WP2. Task 2.3. Local feeding resources rich in agro-by products in the diets for local pig breeds

BACKFAT FATTY ACID PROFILE AFTER GROWING PERIOD IN IBERIAN PIGS FED WITH OLIVE CAKE IN A DRY OR WET (SILAGE) FORM

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BACKGROUND

IBERIAN PIG HANDLING

Growing period
- 25 to 100 kg
- Strong diet restriction

Fattening period
- Up to 160 kg
- *Ad libitum* feed intake

"Cebo" / "Cebo de campo"
- Fodder-based feeding
- Intensive/semi-extensive systems
- Slaughter at 10/12 months

"Montanera"
- Acorn and grass-based feeding
- Semi-extensive system
- Slaughter at 14-16 months

FEEDING STRESS

EXTENSIVITY

ANIMAL WELFARE

López-Bote, 1998

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BACKGROUND

OLIVE-BY PRODUCTS

Benefits as components for feed in growing or finishing periods

***Ad-libitum* availability**

- No overweight risk (low energy products)
- No feeding stress due to restriction

With feeding restriction

- Higher fiber supply (high-fiber products)
- Use of local alternative resources

Positive effect on animal welfare

Effect on final product quality?

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BACKGROUND

Fatty Acid Profile

- Iberian pig products market value may depend on major fatty acid proportions in carcass subcutaneous external fat.

	% Palmitic	% Stearic	% Oleic	% Linoleic	Source
	C16:0	C18:0	C18:1 n-9	C18:2 n-6	
Limits*	≤ 22,0	≤ 10,5	≥ 53,0	≤ 10,5	*BOE, APA/3653/2007, dec 13th*
	≤ 21,0	≤ 9,5	≥ 54,0	≤ 9,5	*De Pedro, 2001; Daza et al., 2005*

** Approximate values. May change by year/source.*

- Related to meat quality properties.
- Useful as indicator of pig diet during fattening period.
- Affected by:

➢ Rearing system
➢ Diet composition
➢ α-tocopherol on diet
➢ Crossbreeding
➢ Tissue type (turnover rate of tissue)

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OBJECTIVES

Study of the influence of olive by-products as part of the growing diet of Iberian pigs in Fatty Acid profile of subcutaneous fat after the growing period.

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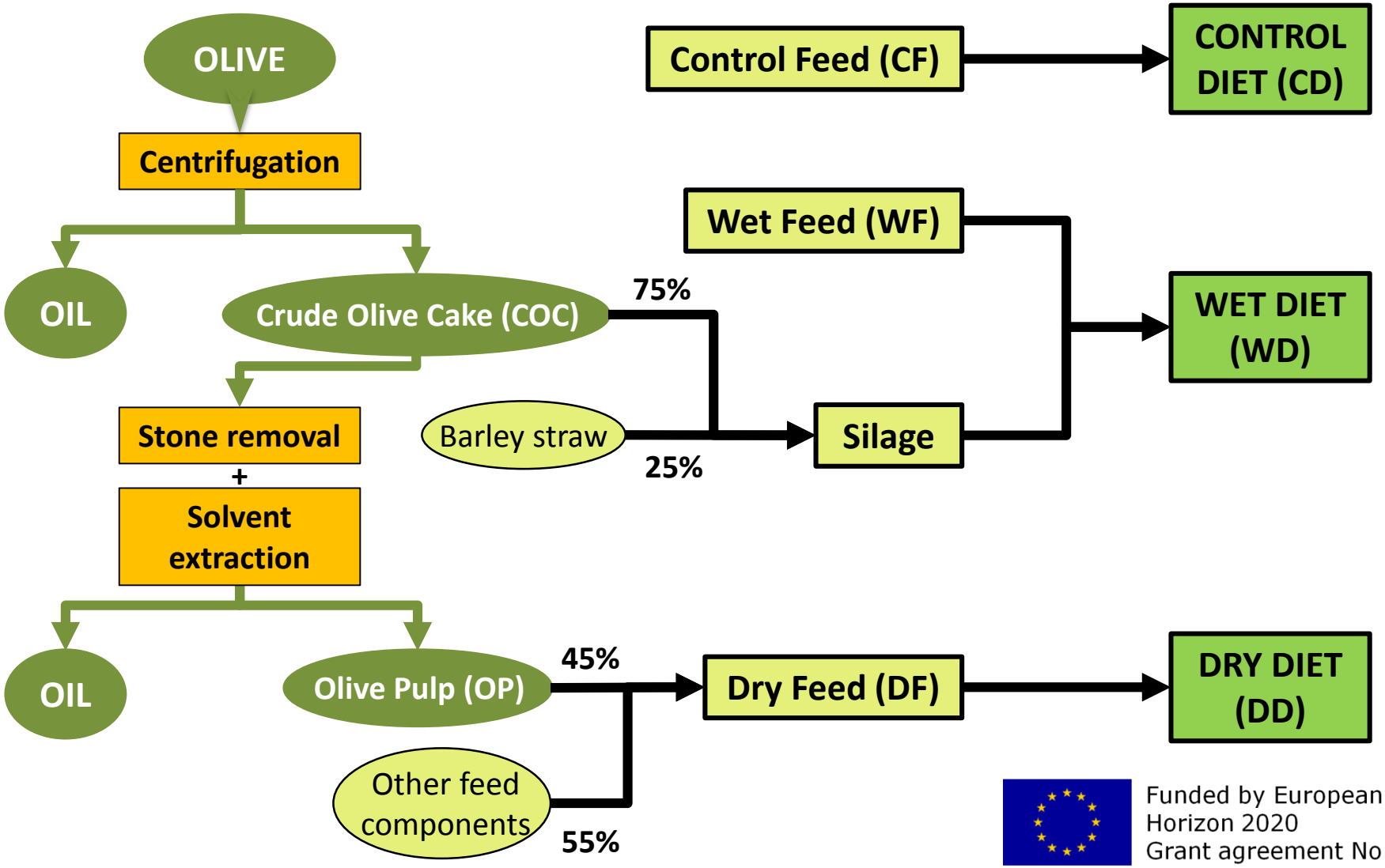
M&M: By-products and diets



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M&M: Animals and sampling

45 Iberian pigs

Start of experiment: at 6.5 months, 42 kg

- Duration: 191 days
- 3 groups: Growing diets CD, DD, WD.
- Each group in 110 m^2 pen.
  Outdoor & covered areas.

Diet	n	Feed	Form	Intake
CD	15	Control Feed	Pellets	Restricted
DD	15	Dry Feed (OP)	Pellets	Restricted
WD	15	Wet Feed	Pellets	Restricted
		COC by-product	Silage	*Ad libitum*

Fattening: Start at 12 months, 100 kg

- *Montanera* (*ad libitum* intake of acorns & grass).
- Animal groups re-adjusted according to extension and acorns & grass availability of each *dehesa.*
- 3 batches according to body weight.

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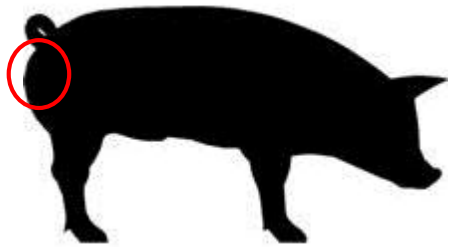
M&M: Animals and sampling

Data & Sampling:

Backfat biopsies:

- Collected from rear part of body *(Spanish Policy for Animal Protection (RD1201/05))*.
- End of growing period.
- Fat homogenised with chloroform.



Fatty Acid profile:

- Gas chromatography after acid transesterification in presence of sulfuric acid (Cava *et al*., 1997).
- **14 FA** analysed.

Statistics:

- ANOVA. Linear model: ***y = Xb + e***
  b = growing diet (3-levelled factor)
  Software: R (*lm, anova, TukeyHSD*)

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RESULTS

FATTY ACIDS	CD (%)	DD (%)	WD (%)	SEM	*ANOVA: p*
C14:0	1.40 [a]	1.14 [c] ↓	1.27 [b] ↓	0.15	1.90×10^{-06}
C16:0	24.30 [a]	21.54 [b] ↓	20.87 [b] ↓	1.90	1.35×10^{-09}
C16:1 (n-7)	2.67 [a]	2.36 [b] ↓	2.29 [b] ↓	0.25	1.76×10^{-05}
C17:0	0.41 [b]	0.50 [a] ↑	0.42 [b]	0.08	4.21×10^{-04}
C17:1	0.42	0.41	0.39	0.05	0.476
C18:0	11.40 [a]	8.62 [c] ↓	10.32 [b] ↓	1.47	2.68×10^{-08}
C18:1 (n-9)	46.69 [b]	49.83 [a] ↑	49.22 [a] ↑	2.12	2.24×10^{-05}
C18:2 (n-6)	9.44 [b]	12.20 [a] ↑	11.38 [a] ↑	1.48	3.27×10^{-09}
C18:3 (n-3)	0.70 [b]	0.87 [a] ↑	0.91 [a] ↑	0.13	1.71×10^{-06}
C20:0	0.23	0.22	0.22	0.03	0.400
C20:1	1.36 [b]	1.31 [b]	1.51 [a] ↑	0.14	1.37×10^{-05}
C20:2	0.63 [b]	0.65 [b]	0.75 [a] ↑	0.08	2.28×10^{-05}
C20:3	0.18 [b]	0.16 [c]	0.25 [a] ↑	0.04	2.64×10^{-12}
C20:4 (n-6)	0.18	0.19	0.19	0.03	0.577

SFA **MUFA** **PUFA**

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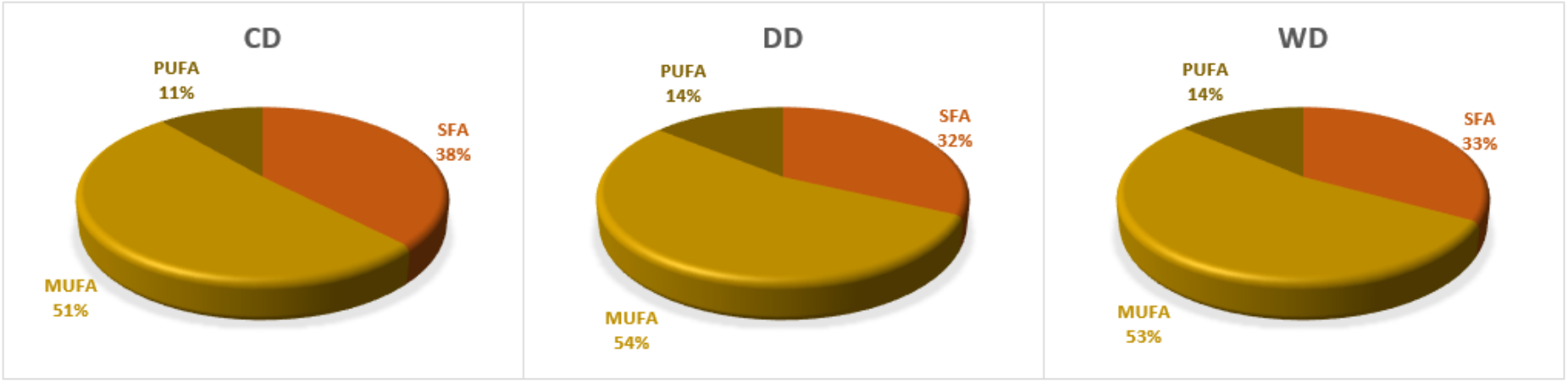
RESULTS

FATTY ACID TOTALS	CD (%)	DD (%)	WD (%)	SEM	*ANOVA: p*
SFA	37.75 [a]	32.03 [b] ↓	33.10 [b] ↓	3.12	8.54×10^{-10}
MUFA	51.13 [b]	53.90 [a] ↑	53.42 [a] ↑	2.06	1.93×10^{-4}
PUFA	11.12 [b]	14.07 [a] ↑	13.49 [a] ↑	1.64	5.53×10^{-09}



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REMARKS

- Incorporation of olive-based diets during growing period has a positive effect on fatty acid profile at the end of this period, diminishing SFA percentage.

- Olive-based *ad-libitum* diets (silage addition, WD treatment) can be a good alternative to avoid restriction during growth, without spoiling fatty acid composition.

- More analyses are being carried out to observe the possible effect of these diets on fatty acid profile after *montanera* period.

- Also, the effect of these diets in meat quality traits is being studied.

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