

Effects of Heat Stress and Spirulina on Productive Performances of Two Slow-growth Broiler Strains

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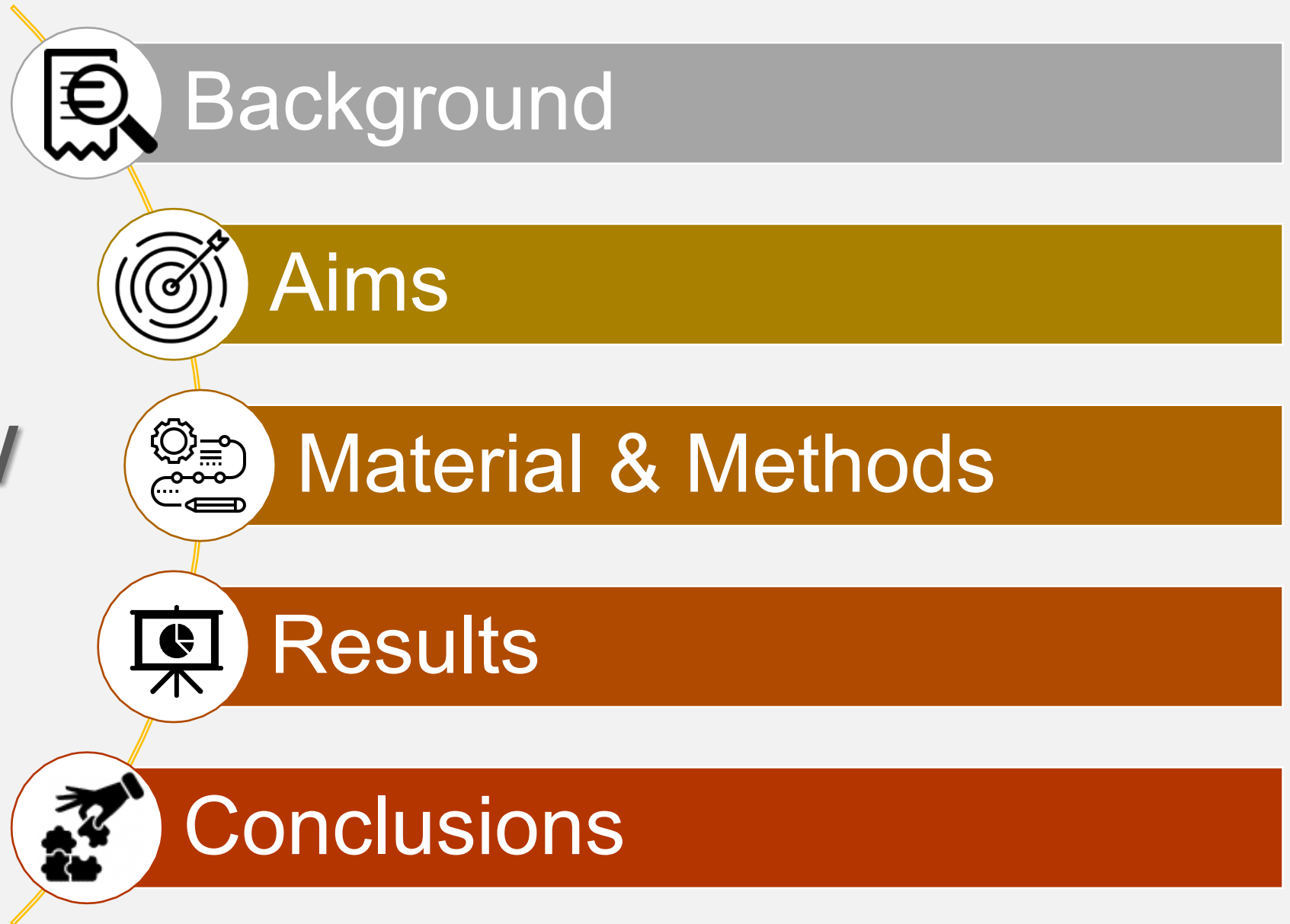
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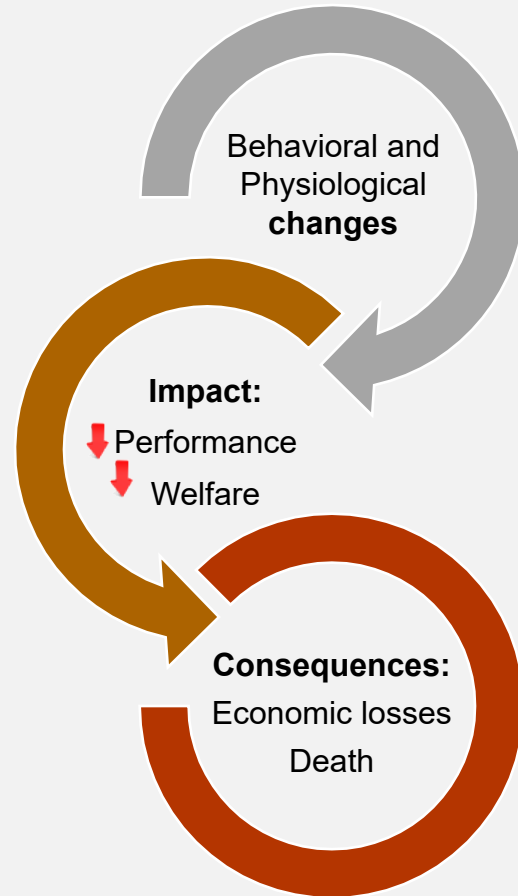
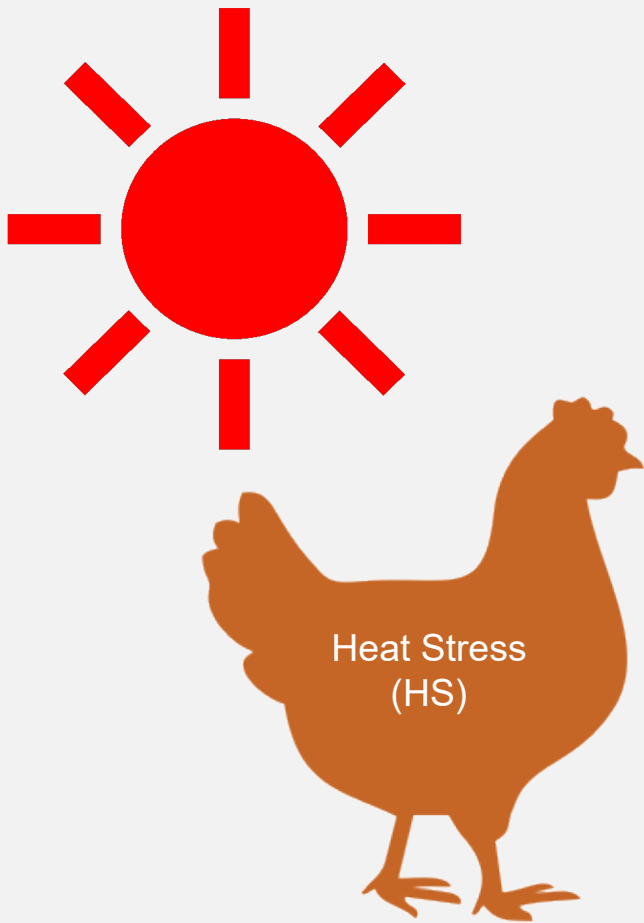
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Overview



Background



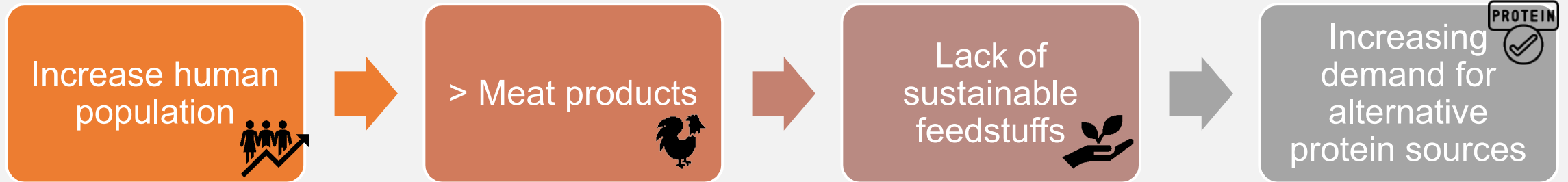
Strains tolerant to high temperatures



Naked neck



Background



Possible Solution

Spirulina
(*Arthrospira platensis*) 



Nutritional Value
(High protein contents, Ω3, carotenoids)

Production
Not require arable land
Bio-sequesters of carbon dioxide

	Protein (% DM)
Spirulina	50-70 Lys: 2.6 – 4.4 Met: 1.3 – 2.75
Soybean meal	44-48 Lys: 2.68 - 2.99 Met: 0.59 - 0.71

Source: Habib et al. 2008; FEDNA. 2019


Aims

Evaluate the effect of 15% Spirulina (**SP**) dietary inclusion and the impact of heat stress (**HS**) on growth performance, organ measurements, and carcass yield in two slow-growth broiler strains: Fully feathered (**FF**) and naked neck (**NN**).





Material & Methods

 30 °C



Individually housed with *ad libitum* access to water and feed

40 one-day-male chicks; 4 groups; 84 days



→ Fully Feathered + Control diet (**FFC**)

→ Fully Feathered + 15% Spirulina Inclusion (**FFSP**)

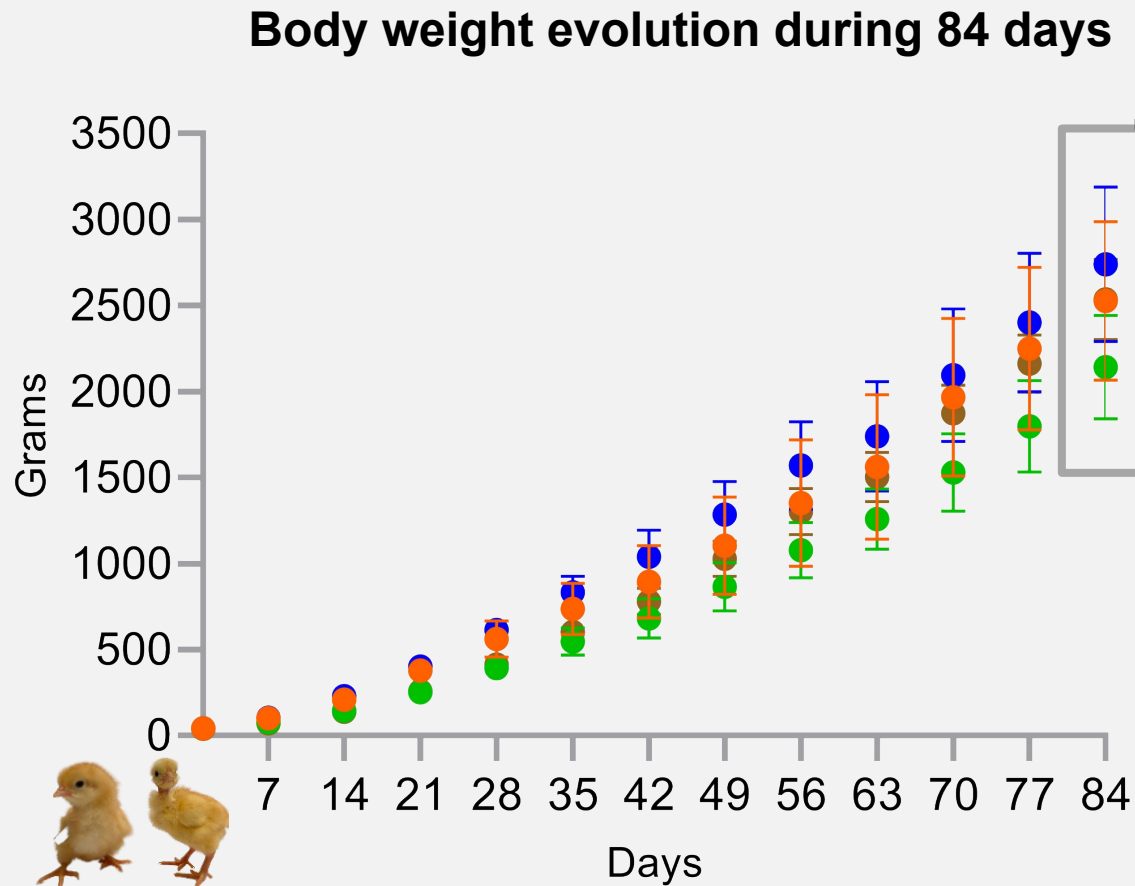


→ Naked Neck + Control diet (**NNC**)

→ Naked Neck + 15% Spirulina Inclusion (**NNSP**)

- ❖ Weekly, body weight and feed intake were monitored to determine animal performance parameters.
- ❖ At the end of the experiment, animals were slaughtered and organs were collected, weighed, measured, and stored for future analysis.

Results - Body Weight (BW)

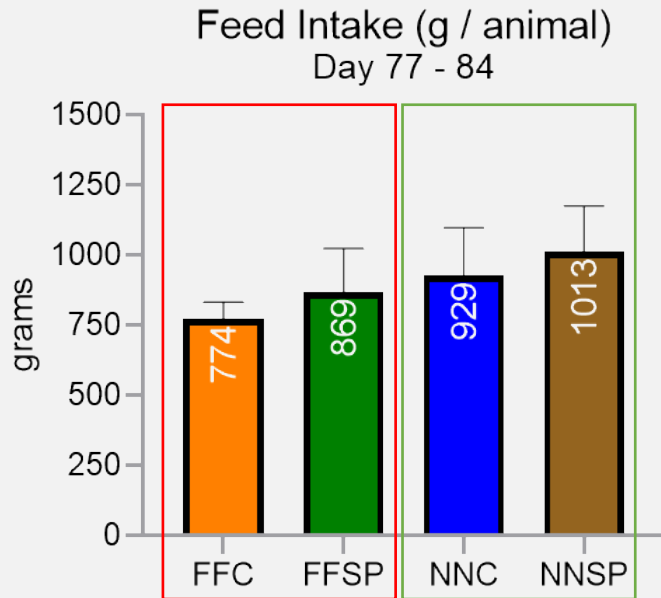


NNC	2741g	
NNSP	2536g	- 200±5g
FFC	2526g	- 600g
FFSP	2141g	

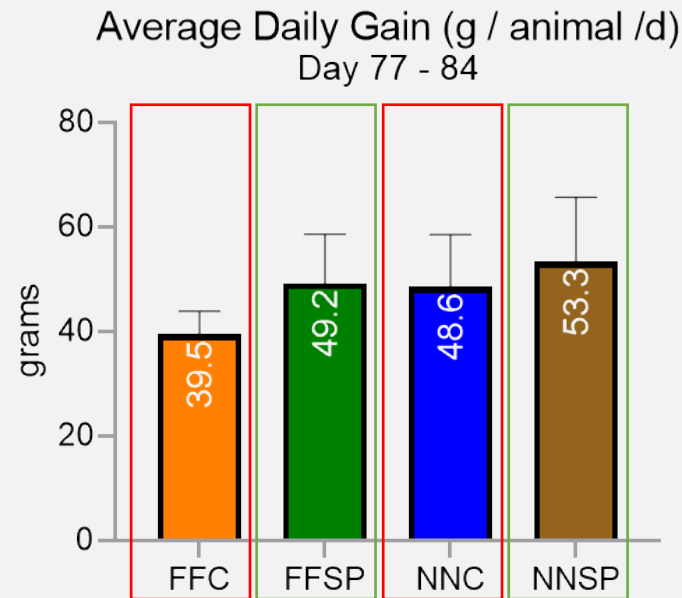
Final BW was **higher** NN in comparison to FF broilers ($P < 0.05$);
SP-fed animals had **lower** final BW than those fed the C diet ($P < 0.05$).



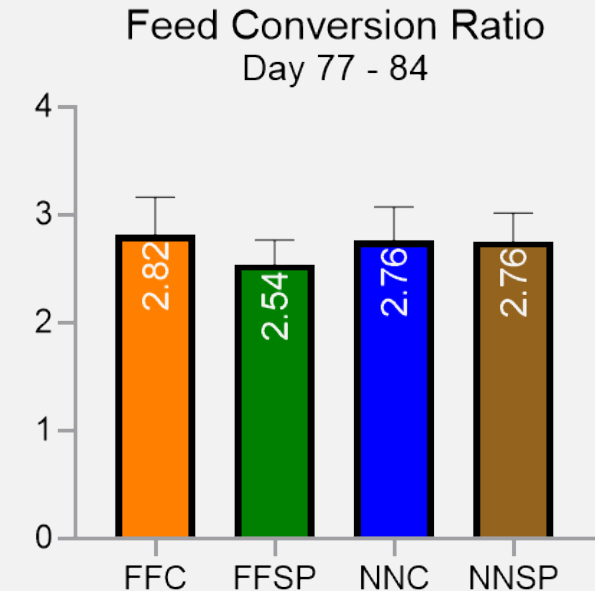
Results – Feed Intake, Average Daily Gain & Feed Conversion Ratio



The FI was higher in NN in comparison to FF broilers ($P < 0.05$)



The incorporation of SP increased ADG in comparison to the control animals ($P < 0.05$)



Neither strain nor diet influenced FCR ($P > 0.05$)



Results – Organ measurements

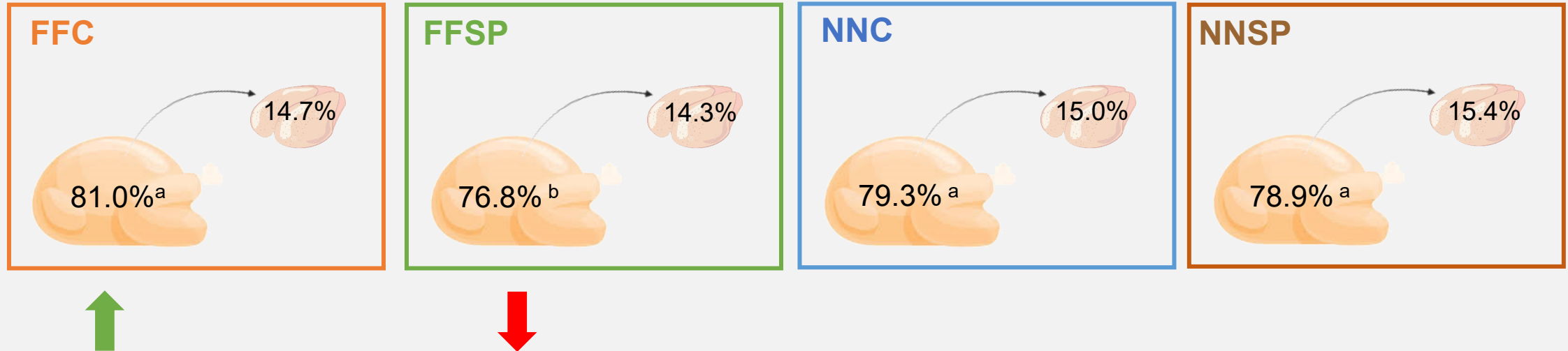
Relative length of GI tract, cm/kg body weight

Parameter	FF		NN		Significance		
	C	SP	C	SP	Strain	Diet	Strain×diet
Duodenum	11.42	13.12	11.07	11.14	ns	ns	ns
Jejunum	25.00	31.69	26.09	27.30	ns	*	ns
Ileum	27.50	31.57	25.72	30.10	ns	*	ns

Significance: ns, $P > 0.5$; *, $P < 0.05$.

The relative length (cm/kg) of the jejunum and ileum **was increased** ($P < 0.05$) by SP incorporation, on average, 25.5 vs. 29.5 and 26.6 vs. 30.8, respectively.

Results – Carcass Yield



Carcass yield was **negatively** influenced ($P < 0.05$) by SP incorporation in FF broilers. This effect was not observed for the NN broilers.

Pectoralis major muscles yield was **not significantly** affected ($P > 0.05$).



Conclusions

- ❖ HS negatively influenced the growth performance of broilers, especially the fully feathered animals.
- ❖ NN animals had better tolerance to HS than FF.
- ❖ Future information provided by digestibility coefficients and meat quality traits will complement these results, allowing a better knowledge of the nutritional values of Spirulina for broilers under HS.



THANK YOU



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