Macauba pulp (*Acrocomia aculeata*) as alternative raw material for growing-pigs

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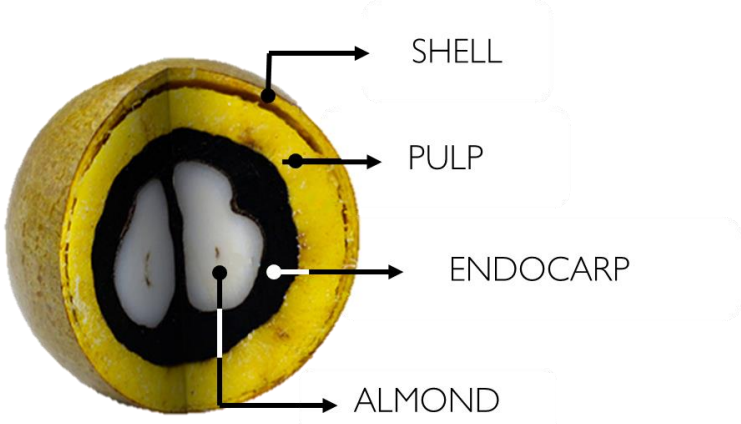
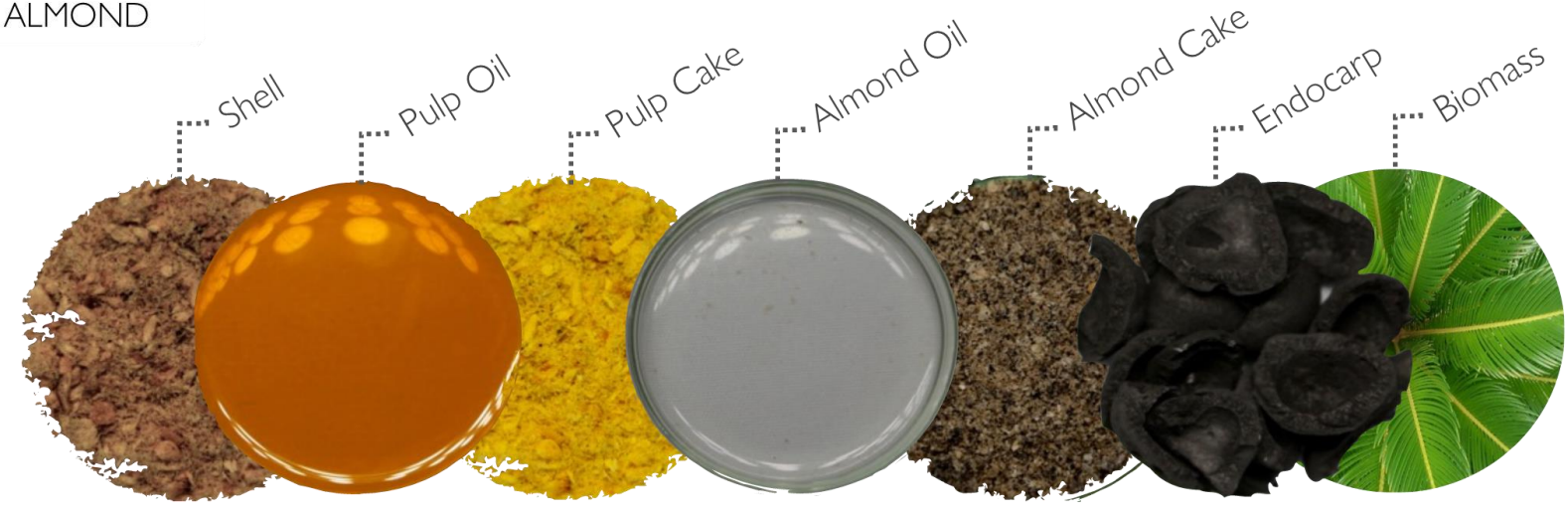
WHAT IS MACAUBA ?

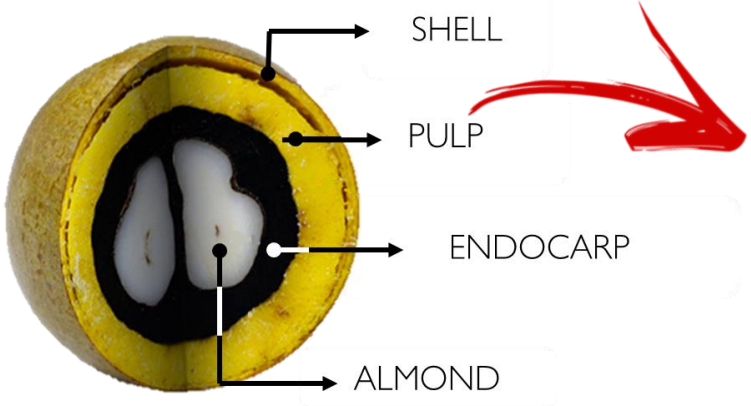
- PALM TREE FROM THE ARECACEAE FAMILY
- NATIVE TO TROPICAL REGIONS OF LATIN AMERICA
- GREATER INCIDENCE IN BRAZIL
- ADAPTED TO DIFFERENT ENVIRONMENTAL CONDITIONS
- GREAT POTENTIAL FOR OIL PRODUCTION

MACAUBA FRUIT





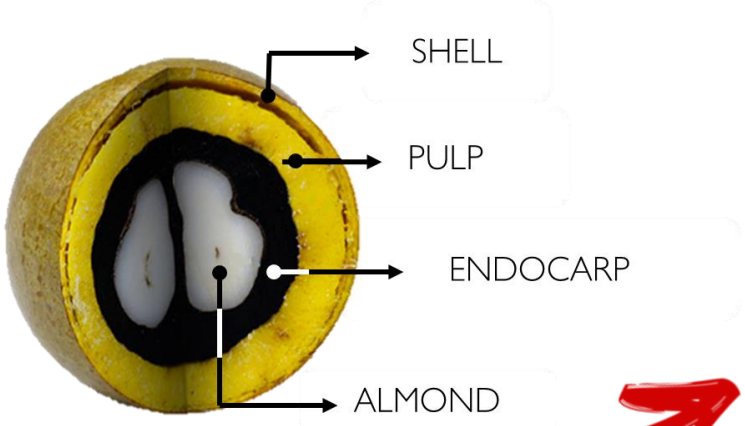
MACAUBA FRUIT



OIL PRODUCTION

PULP OIL: BIODIESEL, BIOKEROSENE AND FOOD INDUSTRY

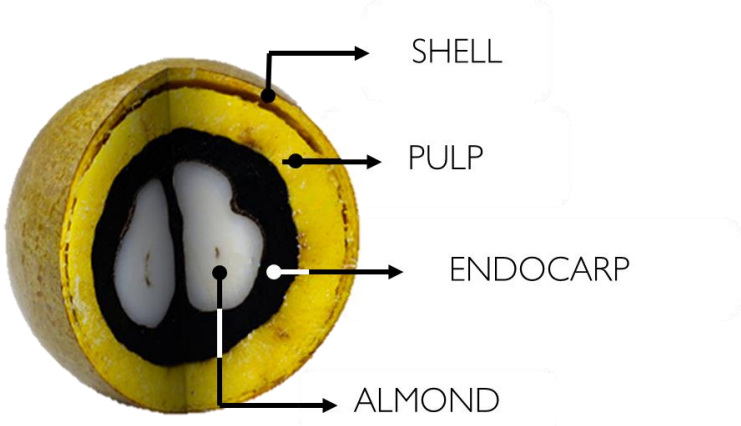
MACAUBA FRUIT



OIL PRODUCTION

ALMOND OIL: COSMETIC AND PHARMACEUTICAL INDUSTRY

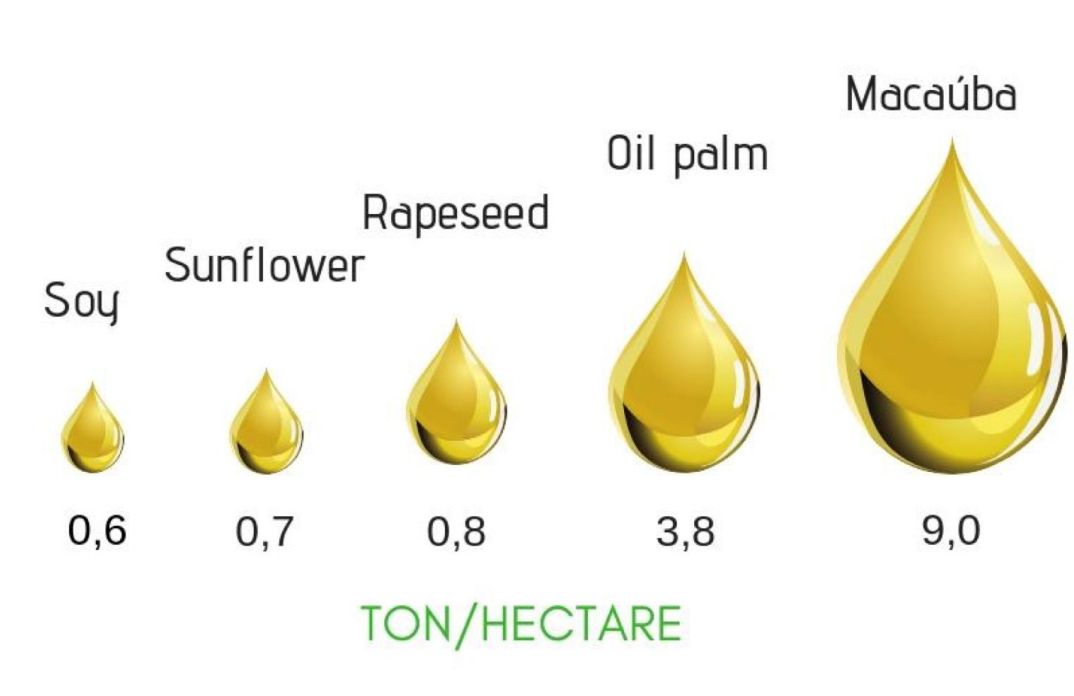
MACAUBA FRUIT



CO-PRODUCTS

SOLID BIOFUELS, FEED, ORGANIC MATERIAL

GREAT POTENTIAL FOR VEGETAL OIL PRODUCTION



UNTIL 2006……

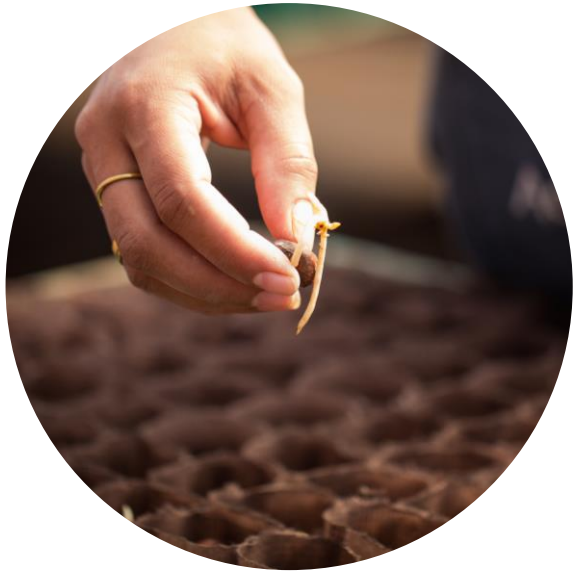
NON-DOMESTICATED PLANT - EXTRACTIVISM ACTIVITY

- LOW SEED GERMINATION RATE
- NO HARVESTING AND PROCESSING TECHNIQUES
- LOW PRODUCTIVITY/AREA
- NO QUALITY STANDARDS
- LOW COMMERCIAL VALUE OF THE FRUIT
- LOW OIL QUALITY – OXIDATION AND RANCIDITY

AFTER 2006…… NEW ERA OF MACAUBA EXPLORATION

DEVELOPMENT OF KNOWLEDGE AND TECHNOLOGIES

Universidade Federal de Viçosa – Brazil / Prof. Motoike et al.



AFTER 2006…… NEW ERA OF MACAUBA EXPLORATION

COMMERCIAL CULTIVATION

400 PLANTS/HECTARE

AFTER 2006…… NEW ERA OF MACAUBA EXPLORATION

COMMERCIAL CULTIVATION – Standardized and High Quality Products

PULP CAKE

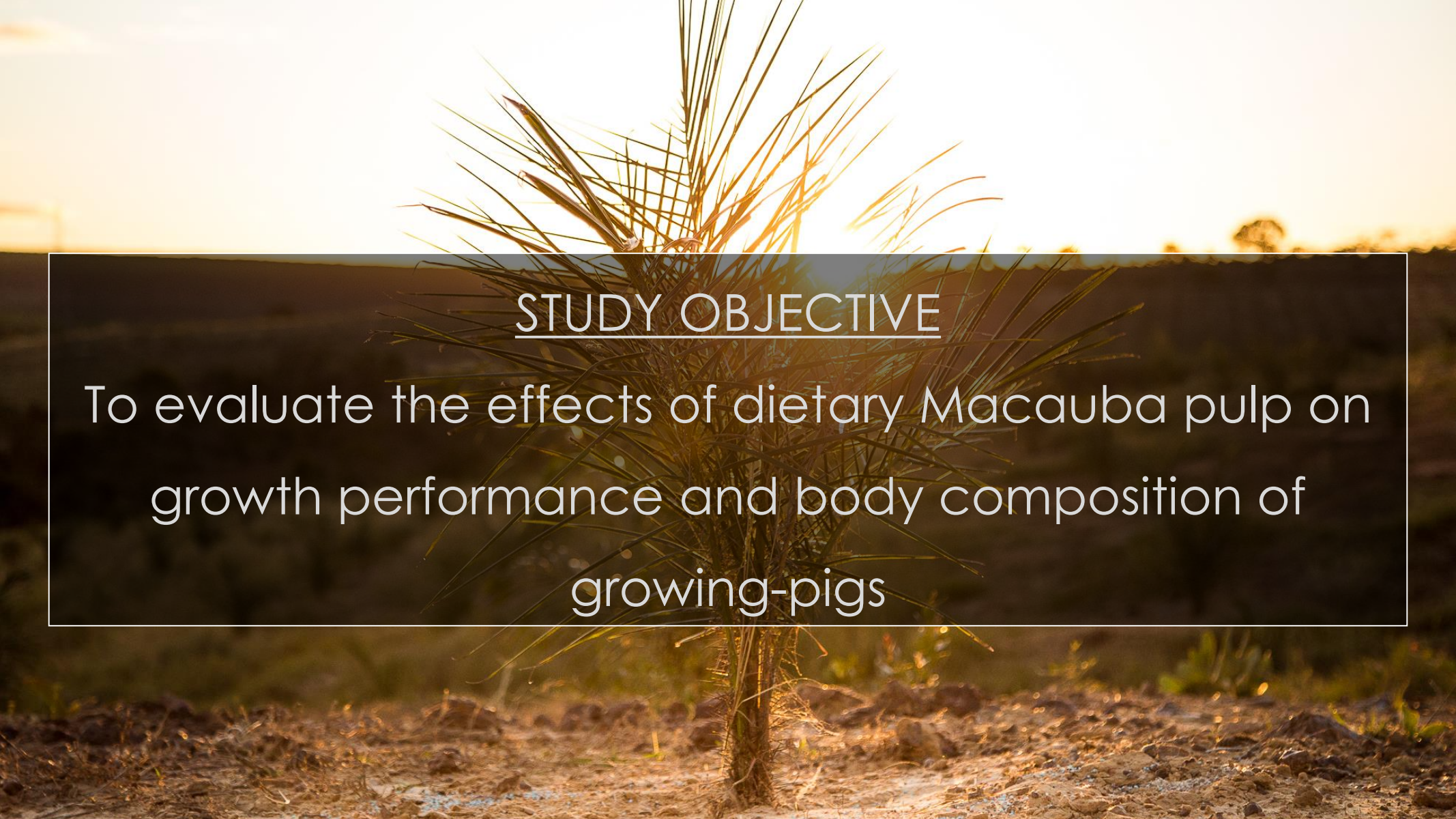
POTENTIAL USE IN LIVESTOCK DIETS

AFTER 2006…… NEW ERA OF MACAUBA EXPLORATION

COMMERCIAL CULTIVATION – Standardized and High Quality Products

30% OF MACAUBA PULP INCLUSION – NO EFFECT ON CARCASS CHARACTERISTICS AND PERFORMANCE (Fonseca et al., 2012)

10% OF MACAUBA PULP INCLUSION – NO EFFECT ON NUTRIENTS DIGESTIBILITY (Pereira et al., 2013)



STUDY OBJECTIVE

To evaluate the effects of dietary Macauba pulp on growth performance and body composition of growing-pigs

Materials and methods

THE EXPERIMENT WAS CONDUCTED AT THE EXPERIMENTAL FACILITIES OF THE ANIMAL SCIENCE DEPARTMENT OF FCAV/UNESP JABOTICABAL – SP.

ALL METHODS INVOLVING ANIMAL CARE AND HANDLING WERE REALIZED IN ACCORDANCE WITH THE LEGISLATION ON ANIMAL EXPERIMENTATION AND WELFARE (protocol 878/2019)

Materials and methods

- 64 barrows (Topigs Norsvin) - 30.2 ± 1.5 kg initial BW
- 4 experimental diets - Macauba pulp inclusion in the diet

Control

50 g/kg

100 g/kg

150 g/kg

Materials and methods

Table: Analysed chemical composition of the macauba pulp.

Item	Amount
Dry matter (%)	97.1
Gross energy (kcal/kg)	6357
Ash (%)	5.02
Crude protein (%)	5.86
Crude fiber (%)	43.39
Ether extract (%)	24.2
Nitrogen-free extract (%)	18.6

ALL DIETS WITH SIMILAR:

- ME (3.200 kcal/kg)
- CP (190 g/kg)
- LysD (9.7 g/kg)

Brazilian Tables for Poultry and Swine recommendations (Rostagno et al. 2017)

Materials and methods

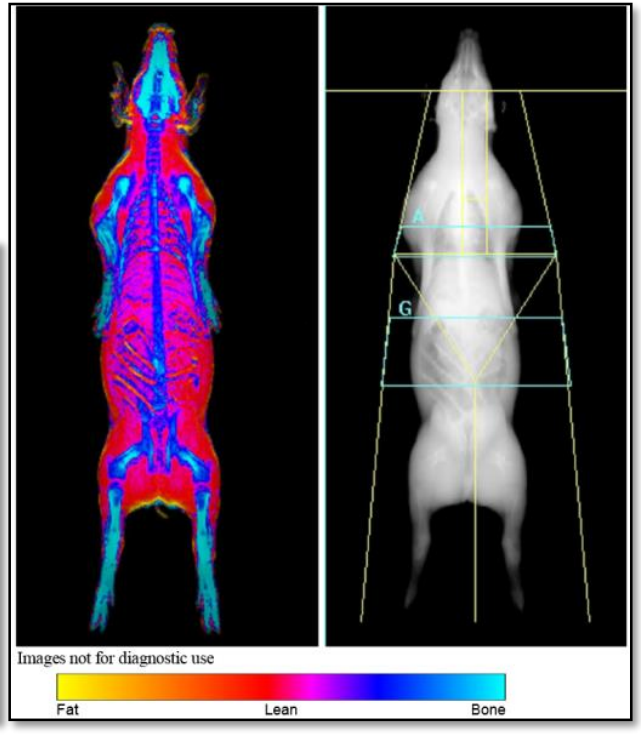
- Pigs remained 42 days in the trial:
  - 7-day adaptation period
  - 35-day experimental period

- Pigs pair-housed in pens with fully slatted plastic floors

Materials and methods

Measurements

- ADFI
- ADG (weekly)
- FCR
- Body composition (DXA, ALOKA)



DXA Hologic (UNESP/FCAV - Jaboticabal

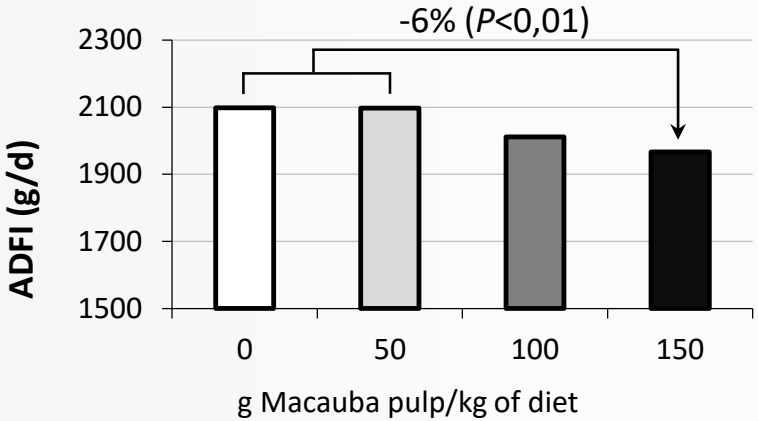
Materials and methods

Analysis

- 8 replicate-pens per treatment (two pigs per pen)
- Pen experimental unit
- GLM procedure of SAS (SAS Institute Inc.,Cary, NC)
- $P < 0.05$

Results and discussion

EFFECTS OF DIETARY MACAUBA PULP ON GROWTH PERFORMANCE OF PIGS



DIETARY INCLUSION OF 150 g/kg RESULTED IN LOWER FEED INTAKE

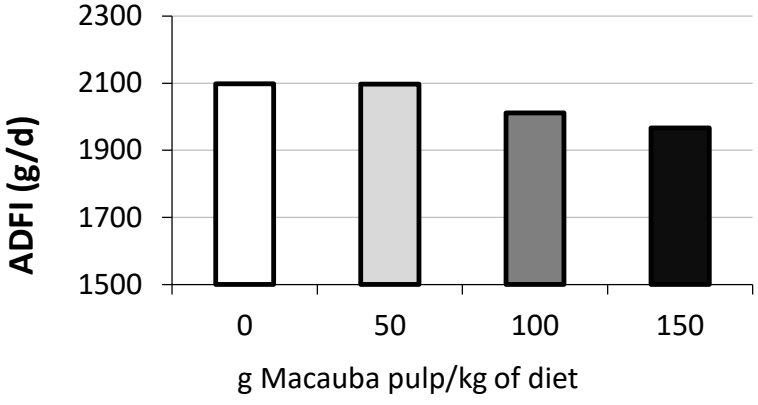
PROBABLY ASSOCIATED WITH GREATER FIBER LEVEL

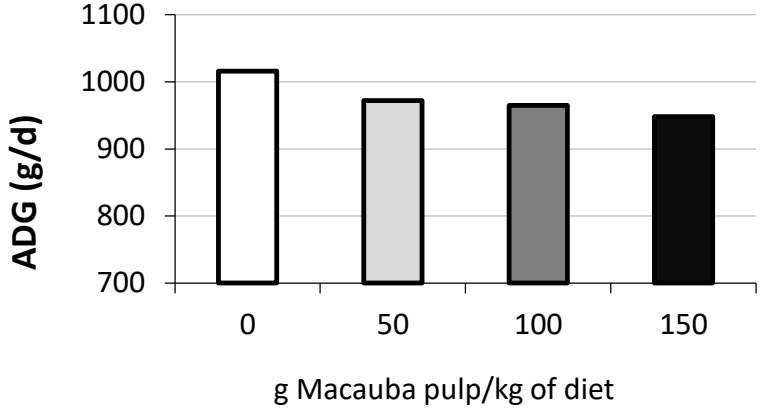
CRUDE FIBER CONTENT INCREASED FROM 3.4 TO 9.0%

- sense of satiety / fullness -

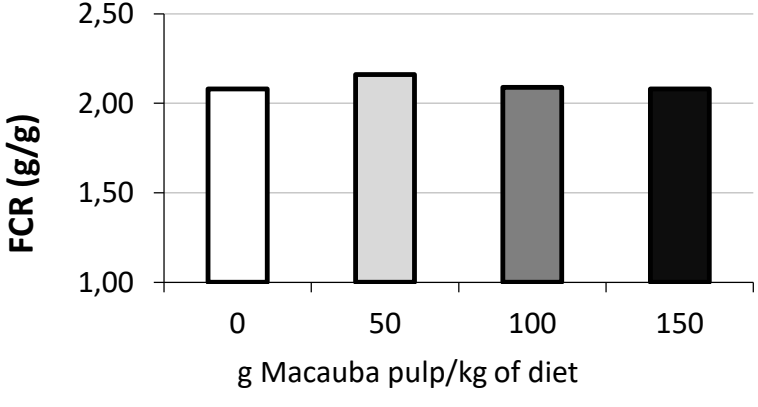
Results and discussion

EFFECTS OF DIETARY MACAUBA PULP ON GROWTH PERFORMANCE OF PIGS





NO EFFECT OF MACAUBA INCLUSION ON ADG
975 g/d, on average



NO EFFECT OF MACAUBA INCLUSION ON FCR
2,10 g/g, on average

Results and discussion

EFFECTS OF DIETARY MACAUBA PULP ON BODY COMPOSITION

	Dietary Macaúba Pulp inclusion (g/kg)					Diet effect
	0	50	100	150	RMSE[2]	(P-value)[4]
Initial condition						
Lean mass, kg	23.8	23.8	23.9	23.8	0.4	0.92
Fat mass, kg	4.6	4.6	4.6	4.8	0.3	0.46
Body mineral content, kg	0.56	0.58	0.58	0.56	0.03	0.43
Total Mass	29.0	29.0	29.1	29.2	0.3	0.74
Backfat thickness, mm	10.0	9.2	9.6	9.9	1.15	0.55
Loin depth, mm	27.9	25.7	28.6	26.1	4.7	0.57

PIGS WITH SIMILAR BODY COMPOSITION AT THE BEGINNING OF THE TRIAL

Results and discussion

EFFECTS OF DIETARY MACAUBA PULP ON BODY COMPOSITION

	Dietary Macaúba Pulp inclusion (g/kg)					Diet effect
	0	50	100	150	RMSE[2]	(P-value)[4]
Final condition						
Lean mass, kg	49.5	48.6	49.3	48.9	1.3	0.56
Fat mass, kg	9.3	9.4	9.3	10.0	1.0	0.41
Body mineral content, kg	1.14	1.16	1.14	1.12	0.06	0.72
Total Mass	59.9	59.2	59.8	60.1	0.8	0.16
Backfat thickness, mm	13.4[a]	12.5[ab]	12.5[ab]	14.9[b]	1.8	0.04

PIGS FED 150 g/kg OF MACAUBA HAD GREATER BACKFAT THICKNESS,

DIETS FORMULATED WITH SIMILAR ME – HOWEVER ≠ NE

Conclusions

- MACAUBA PULP CAN BE CONSIDERED AS AN ALTERNATIVE RAW MATERIAL TO BE USED IN DIETS OF GROWING PIGS.
- **HOWEVER,** ITS INCLUSION MIGHT RESULTS IN INCREASED BACKFAT THICKNESS.
- USE OF **100 g/kg** OF MACAUBA INCLUSION

  – MIGHT BE THE MOST APPROPRIATE –

Perspectives

- EVALUATE AND DEFINE MACAUBA PULP QUALITY STANDARDS
- EVALUATE CHEMICAL COMPOSITION, DIGESTIBILITY, AND NUTRITIONAL VALUES OF MACAUBA FRUIT AND ITS COMPONENTS
- STUDY THE EFFECTS OF DIETARY MACAUBA PULP ON GROWTH PERFORMANCE OF FINISHING-PIGS (AND OTHER SPECIES!)

THE AUTHORS GRATEFULLY ACKNOWLEDGE

WAGENINGEN UNIVERSITY & RESEARCH

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Topigs Norsvin
PROGRESS IN PIGS

UFV

unesp

THANK YOU VERY MUCH FOR YOUR ATTENTION

Prof. Paulo Henrique Reis Furtado Campos

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