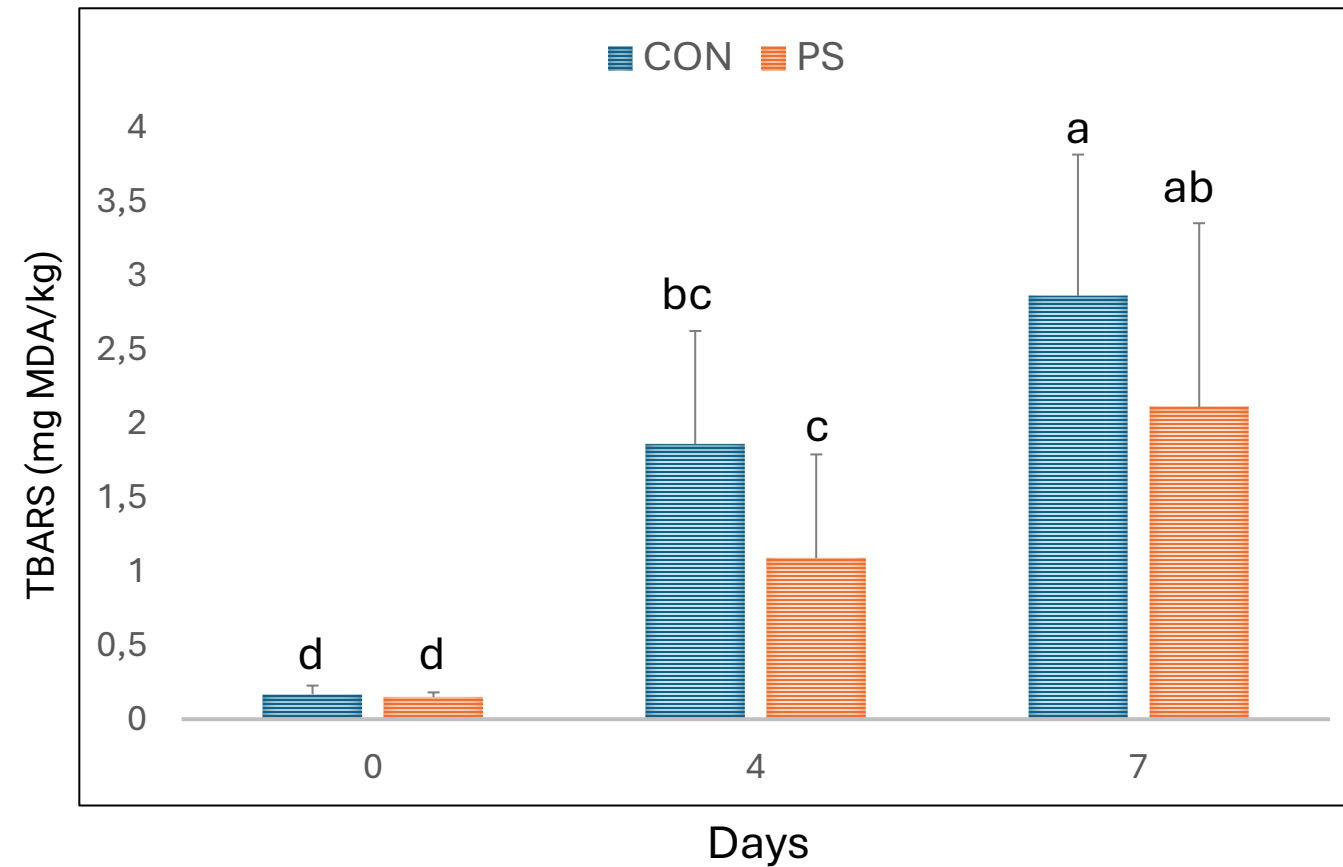


Results

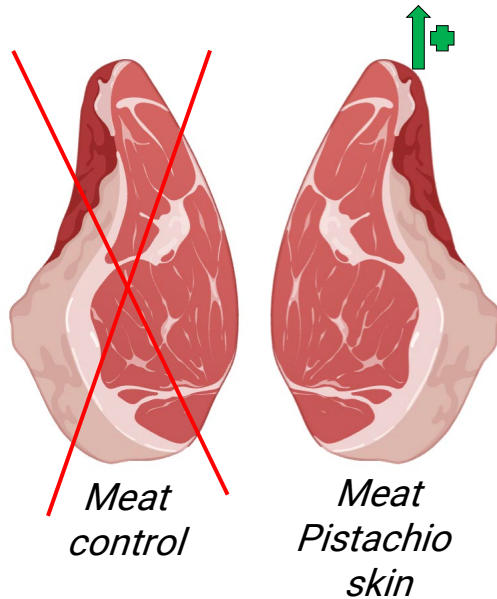
3. TBARS



Diet * Storage Time
($p=0.045$)



Conclusion



Performance

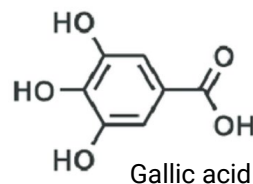
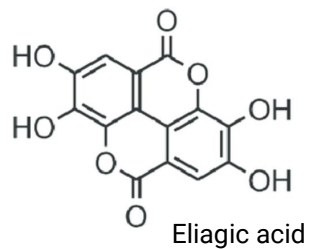
- Does not negatively affect performance

Fatty acids

- Total amount of PUFA +10.83%
- Linoleic acid +12.43%
- n-6/n-3 +15.96%

Oxidation's parameter

- Meat oxidizes less during the storage time
- Less oxidized than the control



Thank you for your attention!!



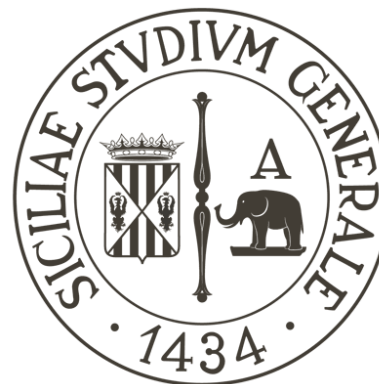
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EAAP
European Federation
of Animal Science



agritech
National Center for technology in Agriculture



University
of Catania

	Pistachio skin	Diets	
		Control	Pistachio
Ingredients, g/kg of dry matter (DM)			
Maize	-	260	180
Barley	-	260	260
Alfalfa hay	-	200	200
Soybean meal	-	160	120
Wheat bran	-	70	70
Molasses	-	30	30
Mineral mix	-	20	20
Pistachio skin	-	-	120