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Addition Of Algae In Pig Feed: Influence On Technological Quality And Composition Of Meat And Offal (#456)

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Introduction

Recent studies showed a real potential of algal as a source of bioactive compounds with a wide range of biological activities like antioxidant, antiviral, anticancer, anticoagulant and anti-hyperlipidemia activities [1]. In farm, algae extracts progressively emerges as a new generation of natural ingredients that improve in addition to immune function, the animal health [2]. But, what are the effects of such supplementation on meat and offal intended to human consumption? The study aim to assess the impact of the algae addition in pork feed on the technological quality of meat, its composition, including nutritional compounds in offal.

Methods

Two batches of 150 and 100 pigs, from Piétrain sires were slaughtered in December 2017 (1st measure) and in September 2018 (a repeat) at Jean Floc'h slaughterhouse (Loudeac Viande, France). Half of them received a basal diet (Control group) or a supplemented diet with algae for the other half (Algae group). The pH1 (30 min. *post mortem* (*pm*)) and ultimate pH (pH 24 hours *pm*) were measured on *Semimembranosus* (SM).

Ultimate pH was also taken on *Longissimus Dorsi* (LD). Meat colour was evaluated at 32h *pm* on LDwith a CR-400 colorimeter (Konica Minolta, Japan) and samples were removed for drip loss (Fig.1). Drip loss was measured according to EZ method [3] and PSE-like zone classification, was performed according to IFIP scale on the inside of deboned ham [4]. Samples of LD, liver and pork casing were selected to the analyses: humidity, protein, lipid, magnesium (Mg), zinc (Zn), vitamins B12 and B6. The effect of algae was assessed on the quality traits and composition using the GLM procedure (SAS Institute, USA). The FREQ procedure was applied on PSE-like zone class data.

Results

Results showed a significant effect of algae supplementation on pH1: mean value for the algae group was higher from 0.06 pH units (Table 1). This effect could indicate a lower susceptibility of algae group to the development of PSE default. No significant effect was observed on ultimate pH, L* drip loss and strong PSE-like zone defect frequency.

Algae supplementation did not change the level of lipids and proteins (Tab. 2). But, the algae addition increased the magnesium level in LD and pork casing (+4% and +15%). Zinc amount in LD from algae group was 8% higher than control group. These effects were probably due to the higher rates of minerals in feed supplemented in algae. Interesting results were observed on group B vitamins. LD and liver arise from animals supplemented had significant higher content in B12 than those to the control group (+ 26% and +37%). Similar effect was observed on B6 vitamin in LD muscle.

Conclusion

An algae supplementation slightly improves the pH1 that could probably reduce the susceptibility of pork to the development of PSE but, we did not find this difference on the drip loss values. Composition of LD was enhanced by algae supplementation with higher level in mineral and group B vitamins. Same trends were observed on magnesium content in liver and in pork casing.

References

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2. Berri, M., Olivier M., Holbert S., Dupont J., Demais H., Le Goff M., Nyvall Collen P. (2017) Ulvan from Ulva Armoricana (Chlorophyta) Activates the PI3K/Akt Signalling Pathway via TLR4 to Induce Intestinal Cytokine Production. *Algal Research* (28): 39–47.
3. Rasmussen, A., Andersson, M. (1996). New method for determination of drip loss in pork muscles. 42nd ICoMST.
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Notes

	Carcass data		SM (n=231)		LD (n=231)			PSE-like zone class[1] (%) (n=230)			
	Carcass weight (kg)	Lean meat content	pH1	pH24	pH24	L*	Drip Loss (%)	1	2	3	4
Control	90.48	61.6	6.58	5.79	5.64	50.5	4.19	63.5	32.2	4.4	0.0
Algae	88.65	61.3	6.64	5.75	5.62	51.0	4.59	62.8	35.5	0.8	0.8
p	0.094	0.305	0.012	0.072	0.198	0.220	0.180			0.252	

Table 1: Effect algae on meat quality.
1: class 1=no defect; class 2=slight defect; class 3= deep defect on Semimembranosus; class 4= deep defect on several muscles (incl. SM)

	LD (pork loin – n= 40)			Liver (n=20)			Pork Casing (n=20)		
	Control	Algae	*p*	Control	Algae	*p*	Control	Algae	*p*
Humidity (%)	74.80	74.10	0.010	-	-	-	73.04	76.64	0.154
Protein (%)	23.10	23.11	0.920	-	-	-	8.88	9.53	0.128
Lipid (%)	1.13	1.42	0.119	-	-	-	17.02	12.99	0.153
Mg (mg/100g)	26.57	27.65	0.022	21.50	21.80	0.777	10.80	12.50	0.066
Zn (mg/100g)	1.40	1.51	0.053	8.76	9.71	0.547	1.39	1.30	0.247
B12 (µg/100g)	0.229	0.289	0.027	21.74	29.82	0.002	1.726	1.345	0.059
B6 (mg/100g)	0.444	0.534	0.001	0.385	0.282	0.010	0.023	0.024	0.714

Table 2:
Effect of algae supplementation on the composition.

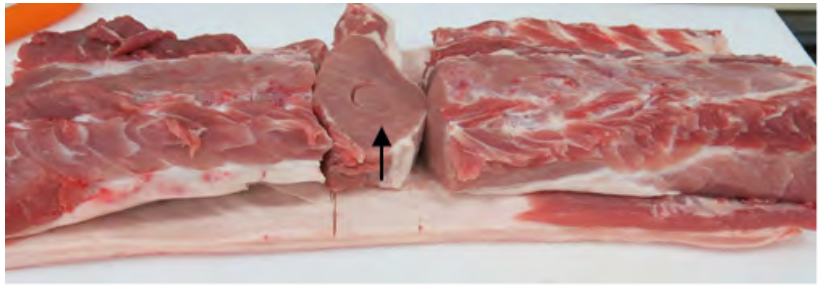

Fig. 1:
Measurements on LD muscle.

Notes