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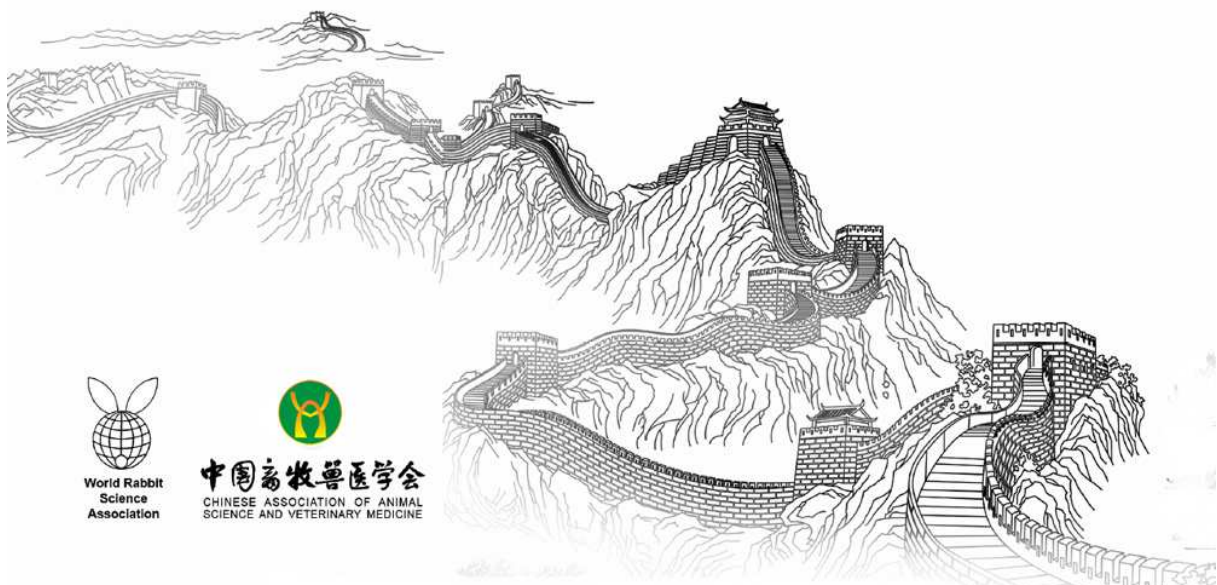
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ADDITIONAL SOLID FEED FOR SUCKLING KITS EFFECT OF THYME SUPPLEMENTATION

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ABSTRACT

The aim of the experiment was to study the possibilities of taking advantage of the suckling kits' high growth potential before weaning. The pregnant does (n=77) were divided into 2 groups. Half of the does received a control diet and the other half received a diet with thyme supplementation (200g/t), *ad libitum* from the 11th day of the pregnancy till weaning. The litters (n=734 kits) of the both maternal dietary groups were divided into 3 sub-groups: "NO" – no pellet supplementation; "P" – basic pellet; "P+T" – basic pellet with 1% added powdered thyme. In group P and P+T, cylinder-shaped solid pellets (20 x 20 x 8 mm) were daily placed into the nest box, on the top of the nest material. The pellets were made of soybean powder, coconut oil and jelly and were supplemented with 1 % powdered Thyme in case of group P+T. The thyme supplementation in the diet did not affect the milk production of the does. The suckling kits consumed the additional solid feed (P and P+T), however it did not have effect on their body weight, weight gain or mortality. To find practical method of the additional feeding of suckling kits needs further investigations.

Key words: Additional feeding, Thyme, Suckling kits, Litter weight

INTRODUCTION

Rabbit does nurse their kits generally once a day (24h) with a circadian periodicity (Zarrow *et al.*, 1965; Morgado *et al.*, 2008). The kits have to consume their daily milk intake during a short nursing period, which is about 3-4 minutes. In the experiment of Seitz *et al.* (1998), the rabbit does visited the nests to nurse their kits 0.8-2.2 times a day, and the average duration between two nursing events was 16.5 hours. Matics *et al.* (2004) published similar results.

Until the age of 15-18 d, the kits consume only milk. Compared to some other domesticated animal species, the fat and energy contents of the rabbit milk are quite high (Maertens *et al.*, 2006). According to some authors during the first part of lactation the milk is enough to satisfy the high energy needs of the kits. However, from the beginning of the third week of lactation, the does are not able to satisfy the nutrient requirement of the kits (Xiccato *et al.*, 1995).

The method of nursing one litter with two does was investigated during the early 2000's (Gyarmati *et al.*, 2000a). In the experiment of Gyarmati *et al.* (2000b), the kits were nursed by two does (kindled at the same day) till the age of 21 d, and they consumed 89% more milk than the control group (nursed by one doe), which led to a 70% higher body weight at the age of 21 d. With this method the growing rabbits reached the slaughter weight (2.5 kg) 9 d earlier than the group nursed once a day. These results show, that rabbit kits are able to consume more milk, and they have higher growth capacity such as they achieve in the practice.

In rabbits like in any other domesticated animals, the lack of the proper microbial microbiota could cause directly or indirectly digestive problems or sickness. During the first 1.5-2 weeks of the lactation the does excrete some faecal pellets in the nest during nursing, which solid pellets are ingested by the kits. The

maternal excretion of solid faecal pellets and the coprophagous behavior of their kits are involved in caecal microbiota implantation of the kits (Kovács *et al.*, 2004, Combes *et al.*, 2014).

In some scientific papers (Altbäcker *et al.*, 1995) we can read about the effects of some herbal extracts. The newborn kits show preference on some herbs which were eaten by does during pregnancy.

The aim of the experiment was to examine the effect of additional thyme (in feed) on the foster skills and milk production of the does. Moreover, to look over the possibilities of additional feeding of suckling kits using solid feed and thyme supplementation.

MATERIALS AND METHODS

Animals and experimental design

The experiment was conducted at Kaposvár University with does from Pannon rabbit breeding program (n=77) and their suckling kits (n=734). 49 d reproduction rhythm and controlled nursing was applied. The pregnant does were divided into 2 dietary groups. Half of the does received control diet and the other half received diet with supplemented thyme (before pelleting process) (200g/t) *ad libitum* from 11 d of the pregnancy (pregnancy diagnosis) till weaning. The does were housed in flat deck cages (86 x 38 x 30 cm, included the nest box: 28.5 x 38 cm). The temperature varied between 20 and 25 °C. The daily lighting was 16 hours.

Newborn kits were identified with ear-tags. In order to maintain the litter size during the experiment, died kits were replaced from extra litters. The litters of both dietary groups were divided into 3-3 sub-groups: “NO” – no pellet supplementation; “P” – basic pellet; “P+T” – basic pellet with 1% added powdered thyme (Figure 1). In groups P and P+T, cylinder-shaped solid pellets (20 mm length x 8 mm of diameter) were scattered into the nest box on the top of the nest material. The pellets were made of soybean powder, coconut oil and jelly and were supplemented with 1 % powdered thyme in case of group P+T. The aim of thyme supplementation was based on the observation of Altbäcker *et al.* (1995) that kits showed preference on some herbs which were eaten by does during pregnancy, and in this way a higher pellet intake was expected in the present experiment. Pellet hardness was measured at 18°C by using Zwick Roell/Z005. The speed of the cutting was 500 mm/min, and the thickness of the blade was 1mm, however the hardness could be changed in the nest because the higher temperature in it. Composition of the pellets is shown in Table 1.

Table 1: Composition (%) of pellets

Dry matter	6.6
Crude protein	21.8
Crude fat	48.9
Crude fibre	4.1
Ash	3.0
NFE	15.6
Starch	1.0

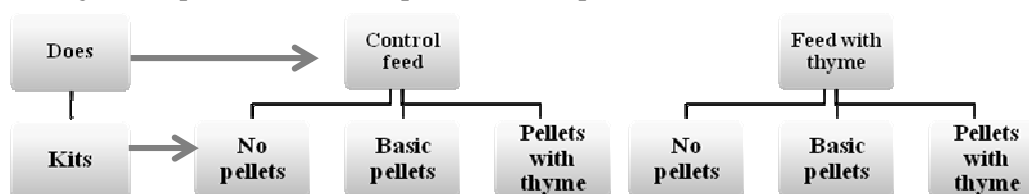


Figure 1: Experimental design

The experiment lasted from the age of 3 d till 16 d. Based on pre-experimental results, at the beginning of the experiment 2 pieces of pellets were placed on the top of the nest material after each nursing. Later on it was increased gradually to 6 pellets. Litter weight at 2, 5, 9, 12 and 16 d of age was measured before and immediately after nursing to calculate the milk production, and also individual body weight of kits was measured at 3, 10 and 16 d of age, one hour after nursing.

Statistical Analysis

The litter weight, milk production and individual body weight were evaluated by Multi-Factor ANOVA (diet of the does and additional pellet groups were considered as fixed factors), the mortality of the kits was calculated by Chi-square test using SPSS 10.0 software package. In case of individual body weight

and weight gain of the kits the doe was considered as a random factor. The hardness value data were evaluated by One-Way ANOVA.

RESULTS AND DISCUSSION

Milk production

The thyme supplementation in the diet of does had no significant effect on milk production (*Table 2*).

Table 2: Effect of thyme supplementation on daily milk production of does (g)

Days of lactation	Groups		SE	P
	Control diet	Diet with thyme		
2	203	205	5.0	0.83
5	219	213	5.9	0.65
9	262	261	4.3	0.93
12	256	273	5.6	0.133

Body weight and weight gain

There were no differences between the two groups in body weight and body weight gain of kits (*Table 3*).

Table 3: Effect of thyme supplementation in the diet of does and in the pellet of the kits on the body weight and weight gain of the kits

age, d	Mother's diet		Kits' pellets			Se	Prob.		
	Control feed	Feed with Thyme	NO	P	P+T		Feed	Pellet	Interaction
n	363	371	239	257	238				
Body weight, g									
3d	155	159	156	157	159	1.1	0.331	0.929	0.16
10d	252	156	251	253	259	1.7	0.486	0.683	0.42
16d	328	333	329	328	334	2.1	0.650	0.893	0.22
Body weight gain, g/d									
3-10d	13.8	14.0	13.6	13.9	14.2	0.2	0.684	0.663	0.77
10-16d	12.7	12.3	12.6	12.3	12.5	0.2	0.298	0.819	0.092
3-16d	13.3	13.3	13.2	13.2	13.4	0.1	0.960	0.876	0.45

The suckling kits seem able and willing to consume some additional solid feed (pellet), but it was not quantified. This observation agreed with Kovács *et al.* (2004) and Combes *et al.* (2014), who described that suckling kits consumed faecal pellets (solid material). However, the additional feeding did not affect the body weight and weight gain of kits. According to Altbäcker *et al.* (1995) thyme supplementation (smell and/or taste) may have a positive effect and diet choice, but in the present experiment this influence was not observed.

Mortality

Neither the diet of does nor the additional feeding of kits affected the suckling mortality (*Table 4*).

Table 4: Mortality of suckling kits between 2 and 16 d of age (%)

	Diet of the does			Additional pellet			
	Control diet	Diet with Thyme	P	NO	P	P+T	P
2-10 d	1.9	1.6	0.75	1.3	2.3	1.7	0.66
10-16 d	3.1	4.9	0.29	3.0	4.8	4.3	0.58

NO = no pellet supplementation, P = basic pellet, P+T = basic pellet with thyme supplementation

CONCLUSIONS

The supplementation of thyme had no effect on milk production of does and body weight of kits. According to our observation the suckling kits seem able to consume some solid feed (pellet), but this needs to be quantified, and their growth was not affected. To find practical method further investigations are needed.

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EFFECT OF THYME SUPPLEMENTATION

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AIM

The aim of the experiment was to look over the possibilities of additional feeding of suckling kits using soybean powder based solid feed and thyme supplementation. Moreover to examine the effect of additional thyme (in doe's feed) on the feed preference of kits.

MATERIAL AND METHODS

Does of Pannon Breeding Program (n=77) and their suckling kits (n=734) were conducted at the experiment. The pregnant does were divided into 2 dietary groups and were kept in flat deck cages. Does in group "C" received commercial diet and in group "T" received feed with supplemented thyme (200g/t) *ad libitum* from 11 d after AI (pregnancy diagnosis) till weaning. After kindling the litters of both dietary groups were divided into 3 sub-groups: "N" – no pellet supplementation; "S" – basic kit's pellet (soybean powder, coconut oil, jelly, *Table 1*); "S+T" – basic pellet with 1% added powdered thyme. In groups P and P+T, cylinder-shaped solid pellets were scattered into the nest box from 3 d to 16 d on the top of the nest material. Control nursing was applied during the experiment.

Table 1: Chemical composition of kit's pellet (%)

	Kit's pellet
Dry matter	6.6
Crude protein	21.8
Crude fat	48.9
Crude fibre	4.1
Ash	3.0
NFE	15.6
Starch	1.0

Table 3: Effect of thyme supplementation in does' diet on daily milk production (g)

Days of lactation	Groups			
	C	T	SE	P
2	203	205	5.0	0.832
5	219	213	5.9	0.651
9	262	261	4.3	0.932
12	256	273	5.6	0.133

Litter weight at 2, 5, 9, 12 and 16 d of age was measured before and immediately after nursing, and the milk production was calculated from the difference. Individual body weight of kits was measured at 3, 10 and 16 d of age, one hour after nursing (individual identification – ear tag).

Table 2: Effect of thyme supplementation in the diet of does and in kit's pellet on the body weight and weight gain of the kits

Age, d	Doe's diet (A)		Kit's pellets (F)			SE	Prob.		
	C	T	N	S	S+T		A	F	AXF
n	363	371	239	257	238				
Body weight, g									
3	155	159	156	157	159	1.1	0.331	0.929	0.163
10	252	156	251	253	259	1.7	0.486	0.683	0.418
16	328	333	329	328	334	2.1	0.650	0.893	0.223
Body weight gain, g/d									
3-10	13.8	14.0	13.6	13.9	14.2	0.2	0.684	0.663	0.773
10-16	12.7	12.3	12.6	12.3	12.5	0.2	0.298	0.819	0.092
3-16	13.3	13.3	13.2	13.2	13.4	0.1	0.960	0.876	0.446

CONCLUSION

The main conclusion of the experiment was that the suckling kits were able to consume additional solid kit's pellets made of soybean powder. The supplementation of thyme as a special taste or smell had no effect on milk consumption, body weight, weight gain, or mortality of kits. Further studies are needed to examine other components and techniques to improve the additional feed intake and growth of kits.