

Influence of algae-based complementary feed on the development of the small intestine of piglets during lactation

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INTRODUCTION



Ulva sp.

At birth, the piglet's small intestine is not mature and is still challenged by pathogenic and environmental factors with consequences on health and growth performances. Barcelo et al. (2000) found that ulvans (Marine Sulphated Polysaccharides extracted from *Ulva sp.*) increase mucins excretion (Table. 1).

Intestinal mucins are involved in a variety of cytoprotective functions against a number of hazards including mechanical insults, colonisation by pathogenic bacteria and their toxins, luminal proteases arising from bacterial and mucosal cells, and potential carcinogens. Oral supplementation of ulvans is a promising solution to protect the epithelial surface of the intestinal tract.

Olmix developed a new complementary feed (Ecopiglet) based on *Ulva sp.*, montmorillonite and clinoptilolite in order to support piglet's health and digestive development.

Table 1. Mucin and total luminal content of fluid after administration of fibers (25 mg/l) (extracted from Barcelo et al., 2000)

	Mucin (µg/mg DNA)	Total fluid content (mg/cm)
Control	131,9 (6,5)	89,7 (2,3)
Pectine	174,7 (20,1)	90,4 (7,8)
Arabic gum	199,9 (24,4)	88,7 (7,4)
Cellulose	127,3 (17,2)	79,9 (1,21)
Ulvans	367,3 (32,7)*	113,5 (5,6)
Alginate	310,1 (24,3)*	103,3 (8,8)
Fucoidan	254,3 (30,2)	107,8 (12,7)
Carrageenan iota	179,4 (22,1)	101,8 (12,7)
Carrageenan kappa	135,3 (35,1)	140,4 (13,1)*
Carrageenan lambda	162,8 (37,5)	123,5 (14,3)*

*p<0,05

MATERIAL & METHODS

Total number of animals: 72 litters (833 piglets)

Experimental design :

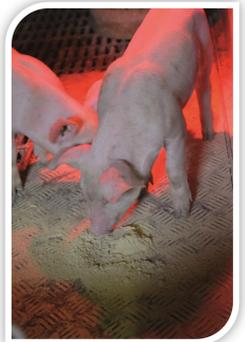
- Control group (T1) : no supplementation
- Test group (T2) : supplementation of algae-based complementary feed (50g at 9h00 and 50g at 17h00) from D5 to weaning (D21).

Randomization : Animals were randomly allocated to one of two groups, balanced in litter weight, sow parity and farrowing date.

Feed : sows from both groups were fed twice a day with the same feed. Starter feed was normally distributed to piglets from 10 days old.

Measures : Piglet's weight, average daily gain (ADG), diarrhoea incidence, medications, weaning rate, weak piglets at weaning, morphological study of the small intestine.

Place of trial: Farm of 1200 sows (Zaragoza, Spain).



RESULTS

- The results showed no significant influence of the treatment on the average daily gain of piglets when the litter is the experimental unit.
- A significant decrease was observed in diarrhoea incidence (P-value < 0.05) and medication use (P-value < 0.001).
- No significant differences were observed on histology parameters of the small intestine (531 vs 577 µm, P-value = 0,607 and 1149 vs 1250 µm², P-value = 0,58, respectively, for Control and Test group).
- No significant differences were observed on survival rate.
- No significant differences were observed on runts and weaning weight homogeneity.

Table 2. Influence of algae-based complementary feed on piglets performances during maternity

Treatment	CONTROL(T1)	TEST(T2)	P-value ¹	P-value ²
Average weight, kg				
D0	1,6±0,04	1,6±0,04	0,65	0,16
D5	2,3±0,05	2,3±0,06	0,46	0,07
D20	5,2±0,14	5,4±0,14	0,32	0,03
Average Daily Gain, g/j				
From D5 to D20	194±7	207±7	0,31	0,02
From D0 to D20	188±6	199±6	0,20	0,01

¹ The litter is the experimental unit.

² The piglet is the experimental unit.

Table 3. Influence of algae-based complementary feed on piglets diarrhoea and medication used during maternity

Treatment	CONTROL(T1)	TEST(T2)	P-value
Total number of piglets	400	393	
Number of piglets with diarrhoea ¹	93	45	< 0,001
Number of piglets with medication	199	87	< 0,001

¹Number of piglets affected at least once during the lactation period

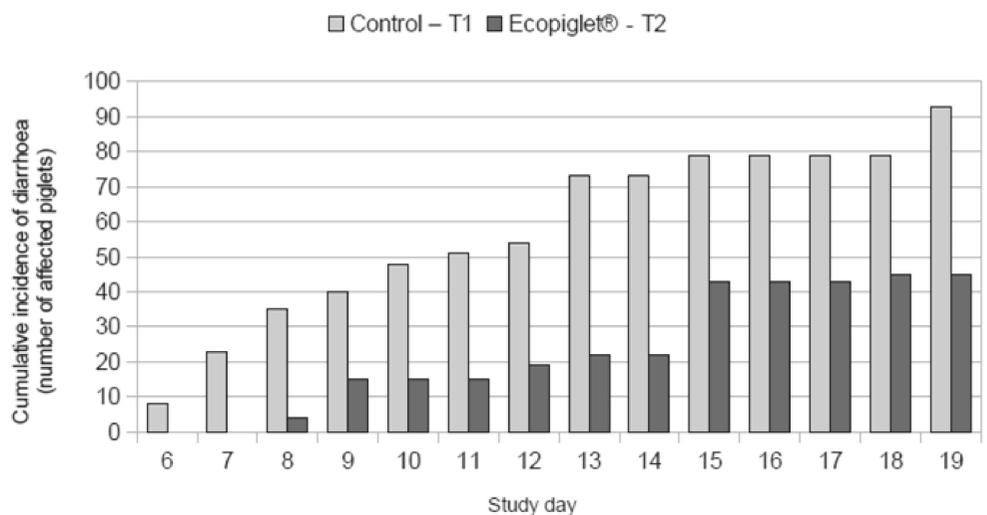


Chart 1. Influence of algae-based complementary feed on cumulative incidence of diarrhoea (number of affected piglets)

CONCLUSION

Preserving the intestinal integrity of piglets during lactation is a challenge in the aim of combining well-being and productivity. Under the conditions of this study, the algae-based complementary feed decreased diarrhoea incidence in piglets during lactation. In addition, this algae-based complementary feed permits to reduce the use of antibiotic for piglets during lactation. Thus, this algae-based complementary feed can help to improve piglet's health. These results are in accordance with Barcelo et al. (2000), Wijesekara et al. (2010) and Leonard et al. (2012) regarding the use of algae extract for animal health and provides new perspectives for the reduction of medication thanks to algae.