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PIGLET FEED BASED ADDITIONAL SOLID FEED FOR SUCKLING KITS

Kacsala L.¹*, Gerencsér Zs.¹, Szendrő Zs.¹, Nagy, I.¹, Radnai I.¹, Odermatt M.², Matics Zs.¹

¹Faculty of Agricultural and Environmental Sciences, Kaposvár University, Kaposvár, Guba S. u. 40, 7400, Kaposvár, Hungary ²Olivia Ltd, Mizse 94, 6050, Lajosmizse, Hungary *Corresponding author: <u>kacsala.laszlo@ke.hu</u>

ABSTRACT

The aim of the experiment was to examine the possibility of additional feeding of suckling kits using solid feed based on commercial piglet feed. The experiment was conducted at Kaposvár University with Pannon White rabbits (n=30 does, 270 suckling kits), they were randomly divided into three groups after crossfostering (2 days after kindling, 10 does and 90 kits per group). The does were housed in flat deck cages. A controlled nursing was applied until 16d of lactation. The litters in control group (C) did not received additional pellets. In group P, the kits were additionally fed with pellets (8 mm of diameter) made of piglet feed powder (Bonni-M Forte® by SANO): pellet adhesive: water in 4: 0.03: 1 weight ratio. In PG group extra glycerine powder was added to the pellet (piglet feed powder: powdered glycerine: water in 4.2: 0.7: 1 weight ratio). The kits consumed additional solid feed. A decline was observed in the milk intake of P and PG kits after 9 days of age. There were no differences in body weight compared to the other groups. The additional feeding did not affect the mortality of kits. The added extra energy source (powdered glycerine) to the kits' feed did not have positive effect on the growth of kits. Further studies are needed to examine the effect of other components and techniques to improve the additional feed intake and growth of the kits.

Key words: Rabbit, Additional feeding, Suckling kits, Piglet feed, Weight gain

INTRODUCTION

Rabbit does usually nurse the kits once a day (Zarrow *et al.*, 1965; Drewett *et al.*, 1982; Morgado *et al.*, 2008), but some authors (Seitz *et al.*, 1998; Matics *et al.*, 2004) observed multiple nursing events. The fat (12.9g/100g), protein (12.3g/100g) and energy content (8.4MJ/kg) of the rabbit milk is quite high compared to other domesticated animal species (Maertens *et al.*, 2006). During the first part of the lactation the milk is enough to satisfy the high energy needs of the kits. Nevertheless, from the beginning of the third week of the lactation, the does are not able to satisfy the nutrient requirements of the kits (Xiccato *et al.*, 1995). Due to the lack of the milk, the hunger will lead the kits to start consuming solid feed.

To achieve the maximal growth potential of the suckling kits one litter was nursed with two kindled does (Gyarmati *et al.*, 2000a). The kits were able to consume almost double amount of milk (+89%) during the first three weeks of lactation compared to the control group, which led to a 70% higher body weight of kits at the age of 21 days. The kits were able to maintain higher body weight during the growing period and they reached the slaughter weight (2.5 kg) 9 days earlier than the control group. Gyarmati *et al.* (2000b) published a nursing method with two does, which can be applied in practice.

In rabbit, similarly to other domesticated animals, the development of the appropriate intestinal microbiota is essential. During the first 1.5-2 weeks of the lactation the does excrete faecal pellets in the nest during nursing, which pellets are ingested by the pups. According to Kovács *et al.* (2004) and Combes *et al.* (2014) the maternal excretion of solid faecal pellets were consumed by the kits and were involved in caecal microbiota implantation. These results demonstrate that kits are able to consume solid feed.

The aim of our experiment was to examine the possibility of additional feeding of suckling kits using solid feed based on commercial piglet feed and addition of glycerin as pellet adhesive and energy source (Retore et al., 2012).

MATERIALS AND METHODS

Animals and experimental design

The experiment was conducted at Kaposvár University with Pannon White rabbits (n=30 does, 270 suckling kits). They were housed in flat deck cages ($86 \times 38 \times 30$ cm, included the nest box /28.5 x 38 cm/) and fed with commercial pellet *ad libitum*. The temperature varied between 20 and 25 °C. The daily lighting was 16 hours. The experiment lasted from the age of 3 days till the age of 21 days. In all groups controlled nursing method and additional feeding was used till 16 days after parturition.

After kindling, the does and litters were divided into three groups, randomly (10 does and 90 kits per group, 9 kits/litter using crossfostering within groups, dead kits were not replaced). The litters in control group (C) did not receive additional pellets. In group P, the kits were additionally fed with pellets made of piglet feed powder (Bonni-M Forte® by SANO; *Table 1*): pellet adhesive: water in 4: 0.03: 1 weight ratio. To examine the effect of an additional feed with higher energy, extra glycerine as pellet adhesive powder was added to the pellet fed in PG group (piglet feed powder : powdered glycerine : water in 4.2 : 0.7 : 1 weight ratio). The size of additional pellets was similar to the size of does' faeces and they were made by a bojliroller (8 mm) (*Figure 1*). Pellet hardness was measured by using Zwick Roell/Z005. The speed of the cutting was 500 mm/min and the thickness of the blade was 1mm. Compositions of the pellets are listed in *Table 2*.

Based on the pre-experimental results, at the beginning (3 days of age) 6 pellets were inserted into the nestbox. Later on, the amount was gradually increased to 24 pellets. They were placed near to kits after nursing.

Table 1: Composition	of piglet feed (%)
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	Piglet feed
Dry matter	94
Crude protein	20
Crude fat	13.5
Crude fibre	1.5
Ash	7.0
Lysine	1.5
Methionine	0.9



Figure 1: Pellets

Table 2:	Com	position	of	pellets ((%))
						,

	Group P	Group PG
Dry matter	75.4	73.0
Crude protein	15.6	12.7
Crude fat	11.2	11.0
Crude fibre	1.4	1.2
Ash	6.4	7.7
NFE	40.8	40.4
Starch	13.6	12.5

The body weight of the kits before nursing, and the litter weight immediately after nursing (for calculation of milk production) were measured at 2, 5, 9, 12, 16, 19 and 21 days of age. Weight gain per litter was calculated based on the individual body weights of kits (lack of identification). At 19 and 21 days of age the does had free access to the nest, and kits'weight were measured between 8 and 9 am. Due to the different nursing methods, two periods were evaluated separately (2-16 days: body weight, weight gain/day; 19-21 days: body weight). **Statistical analysis**

The daily milk production, and the individual body weight and weight gain of kits were evaluated using linear mixed model (additional pellets as fix factor; effect of does as random factor). The hardness value data were evaluated by One-Way ANOVA, and the mortality of the kits was calculated by Chi-square test using SPSS 10.0 software package.

RESULTS AND DISCUSSION

The suckling kits consumed the additional solid feed (similar results Kacsala *et al.*, 2016) which was visually checked (bitemarks and missing pieces of the pellets) daily and recorded by camera, but the amount of consumed pellet could not be measured due to the consistency of the pellets. The movement of the kits could cause the distraction of the pellet, thus we could not find all the pieces in the nest material. Evaporation and/or the moisture absorption feature of the pellets could cause mismeasurements. The pellet hardness of the group P was 5.9 ± 0.9 N/mm² and that of group PG was 12.2 ± 2.1 N/mm².

Milk production

The additional feeding did not affect the milk production of does (*Table 3*). The milk production of C does showed a clear increasing tendency during the first 16 days of lactation, however slight decline can be observed in P and PG kits after 9 days of age. This is the time when the kits start to consume a higher amount of additional feed.

There were no differences in body weight of kits at 2, 5 and 9 days of age (*Table 3*). From 12 days of age till the end of the experiment (21 days), kits with added piglet feed (P) had an average 6-9% higher body weight compared to the other groups (P < 0.05).

	M	ilk producti	on (g/doe)		
Ages,	es, Experimental groups			SF	D
days	С	Р	PG	SE	1
5	161±16	168±21	177±20	4.55	0.38
9	221±35	232±27	229±27	6.26	0.81
12	253±22	243±48	246±24	8.15	0.89
16	293±32	283±24	294±19	6.37	0.76
	В	ody weight o	of kits (g)		
2	65	66	64	0.64	0.22
5	94	94	88	1.21	0.084
9	146	153	144	1.68	0.051
12	189 ^a	202 ^b	187 ^a	2.24	0.028
16	246 ^a	266 ^b	249 ^a	2.74	0.001
19	315 ^a	343 ^b	323 ^a	3.41	0.001
21	343 ^a	372 ^b	354 ^a	3.66	0.002

Table 3: Milk production of does (g/day) and body weight of kits (g)

C: Control group – without additional pellet; P: Additional pellet based on piglet feed; PG: Additional pellet based on piglet feed and added glycerin

 a,b : means with different letters on the same row differ significantly at P<0.05 level.

The additional feeding did not affect the weight gain of the kits significantly. Even so there are moderately higher weight gains of the P kits, but the differences are not statistically proved (*Table 4*). The additional feeding did not affect the mortality of kits.

		Weight gain ((g/day/rabbit)		
Ago dovo	Ex	perimental gro	SE	P	
Age, uays	С	Р	PG	9F	1
2-5	9.0±4.2	9.1±2.9	8.0±2.6	0.59	0.70
5-9	12.8 ± 2.7	$15.0{\pm}1.6$	14.2 ± 2.2	0.43	0.107
9-12	14.3±3.5	16.4±4.3	15.6±2.3	0.59	0.26
12-16	14.2±2.3	16.5 ± 1.8	15.6±1.5	0.59	0.28
		Mortal	lity (%)		
0-9	14.4	10.0	7.8		0.34
9-21	0.0	1.2	2.4		0.39

Table 4: Weight gain of kits and mortality

C: Control group – without additional pellet; P: Additional pellet based on piglet feed; PG: Additional pellet based on piglet feed and added glycerin

CONCLUSIONS

The main conclusion of the experiment is that the suckling kits seems able to consume additional solid feed made of feed for piglets, but this needs to be quantified. The body weight of P kits increased by 6-9% from 12 days of age. However the added extra energy source (powdered glycerin) to the kits' feed did not have positive effect on their growth. Further studies are needed to examine the effect of other components and techniques to improve the additional feed intake, growth of the kits, and to evaluate its consumption.

REFERENCES

- Combes S., Gidenne T., Cauquil L., Bouchez O., Fortun-Lamothe L. 2014. Coprophagous behaviour of rabbit pups affect implantation of cecal microbiota and health status. J. Anim. Sci., 92:652-665.
- Drewett R., Kendrick K., Sanders D., Trew A. 1982. A quantitative analysis of the feeding behaviour of suckling rabbits. Dev. Psychobiol., Vol. 15: Issue. 1:25-32.
- Gyarmati T., Szendrő Zs., Zomborszky-Kovács M., Matics Zs., Radnai I., Biró-Nemeth E. 2000a. Effect of double suckling and early weaning on the weight and length of the gastrointestinal tract. In Proc. 7th World Rabbit Congr. 2000 July, Valencia, Spain, Vol. A, 591-598.
- Gyarmati T., Szendrő Zs., Maertens L, Biró-Németh E., Radnai I., Milisits G., Matics Zs. 2000b. Effect of suckling twice a day on the performance of suckling and growing rabbits. In Proc. 7th World Rabbit Congr. 2000 July, Valencia, Spain, Vol. C, 283-289.
- Kacsala L., Szendrő Zs., Gerencsér Zs., Radnai, I., Odermatt M., Matics Zs. 2016. Additional solid feed for suckling kits Effect of thyme supplementation. In: Proc. 11th World Rabbit Congr., 2016 June, Qingdao, China (in press).
- Kovács M., Szendrö Z., Milisits G., Biro-Nemeth E., Radnai I., Posa R., Bónai A., Kovács F., Horn P., 2006. Effect of nursing method and faeces consumption on the development of bacteroides, lactobacillus and coliform flora in the caecum of the newborn rabbits. *Reprod Nutr Dev*, 46, 205-210.
- Maertens L., Lebas F., Szendrő Zs. 2006. Rabbit milk: A review of quantity, quality and non-dietary affecting factors. World Rabbit Sci., Vol. 14: 205-230.
- Matics Zs., Szendrő Zs., Hoy St., Nagy I., Radnai I., Biró-Németh E., Gyovai, M. 2004. Effect of different management methods on the nursing behaviour of rabbits. World Rabbit Sci., Vol. 12: 95-108.
- Morgado E., Gordon M. K., Minana-Solis M. C., Meza E., Levine S., Escobar C., Caba M. 2008. Hormonal and metabolic rhythms associated with the daily scheduled nursing in rabbit pups. Am. J. Physiol. Regul. Integr. Comp. Physiol, 295: 690–695.
- Tetore M., Scapinello C., Murakami A. E., Araujo I. G., Neto B. P., Felssner K. S., Sato J., Oliveira A. F. G. 2012. Nutritional evaluation of vegetable and mixed crude glycerin in the diet of growing rabbits. R. Bras. Zootec., Vol.41:333-340.
- Seitz K., Hoy ST., Lange K. 1998. Untersuchungen zum Einfluss verschiedener Faktoren auf das Säugeverhalten bei Hauskaninchen. Berl. Münch. Tierärztl. Wschr. 111: 48–52.
- Xiccato G., Parigi-Bini R., Dalle Zotte A., Carazzolo A., Cossu M. E. 1995. Effect of dietary energy level, addition of fat and physiological state on performance and energy balance of lactating and pregnant rabbit does. Anim. Sci., Vol. 61, 02:387-39.

Zarrow M. X., Denenberg V. M., Anderson C. O. 1965. Rabbit: Frequency of suckling in the pup. Sci., Vol.150: 1835-1836.













	Compositio	Pellet on of piglet fe	ts eed and pelle	ts (%)
		Piglet feed	Group P	Group PG
	Dry matter	94.0	75.4	73.0
	Crude protein	20.0	15.6	12.7
	Crude fat	13.5	11.2	11.0
	Ether extract	1.5	1.4	1.2
	Ash	7.0	6.4	7.7
	NFE		40.8	40.4
	Starch		13.6	12.5
K K A P	OSVÁR ERSITY			





		Res	ults		
	Weigh	nt gain and	mortality	of kits	
Ago dave		Groups			
Age, uays	С	Р	PG	SE	Р
		Weight gair	n of kits, g/d		
2-5	9.0	9.1	8.0	0.59	0.703
5-9	12.8	15.0	14.2	0.43	0.107
9-12	14.3	16.4	15.6	0.59	0.256
12-16	14.2	16.5	15.6	0.59	0.278
		Morta	lity, %		
0-9	14.4	10.0	7.8		0.340
9-21	0.0	1.2	2.4		0.391
"C": withou "PG":	it additional additional p	pellet; " P ": a ellet based o	additional pe n piglet feed	llet based on and added g	piglet feed; lycerin
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		Res Body weig	ults ht of kits, g		
A 1		Groups			
Age, days	С	Р	PG	SE	Р
2	65	66	64	0.64	0.223
5	94	94	88	1.21	0.084
9	146	153	144	1.68	0.051
12	189 ^a	202 ^b	187 ^a	2.24	0.028
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"C": withou "PG":	it additional additional p	pellet; "P": : ellet based of	additional pe n piglet feed	llet based on and added gl	piglet feed; ycerin
P	kits had ar compared t	n average 6- o the other	-9% higher groups (12-	body weigh 21 d of age)	t
A P O S V A					





