

Effect of dietary P depletion-repletion on pig bone characteristics

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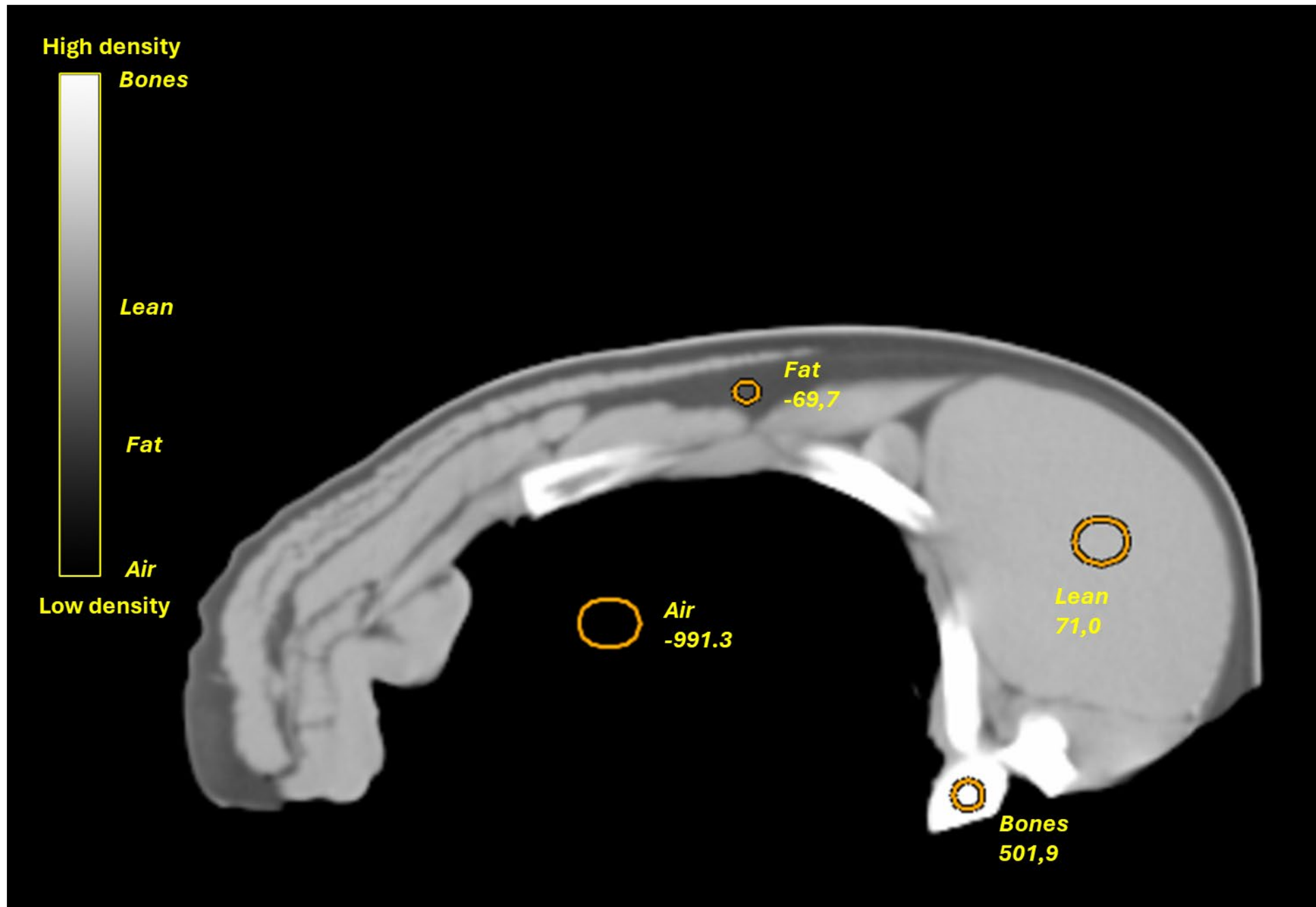
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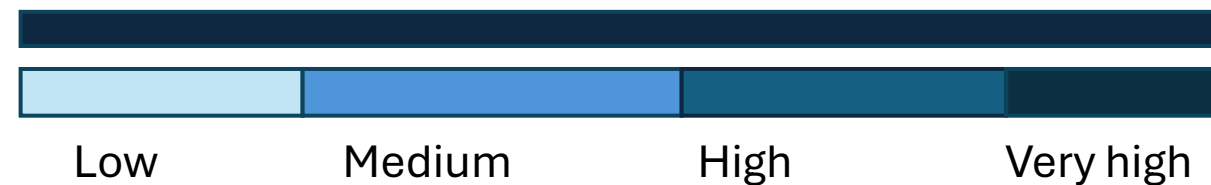
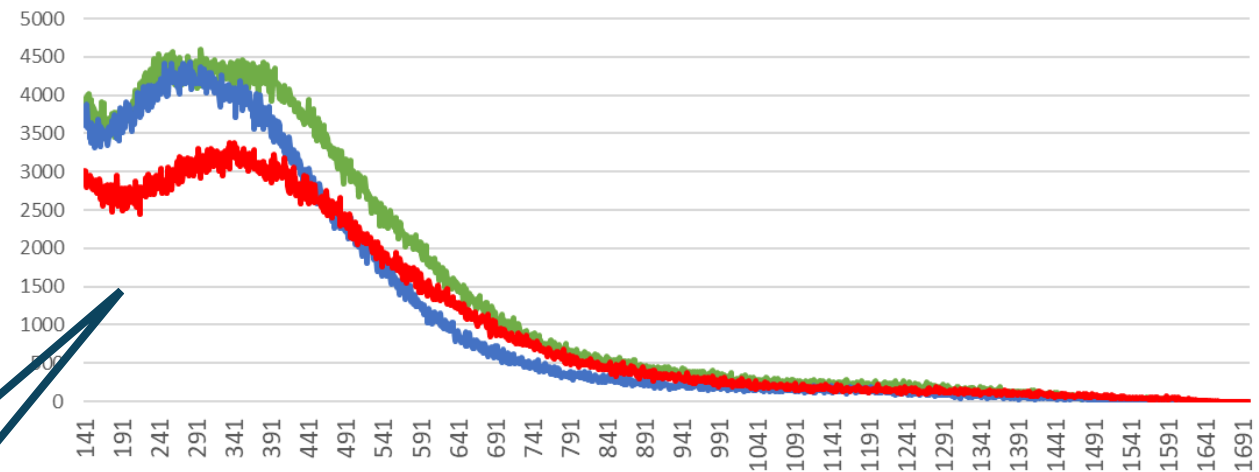
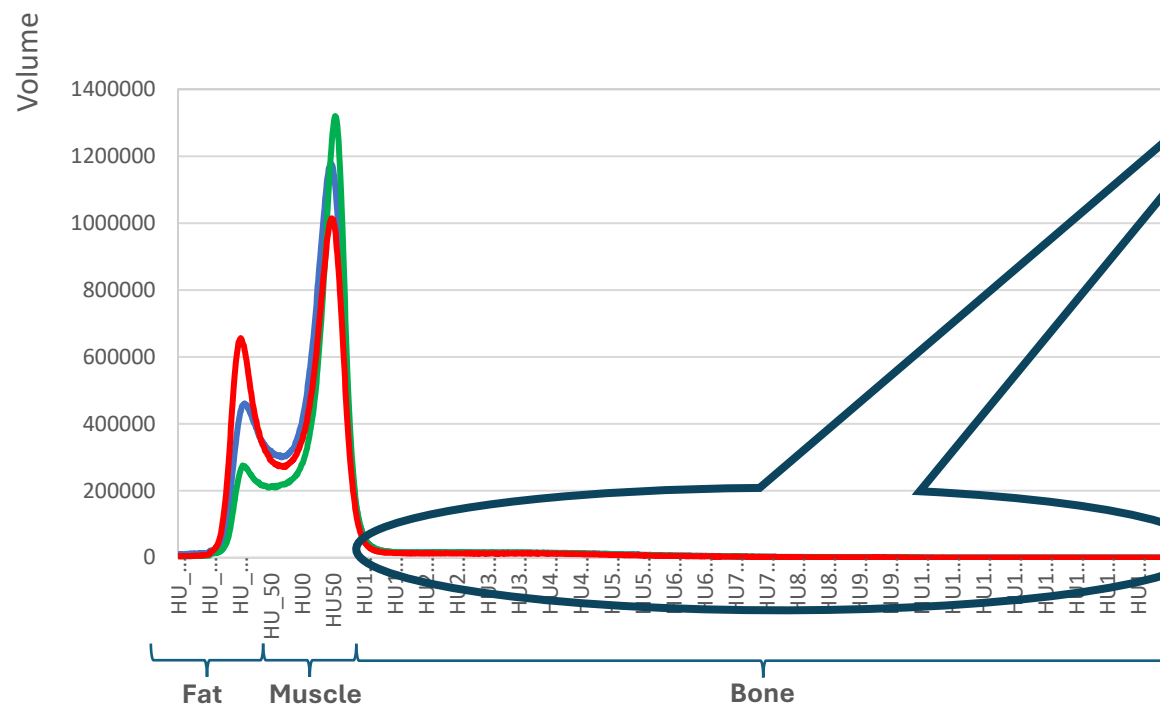
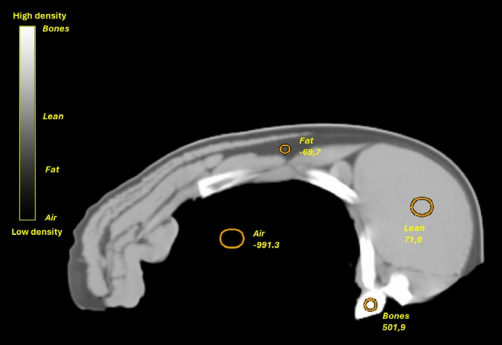
INTRODUCTION

- P is essential in feed for **bone mineralization** and avoid **welfare problems** → but some is not absorbed → **environmental problems**.
- Possible solutions:
 - ✓ Include **phytase** or addition of **ingredients with high digestible P**.
 - ✓ Apply P restriction (**depletion**) followed by a **repletion** period → pigs can improve digestive/metabolic use of P after a depletion period → **compensatory effect**.
- **Computed tomography (CT)** is a non-destructive technology based on X-rays that can be used to scan live pigs or carcasses to determine its composition non-invasively.



(Crenshaw et al., 1981; Cromwell et al., 1995; Sims et al., 2000; Létourneau-Montminy et al., 2015; Hill et al., 2009; Rojas et al., 2013; Tous et al., 2021; Gonzalo et al., 2018; Létourneau-Montminy et al., 2014; Ryan et al., 2011; Varley et al., 2011; Font-i-Furnols et al. 2015; 2020, Carabús et al., 2014, 2015)



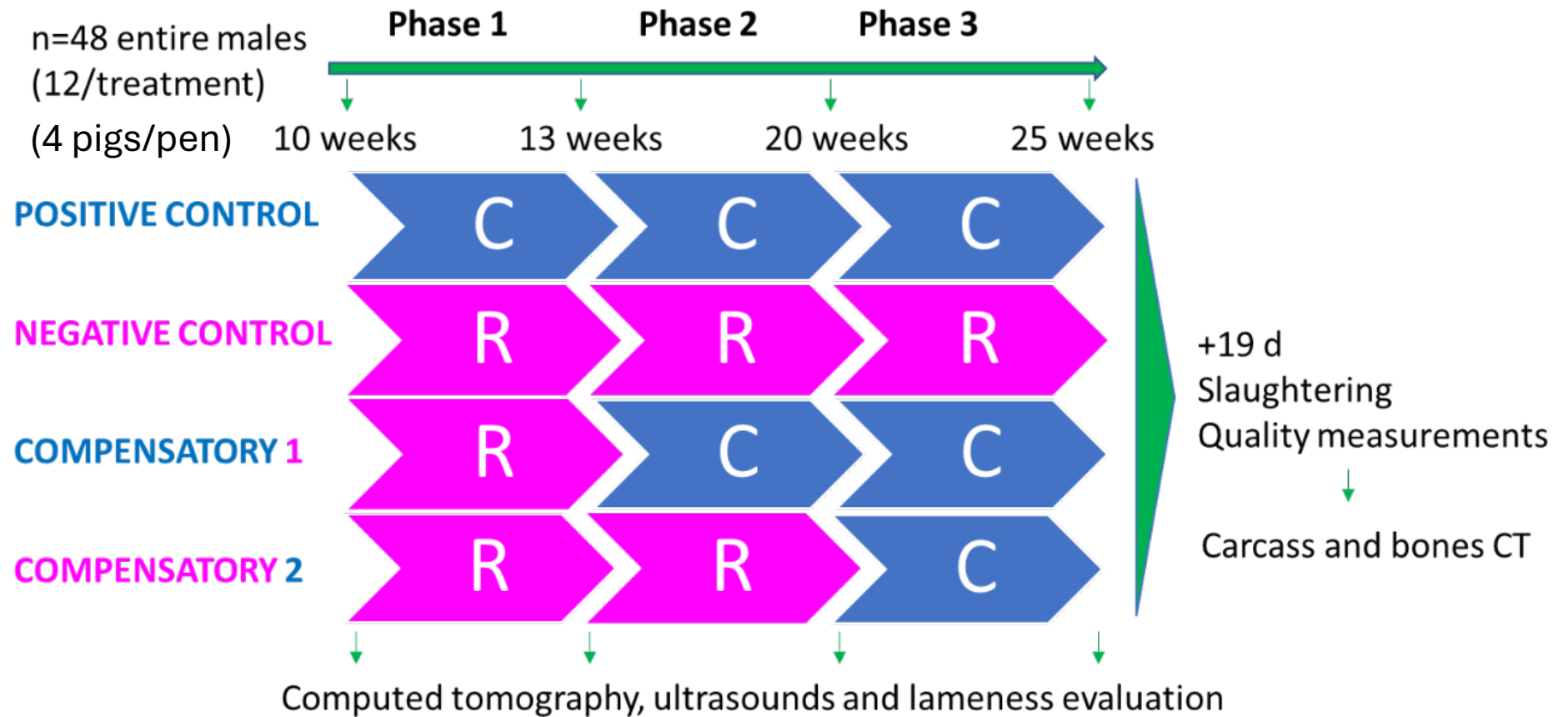


OBJECTIVE

The objective of the present study was to evaluate the influence of combinations of depletion-repletion periods of dietary P and Ca levels on **bone characteristics** in pig carcasses using **computed tomography (CT)**.



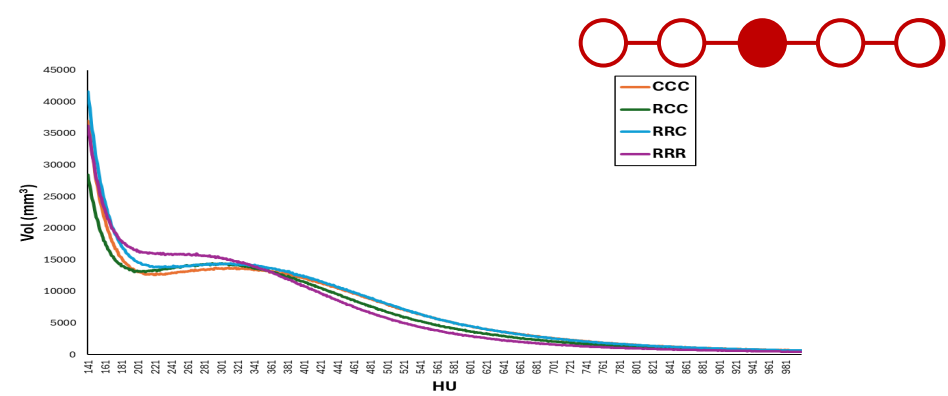
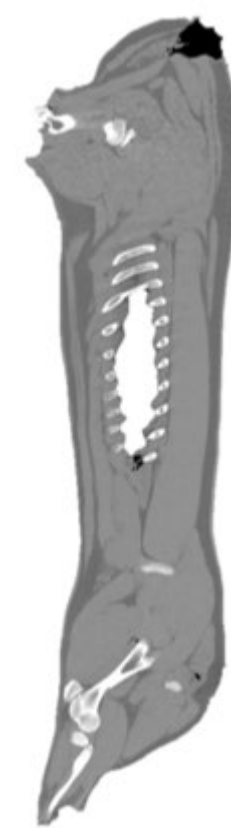
MATERIALS & METHODS



C: All nutritional requirements.
R: 60% of P and Ca.

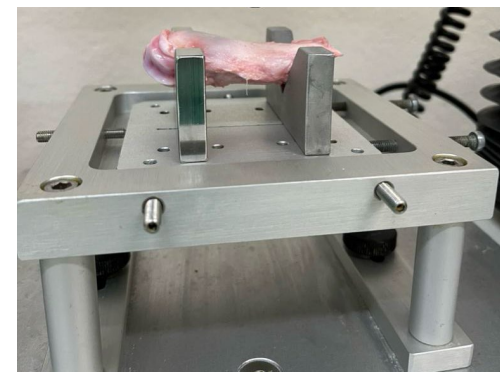


Chemical composition	Growing diet (Phase 1 and 2)		Finishing diet (Phase 3)	
	C	R	C	R
Dry matter (%)	89.00	88.63	88.68	89.44
Crude protein (%)	15.87	15.98	15.00	15.75
Ether extract (%)	4.54	4.65	4.63	4.51
Ash (%)	4.91	4.80	4.81	4.68
Crude fiber (%)	3.56	3.68	3.56	3.70
Gross Energy (cal/g)	3994.00	3993.00	3970.00	4020.00
Phytase (FTU/kg)	744.00	917.00	1405.00	1332.00
Phytate P (g/kg)	2.16	2.26	2.26	2.24
P (mg/g)	4.25	3.49	4.65	3.90
Ca (mg/g)	5.67	5.14	5.97	5.50
Insoluble ashes (%)	1.18	1.22	1.06	1.05



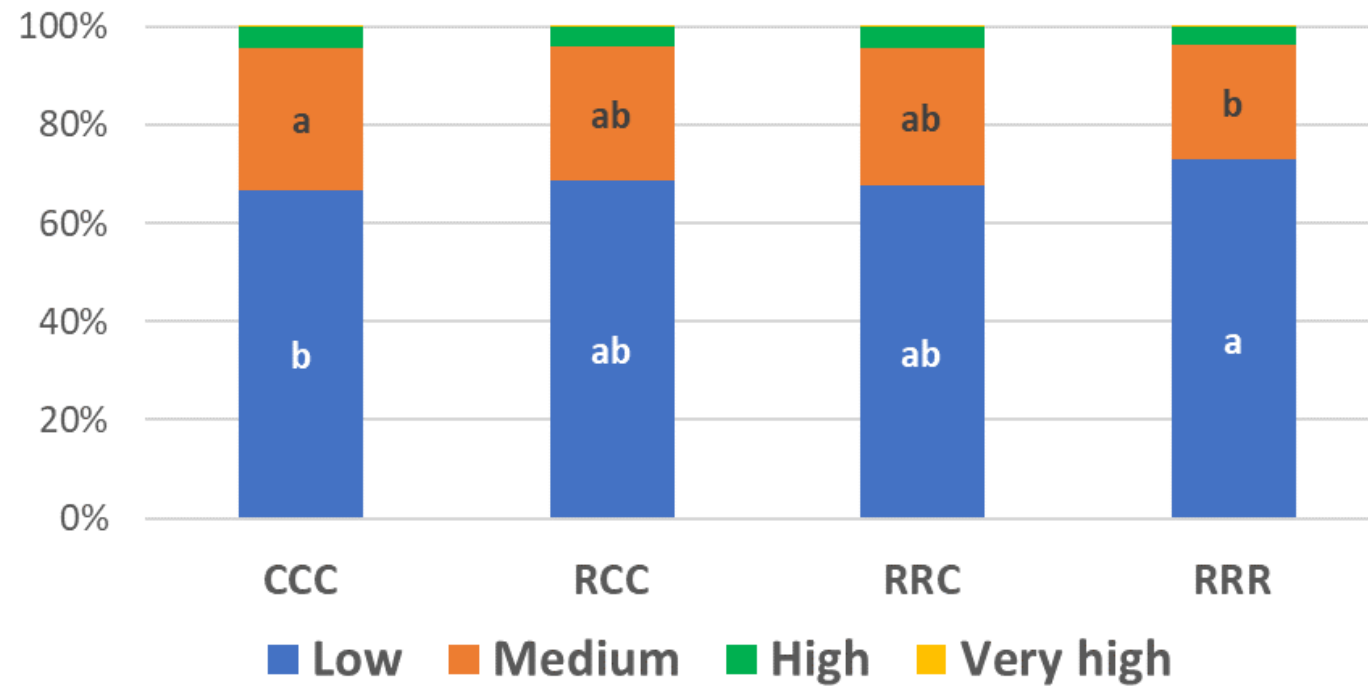
% low density (HU 141 to 499)
 % medium density (HU 500 to 999)
 % high density (HU 1000 to 1500)
 % very high density (HU >1500)
 Density (Picouet et al., 2010)

metacarpus III and IV
 1st and 4th ultimate ribs

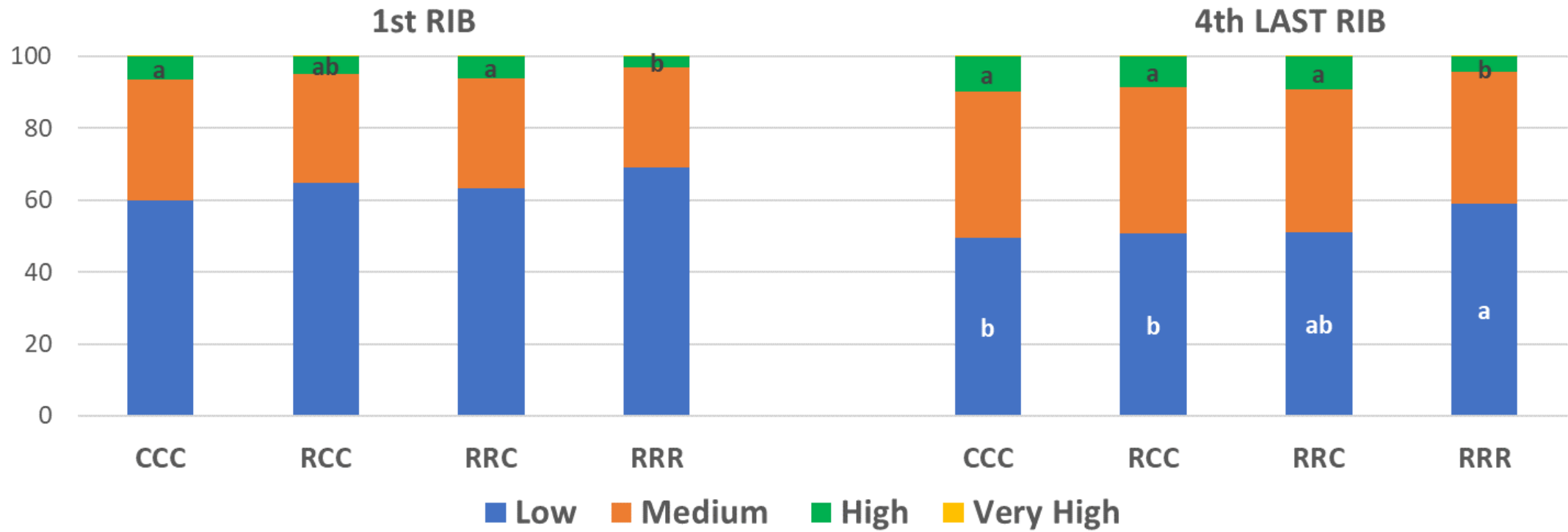


RESULTS

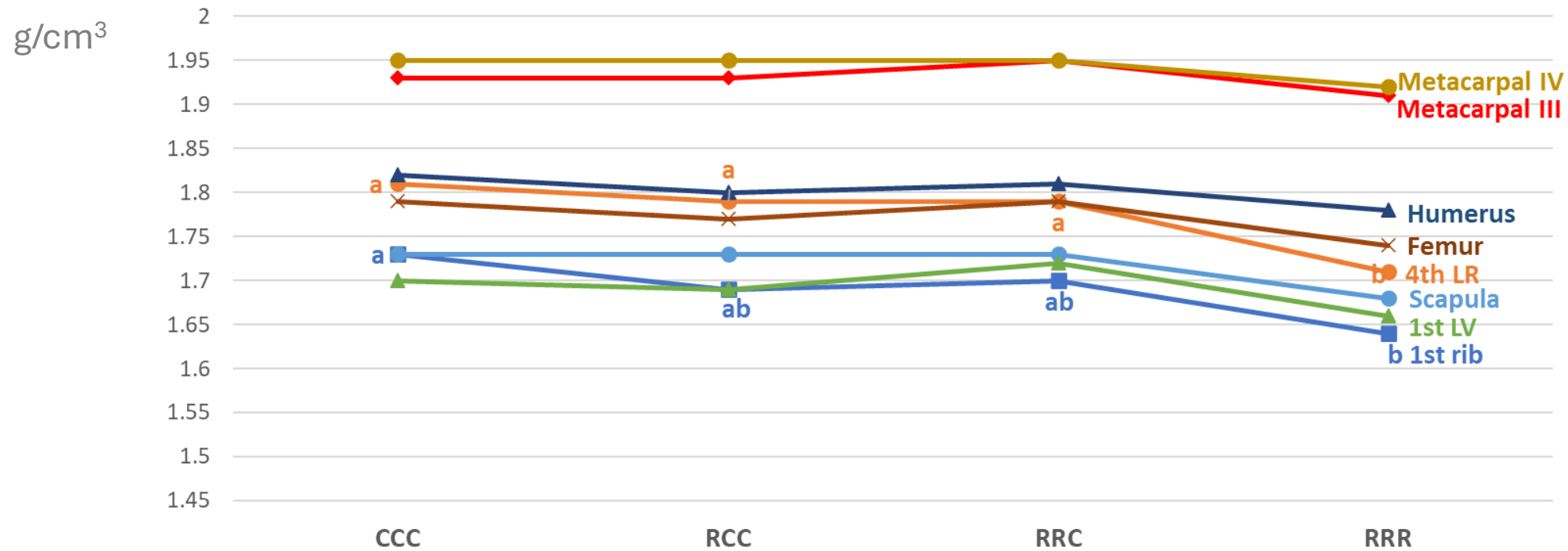
WHOLE CARCASS BONES



RIB BONES



BONES DENSITY



MECHANICAL PROPERTIES

PARAMETERS

Breaking force
Area
Slope



BONES

Metacarpals III and IV
1st rib and 4th last rib



RESULTS

NS



CONCLUSIONS

These results indicate that the conventional diet (CCC) could be substituted by the RRC or RCC strategies, in turn reducing dietary P with no effect on the bone characteristics and productive parameters during the growing of the pigs.





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