ARE MEDICINAL PLANTS INFLUENTIAL ON POTENTIALLY ZOONOTIC BACTERIOME IN SWINE?

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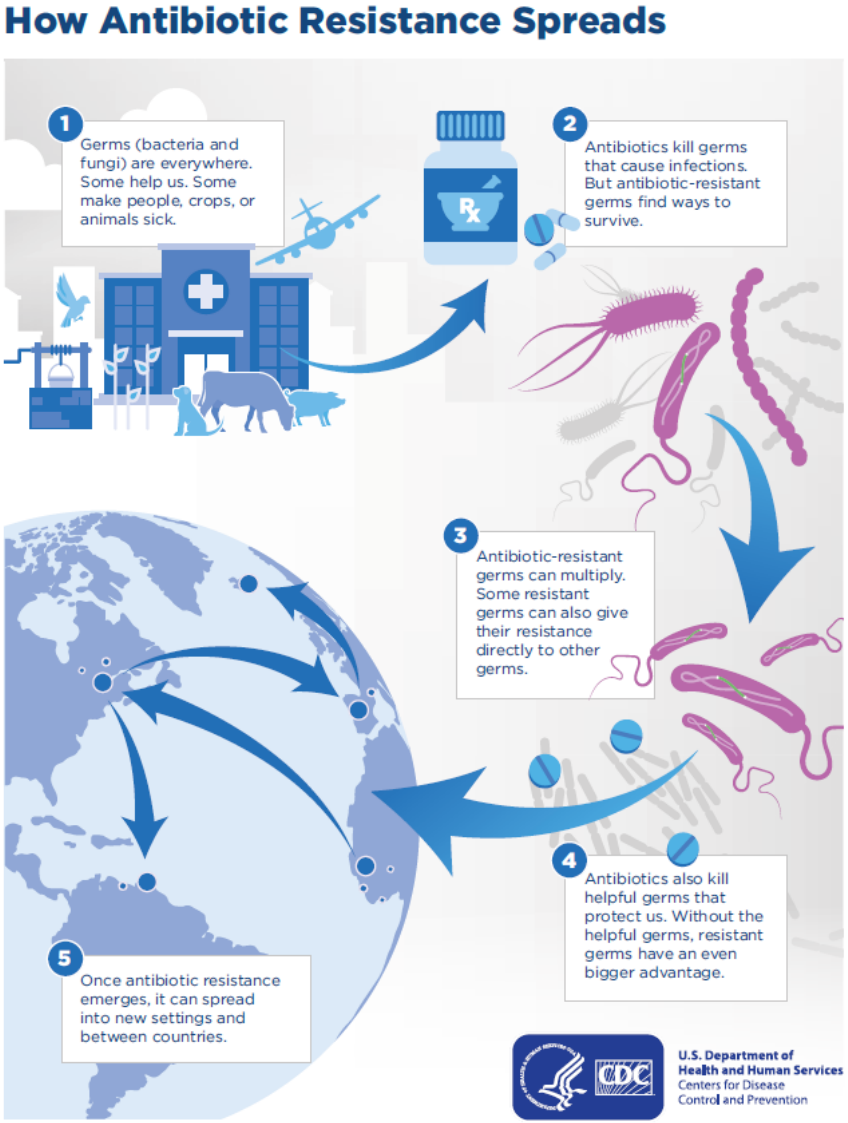
Worlwide society confronts in the last years with an increasing number of zoonotic diseases outbreaks due to an intensifying farming sector which facilitates spread, severely impacting on human and animal health, social activities and economies

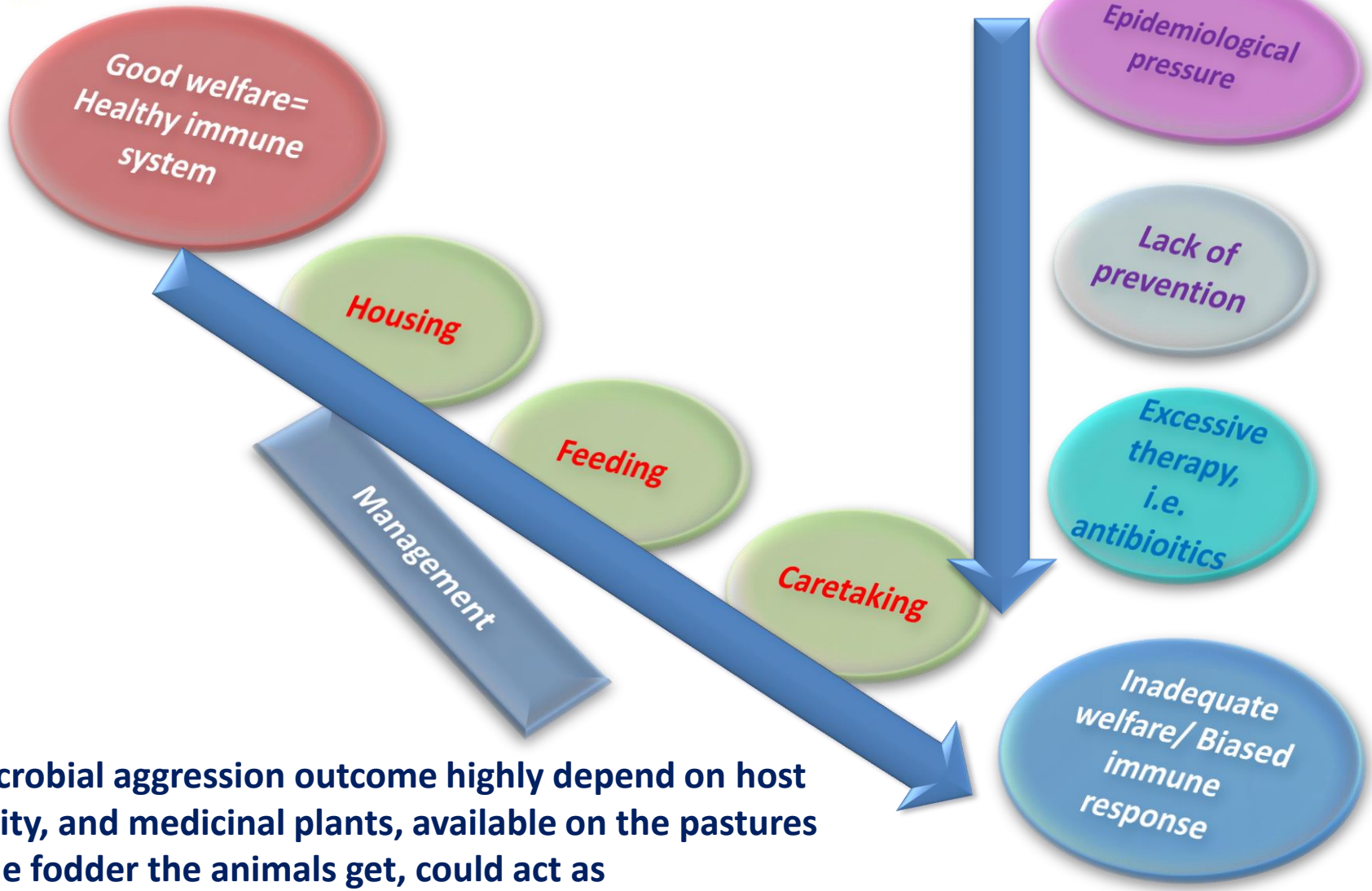
Raising pigs in extensive systems enhances their susceptibility to changes in micro- and macro- climate (uncontrollable stressful factor)

Development of the organic swine farming, strenghtening the conections between animals and caretakers, could increase the spread of potentially pathogenic, mainly Gram negative bacteria, the animals carry

Parasitic, bacterial and viral diseases cause major losses in swine, thus inducing a high health, welfare and also economic impact.

More and more wide-spreading free-range farming depends on the factors targeting environment protection, plant health, animal health, food safety, and consumer health.





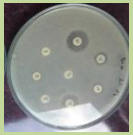
The microbial aggression outcome highly depend on host immunity, and medicinal plants, available on the pastures or in the fodder the animals get, could act as antimicrobials, strengthening resistance to diseases.

Under immune suppressive circumstances it is important to define and use

imunestimulating/imunomodulating products of vegetal origin

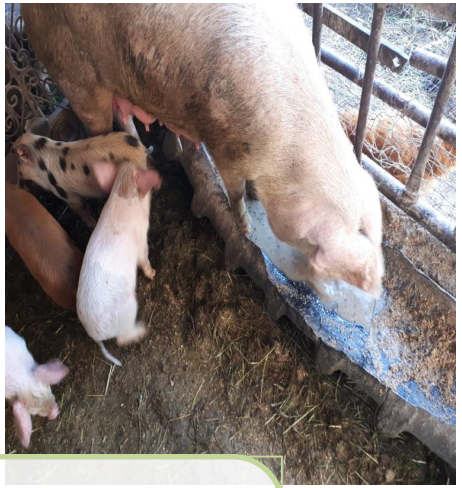
Potentiate the host ability to control infection

Diminish the allopatic/synthetic drug consumption



Prevent antibiotic resistance

Objectives



1

- Testing the tolerance to **oral administration of** *Calendula officinalis* and *Satureja hortensis*

2

- Testing the powdered plants' effects on the bacteriome carried by healthy pigs

Materials and methods

To identify the content of the plants in bio-chemicals, alcoholic plant extracts were prepared according to the provisions of German pharmacopoeia by the University of Pharmacy, Cluj-Napoca, Romania

Method 1. A new LC-MS method was used to identify 6 polyphenols in WS extracts: epicatechin, catechin, syringic acid, gallic acid, protocatechuic acid and vanilic acid.

Method 2. The MS signal was used only for qualitative analysis based on specific mass spectra of each polyphenol. The MS spectra obtained from a standard solution of polyphenols were integrated in a mass spectra library.

Dosages of *Calendula officinalis* and *Satureja hortensis for orall administration* were established based on the literature

Materials and methods

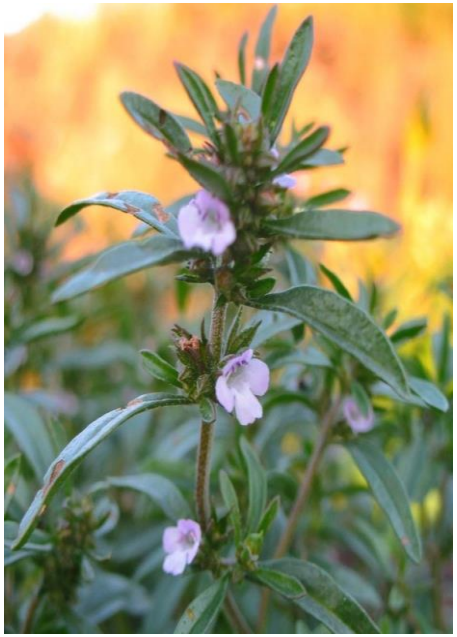
Swine

batch 1: sows=10,
fatteners=10 and
piglets=10 and

batch 2: three identical control groups from a free-range low-input farm

Administration protocol

The experimental batches received orally both powdered *C. officinalis* (140 mg/kg bw/day) and *S. hortensis* (100 mg/kg bw/day), for 10 consecutive days (0 to 10)

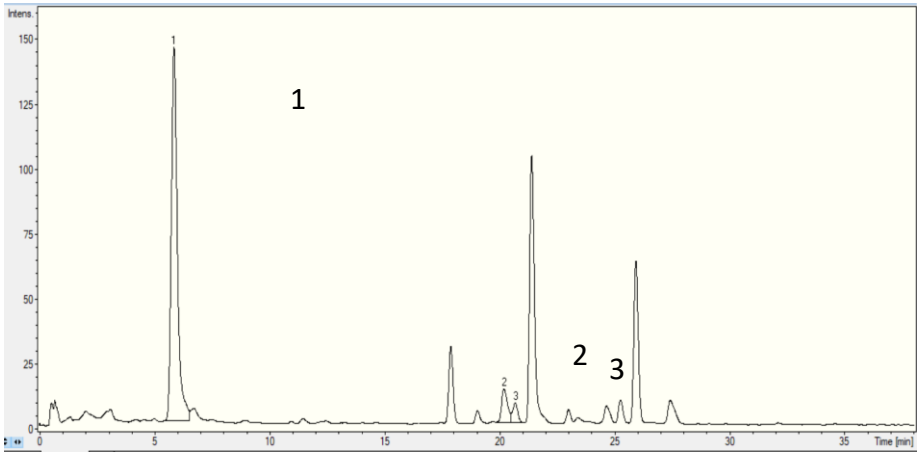


Sampling

Oral swabs were collected from both batches on days 0, 14 and 28 of the experiment were processed by classical bacteriological methods: broth and agar cultivation, API (Biomerieux, France). Percentages of Gram positive and Gram negative bacteria were calculated for each sampling.

Results and discussions

The MS spectra obtained for polyphenols

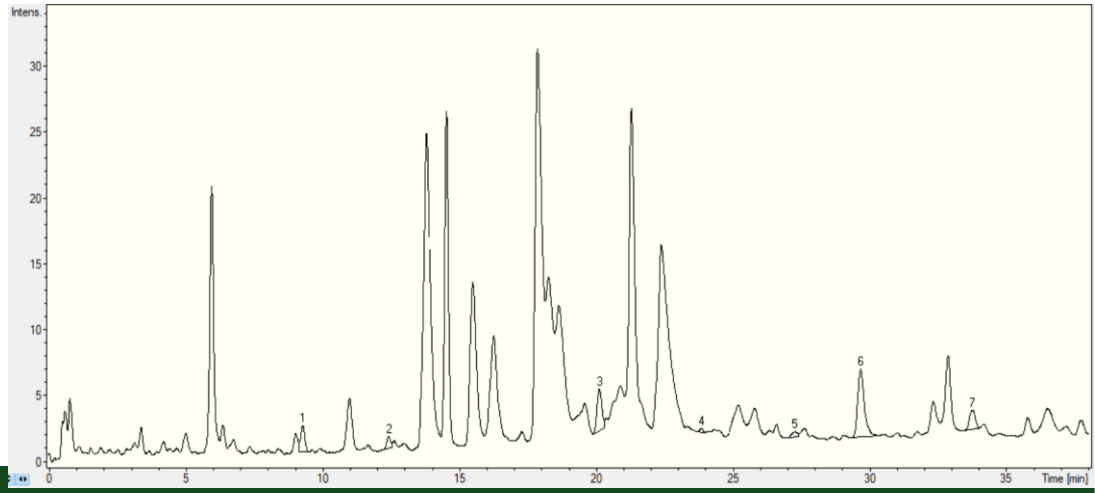


Calendula officinalis

Polyphenols (method 2)	
Acid siringic	1.51 (µg/mL)
Acid protocatechuic	0.67 (µg/mL)
Vanilic acid	0.44 (µg/mL)

Polyphenols (method 2)	
Acid siringic	2.28 (µg/mL)
Acid protocatechuic	0.95 (µg/mL)
Vanilic acid	0.65 (µg/mL)

Satureja hortenis



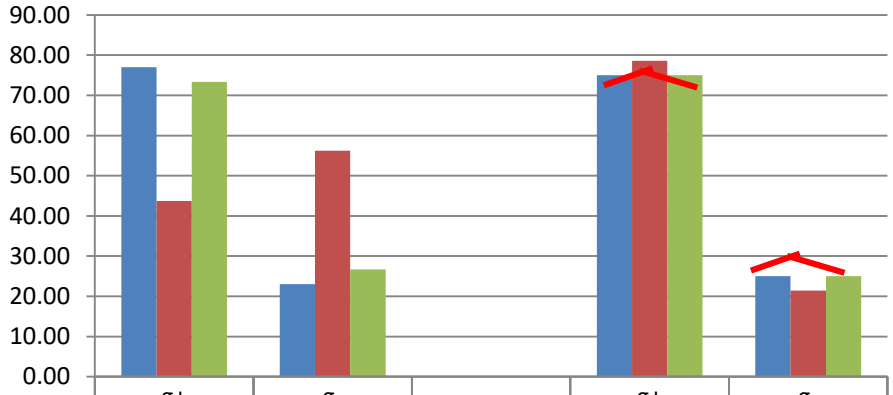
Results and discussions

Treated sows	Control sows	Treated piglets	Control piglets
Ewingella americana	Enterobacter aerogenes	E. faecalis	C. tertium
E. faecium	E. faecalis	Enterobacter cloacae	E. faecalis
E. faecalis	Streptococcus spp.		E. faecium
	Enterobacter aerogenes		
S. simulans	Streptococcus spp.		Enterobacter cloacae
E. faecalis		E.coli	E. faecalis
Candida spp.		E. faecium	S. suis
	E. faecalis	E. faecalis	E. coli
S. simulans		S. xylosus	S. epidermidis
E. faecium		Enterobacter aerogenes	E. faecalis
			E. faecium
Ewingela americana	S. epidermidis	E. faecalis	E. faecium
Citrobacter freundii	Proteus vulgaris	Enterobacter cloacae	E. faecalis
Enterobacter aerogenes	E. faecalis		Raoultella terrigena
Streptococcus spp.		E. faecalis	Raoultella terrigena
S. simulans	E. faecium	E. faecium	E. faecalis
E. faecalis	E faecalis		E. faecium
S. suis	Streptococcus spp.	Enterobacter cloacae	

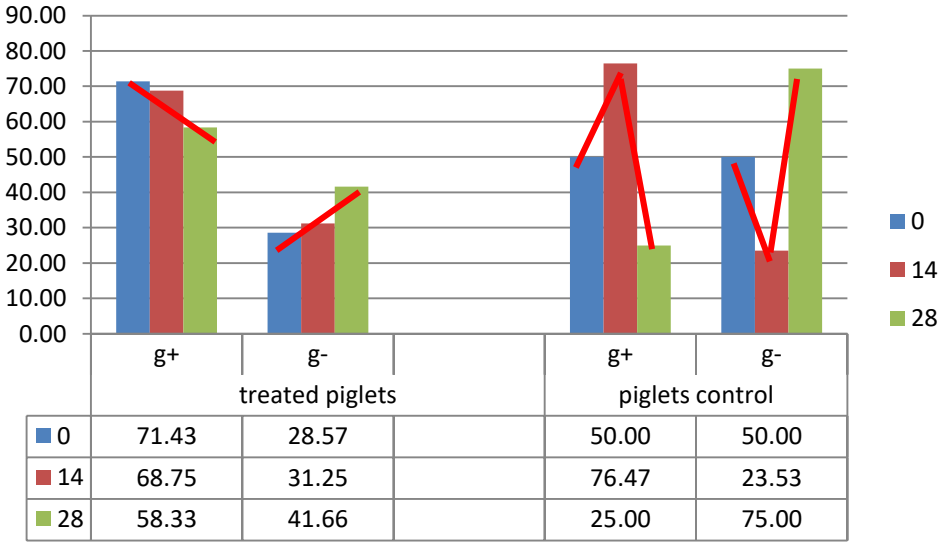
Results and discussions

Treated fatteners	Control fatteners
Ewingella americana	E.faecium
Kokkuria kristinae	Streptococcus spp.
Aeromonas hydrophyla	
E. faecalis	S. aureus
E.faecium	Entereobacter aerogenes
E.coli	Morganella morganii
E. faecalis	Clostridium spp.
E.faecium	V. parahaemolyticus
Streptococcus spp.	Enterobacter aerogenes
C. tertium	
Raoultella terrigena	
E. faecalis	
E.faecium	V. parahaemolyticus
Streptococcus orisuis	Enterobacter aerogenes
Enterobacter cloacae	E.faecium
Raoultella terrigena	E.faecium
E. faecalis	Streptococcus spp.
E.faecium	

Results and discussions

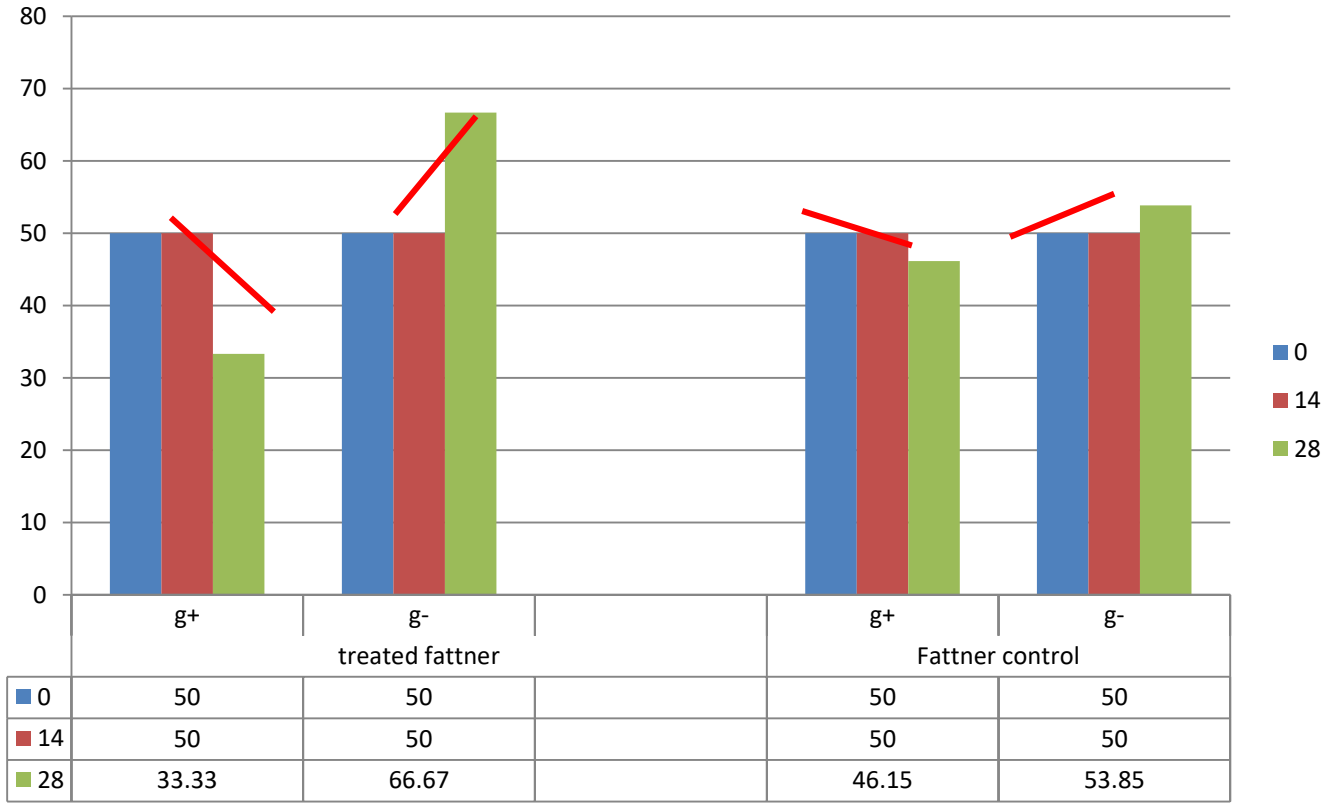


	g+	g-		g+	g-
	treated sows			sows control	
0	77.00	23.00		75.00	25.00
14	43.75	56.25		78.57	21.43
28	73.33	26.67		75.00	25.00



	g+	g-		g+	g-
	treated piglets			piglets control	
0	71.43	28.57		50.00	50.00
14	68.75	31.25		76.47	23.53
28	58.33	41.66		25.00	75.00

Results and discussions



	g+	g-		g+	g-
	treated fattner			Fattner control	
0	50	50		50	50
14	50	50		50	50
28	33.33	66.67		46.15	53.85

Conclusion

Given the importance of the diet in shaping the bacterial gut population, the results indicated the need for further investigations in tailoring the dose of administered powdered plants plant to obtain the best possible effects in enhancing the gut microbial diversity and structure in pigs of all age categories.

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Thank you!
Teşekkür ederim