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IS HORSE MEAT TENDER ENOUGH TO GRILL?

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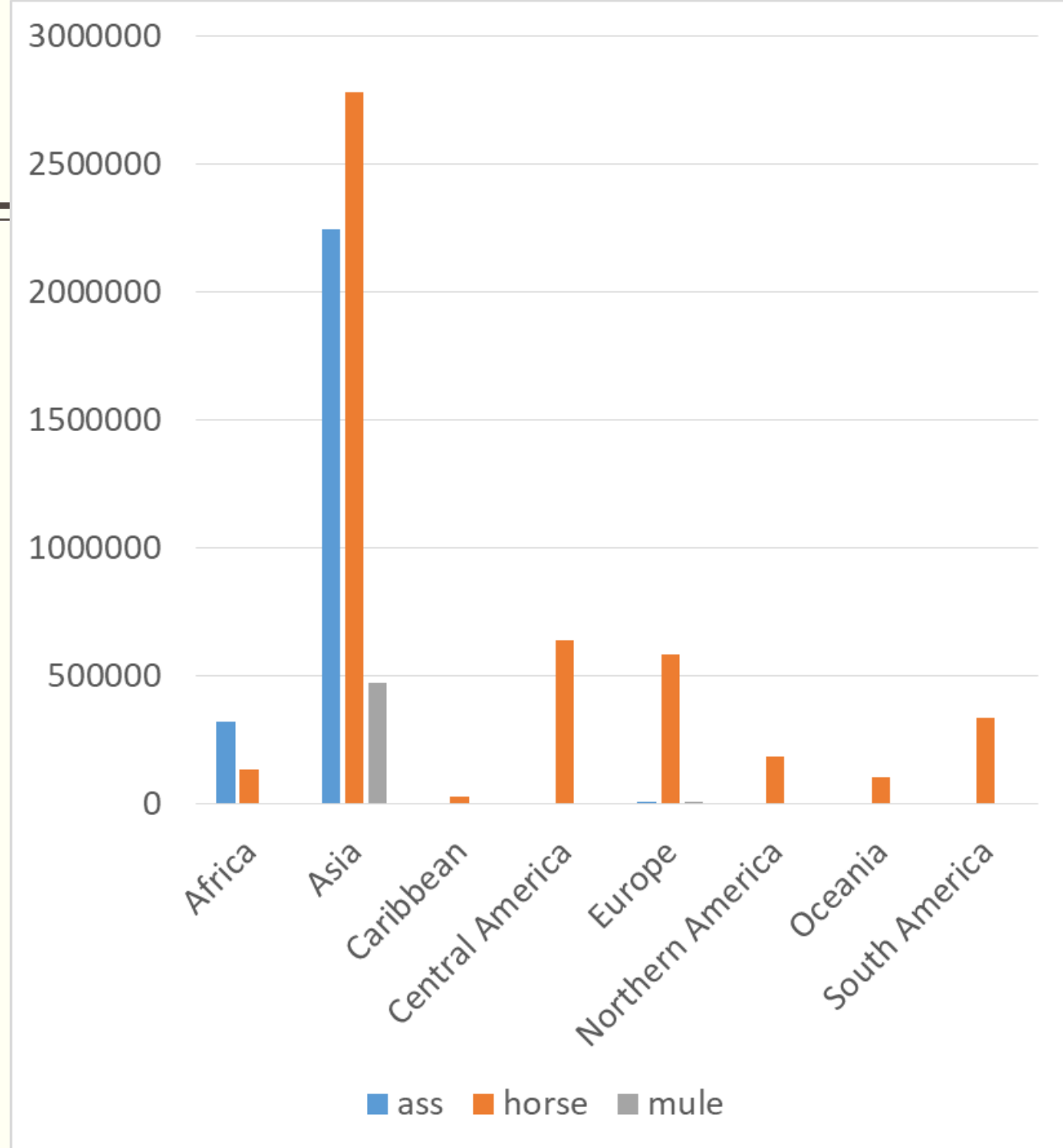
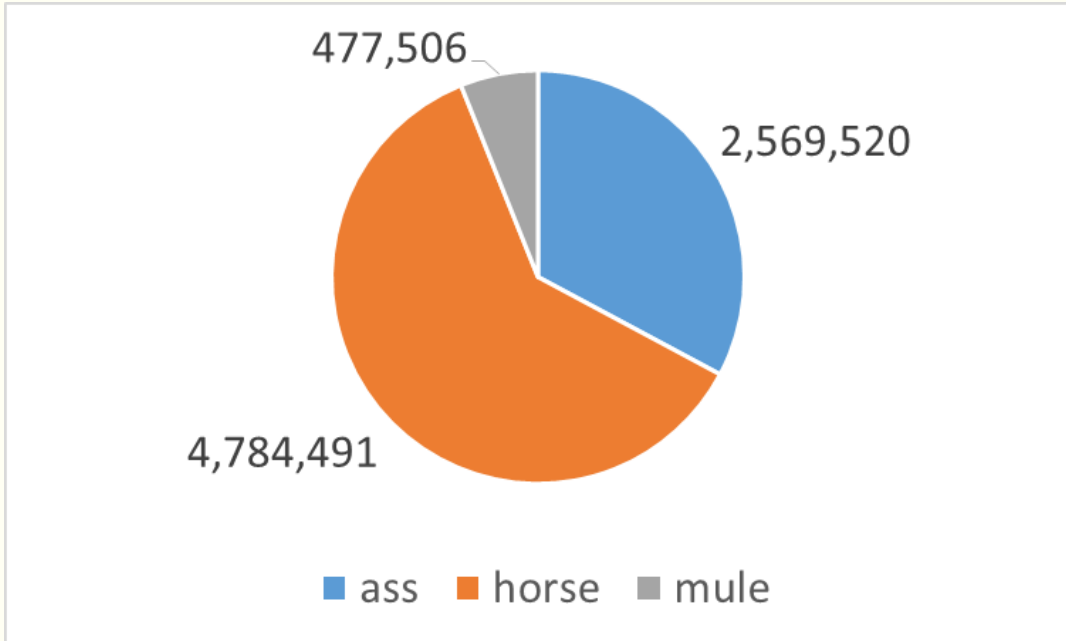
Topics

- Some facts about horse meat industry
 - FaoStat
- Horse meat characteristics
 - Quality and chemical composition
 - Impact on consumers health
- Results of horse meat analyses in Slovenia
- Some suggestions to make this sector more transparent!

Equine meat industry - FaoStat

- ~ 700,000 t horse meat is annually World production
 - ~1/2 Asia,
 - ~1/3 Americas,
 - Europe ~4%
 - consumption estimate 0.4 kg/year (0.5% of whole meat consumption)

Slaughtered heads (FaoStat)



Proportion of slaughtered heads to population size

Calculated average age!

Area	ass	horse	mule	ass	horse	mule
Africa	1.6%	2.1%	0.0%	64	47	
Asia	14.1%	18.4%	17.2%	7	5	6
Caribbean	0.0%	1.6%	0.0%		62	
Central America	0.0%	8.7%	0.0%		11	
Europe	0.8%	10.5%	2.1%	119	10	47
Northern America	0.0%	1.7%	0.0%		59	
Oceania	0.0%	25.5%			4	
South America	0.0%	2.9%	0.0%		35	
World	5.9%	8.1%	4.9%	17	12	20

USA situation

Period	USA	Mexico	Canada
1994-2000	598,722	0	0
2001-2007	416,471	70,461	166,353
2009-2014	0	390,730	306,071

In 2012 EU Import 54,853 t of horse meat

Countries with significant import

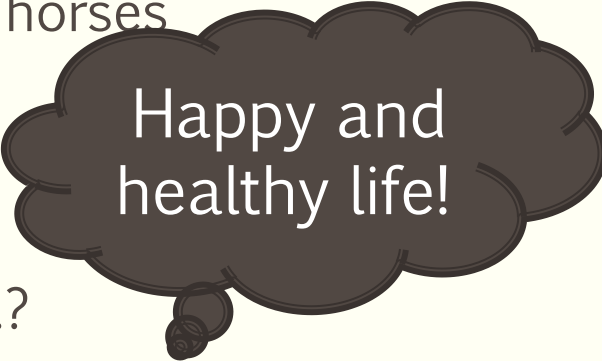
- France and Italy 2/3
- Belgium, The Netherlands, Bulgaria, Finland and Hungary

Also

- Russia, China, Indonesia, Japan, Kazakhstan and Scotland

Why horse meat does (did) not popular?

- Till beginning of 20th century horses were:
 - Important in transport
 - Main force in forestry and agriculture
 - Crucial part of military structures
- Consequently:
 - Horse meat on market was from old, injured and/or exacerbated horses
 - Emotions: horse is so cute, my companion, noble, intelligent, ...
- Scientific facts?!:
 - Foals grown up with their mothers! What about chicken, piglets, ...?
 - The horse selectively chooses feed and water! What can we find in digestion in different species?
 - Horse has very sensitive digestion and need moving - exercising!



Happy and
healthy life!

What affect meat quality?

- Genetics
 - Breed – number of fibbers per cm² of muscle, marbling,
- Nutrition
 - In general no additives, mainly grass and some oats, barley, Very rear treated with medicaments
- Age
- Aging
 - Different technic (wet, dry)
 - Time and temperature combination
- Baking - cooking– have to be adapted to each part of meat

Aging

- Important biochemical process

→ microstructure of the

meat and eating quality.

Not very tender

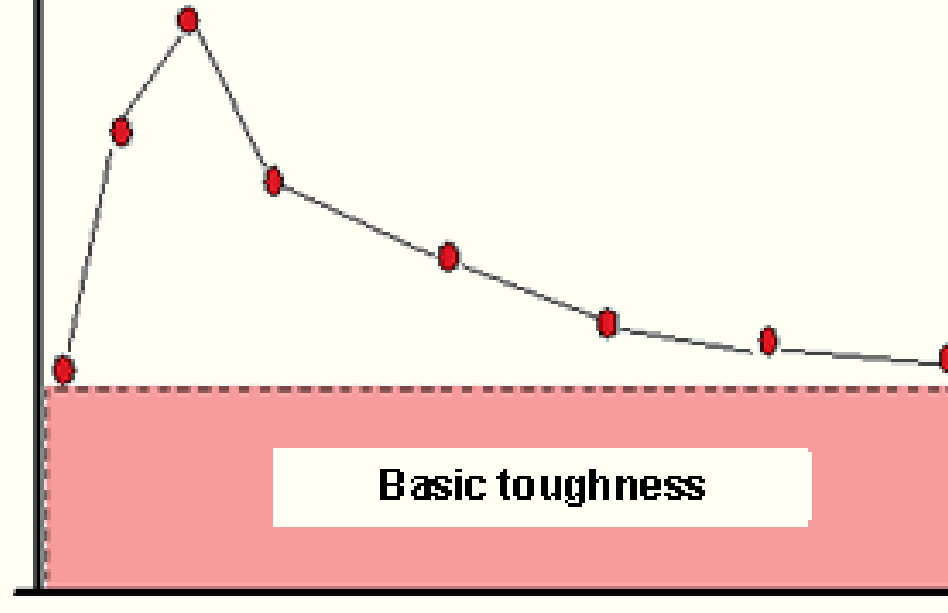


Very tender

Toughness

Rigor Mortis

24 hours after slaughter

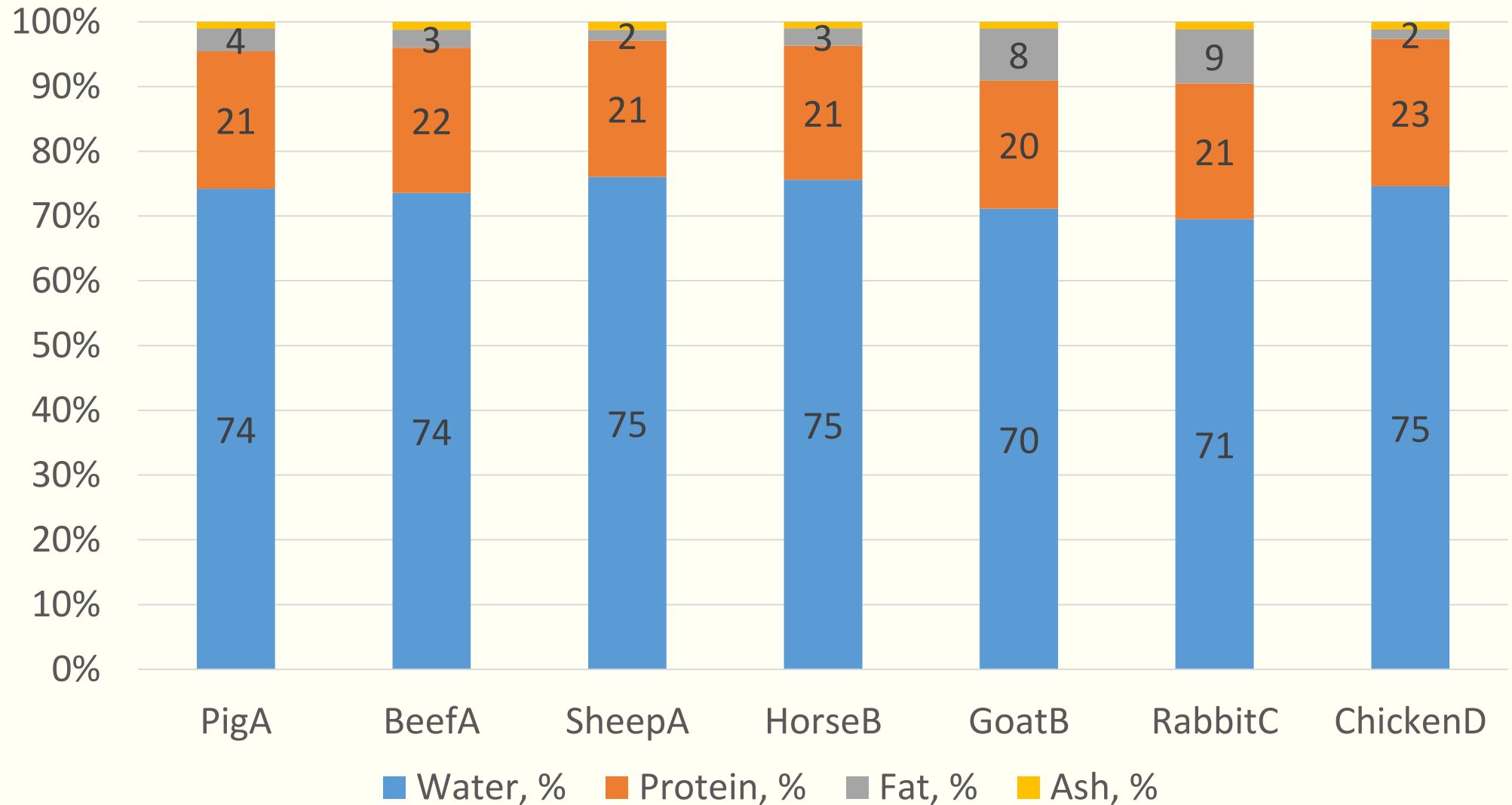


Basic toughness

Time

Chemical composition (Slovenske prehranske tabele, 2006)

A-loin; B-carcass; C-saddle and thigh; D-breast – no skin



Minerals

	Pig A	Beef A	Sheep A	Horse B	Goat B	Rabbit C	Chicken D
Na,mg	61	58,8	75	44		32,4	33,8
K, mg	338	355	330	400		407	392
Ca, mg	7,7	10	9,2	9,2	9,5	7,0	6,2
P, mg	208	195	208	216		245	243
Mg, mg	26	23,7	23,8	27		25,6	30,1
Fe, mg	0,5	1,5	1,4	4,9	2,0	0,7	0,6
Zn, mg	1,4	3,4	2,3	4,9		1,2	1,0
Se, ng	87,4	47,6	106			79,1	73,5
Cu, mg	0,1	0,1	0,1	0,2		73,6	55,9

A-loin; B-carcass; C-saddle and thigh; D-breast – no skin

Important dietetically factors horse meat vs. beef

Trait	Beef rump	Horse carcass
n-3 FA (mg/100g)	27	267
n-6 FA (mg/100g)	97	299
n-6/n-3 ratio	3.6	1.1
UFA/SFA	0.12	0.59
Vitamin A ($\mu\text{g}/100\text{g}$)	10	21
Vitamin B ₁₂ ($\mu\text{g}/100\text{g}$)	2.2	3.0
Tiamin ($\mu\text{g}/100\text{g}$)	90	110
Riboflavin ($\mu\text{g}/100\text{g}$)	170	150

Cholesterol

Species	mg/100g	Index
Wild boar	155.3	519
Deer	138.3	463
Goat	121.4	406
Beef	76.5	256
Horse	29.9	100

Taste

In a recent steak tasting at Edinburgh's L'Escargot Bleu, 12 foodies and chefs were given two steaks - one the best Orkney beef, the other Comtois horse.³

The horse won by **12** votes to **0**



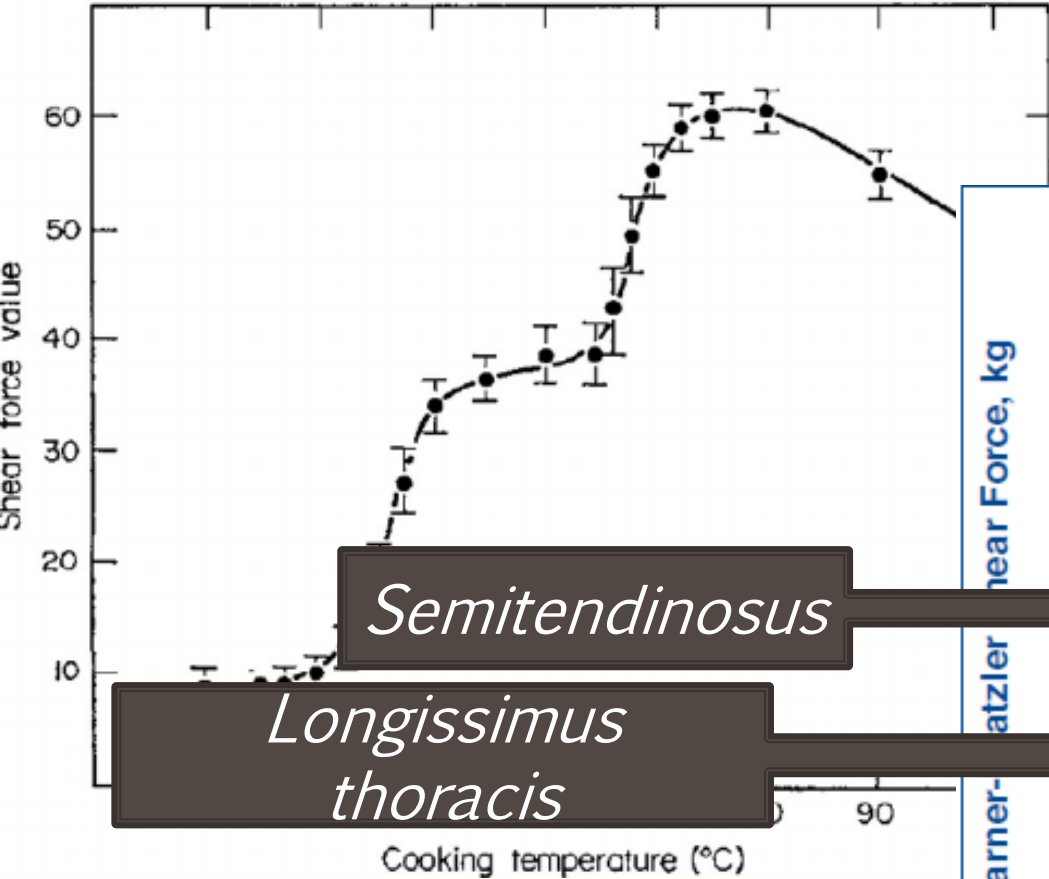
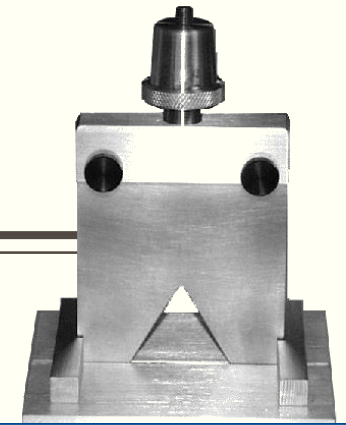
RESULTS OF OUR TRIAL

Samples of all horses slaughtered from January to April 2016

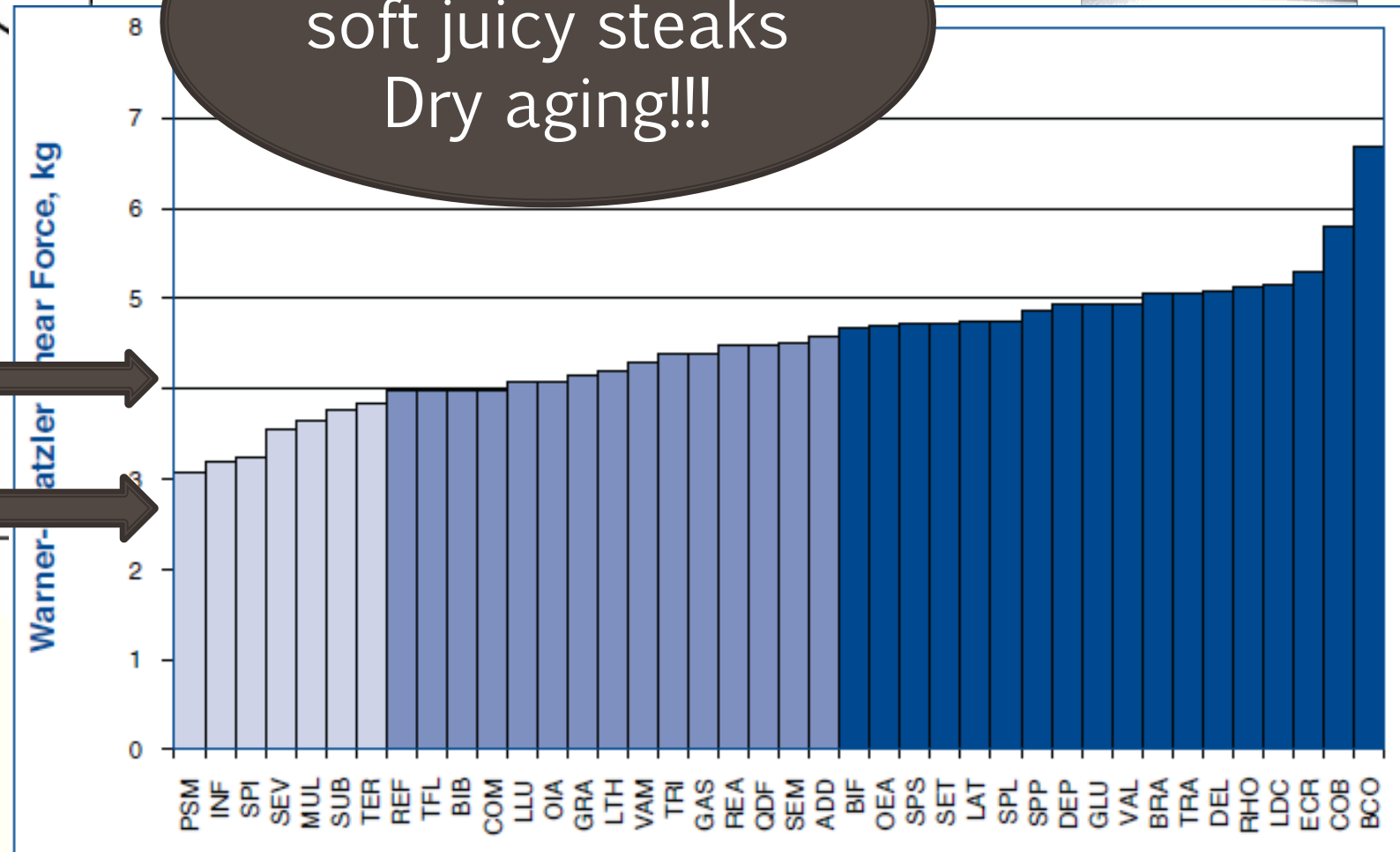
HOT HORSE

- 5 horses per week, 12 weeks = 60 horses x 2 muscles = 120 samples
- Dry aged for 2 weeks in carcass (routine)
 - + 2 weeks vacuum – wet aged
- pH – 5,5 – optimum
- Colour – expected dark
- Losses: thawing & cooking
- Shear force – same procedure as routine for beef

Shear force LSM



Conclusion:
soft juicy steaks
Dry aging!!!



Suggestions

- Promotion of horse meat quality
 - Use it in your diet
 - Publications
 - Research, ...
- Help to reduce hypocrisy of horses culling
 - Current legislation work against horse welfare!

Legislation

Owner decision
not for human
consumption



... directives: [Directive 2009/156/EC](#) and [Directive 90/427/EEC](#) for registered equidae

Simple test before
slaughtering



Identification methods of equidae: [Regulation \(EC\) 504/2008](#) and [Regulation \(EU\) 2015/262](#)

Identification document (passport): [Decision 93/623/EEC](#) for registered equidae.
[Decision 2000/68/EC](#) for the equidae for breeding and production

Also not the best parts could be used for delicious meal!



Thank you for your attention!



Equine meat processing

- Effect of processing
 - Added value
 - New jobs
 - Short traveling - welfare
 - Food quality
- Some examples
 - AZRRI – Istrian donkey
 - butchery Krušič
 - Hot Horse

