Session 15 Abstract Number 0477
Author email: wkishk@hotmail.com

Effect of lactation period on body physical characters in growing rabbit puny

W. H. Kishk

Department of Animal Production, Faculty of Agriculture, Suez Canal University, Ismailia, Egypt

Abstract

One hundred new born of White New Zealand rabbit was divided into two groups. The first group was weaned at 35 days of age. The second group was weaned at 60 days old. During lactation period and until marketing age both groups were subjected to measurements of body physical characters. These characters were lengths of ear loop, head, body, tail, fore legs, hind legs in addition thoracic, abdomen circumference and marketing body weight at 10 weeks of age. The results showed that there were significant differences ($P < 0.05$) in marketing body weight, thoracic, abdomen circumference and body length between two studied groups. While there were no significant differences in lengths of ear loop, head, body, tail, fore legs, hind legs between two investigated groups. It could be concluded that it is better to prolong lactation period in growing rabbits to get better physical body characters and marketing weight.

Introduction

Rabbit puny growth is affected by many factors such as nutrition, management, mothering care and suckling period (Labas et al., 1997). Rabbit milk is very reach in its protein content (Larson, 1995). This content can reach 10.4% which could reflect high growth rate during fattening period of growing rabbits. In addition it has been found that, a protective role of milk in vivo in association with in vitro antibacterial activity. These effects are independent of the presence of specific anti-EPEC(Enteropathogenic Escherichia coli) antibodies **(**Gallois et al., 2007). In addition, milk proteins are very necessary to exert a key functional role via acting on nutrient supply, as protective compounds against aggression or by a regulatory action on different physiological functions (Bos et al., 2000). Milk proteins are a complex mixture of various components with quantitative and qualitative differences according to mammalian species. The two major fractions include a micellar casein fraction and the soluble whey protein fraction. Bioactive components in the protein fraction of milk include enzymes, bactericides, hormones, mediators and growth factors (Britton and Kastin, 1991 & Schanbacher et al., 1997). The purpose of this work is to find out the effect of prolongation suckling period on period on body physical characters in growing rabbit puny.

Materials & Methods.

A total of one hundred Newborn White New Zealand rabbit pups were allocated into two groups. The first group was weaned at traditional weaning age up to 35 days. The second group was weaned up to 60 days of age. Both groups were subjected to the following measurements: lengths of ear loop, head, body, tail, fore legs, hind legs in addition thoracic, abdomen circumference and marketing body weight at 10 weeks of age growth rate through weekly live weight (LW) and finally after 10 weeks of age at marketing weight. Mortality rate from birth until marketing age, blood metabolites levels of total protein, total lipids, blood sugar , blood criateine level and N-Urea content during the experiment period were recorded for two groups. All does were kept at Experimental Farm of Faculty of Agriculture, Ismailia, Egypt. 20 Multiperous of White New Zealand rabbit does were reared in a galvanized wire cages for reproducing. The cages were equipped with automatic drinkers and manual feeders and a photoperiod of about 12 h was provided. To obtain 100 of newborn rabbit pups for an average of 6 newborn kits per doe for each litter size were collected. In first group (normal weaning) NW does reared the young kids in the traditional manner until they were weaned at 35 days of age. While, in the second group, (delayed weaning) DW does reared young kits until they were weaned at 60 days of age.

In both groups, the young rabbits and rabbit does used in the experiment were fed pelleted rabbit feed (CP: 16.8%, CFat: 2.9%, CF: 14.1%, 10.3 DE MJ/kg), without any kind of supplementation. The various pelleted feedstuffs provided were available in *ad libitum* quantities, and the rabbits also had free access to drinking water from automatic nipples.

Statistical analyses of the experimental data was performed by means of one-way analysis of variance (ANOVA-test), according to Steel and Torrie (1982) with SPSS 8.0, (1997) software for the effect of weaning age on physical body characters, marketing weight, mortality rate, blood metabolites levels. Duncan's multiple range test (1955) was used to test significant differences among different means of studied parameters.

Results & Discussion

Data of this experiment showed that, there were significant differences ($P< 0.05$) as regards body girth (thoracic and abdominal circumferences) between two tested groups. Where thoracic circumferences were 21, 23, 27 and 23.4, 25.8 , 29.7cm at 7^{th} , 8^{th} and 10^{th} weeks of age for normal weaning (NW) and delayed weaning (DW), respectively. These differences also were recorded as for body girth at abdominal rejoin. In which, abdominal circumferences were 22, 27, 28 and 24.9, 29.8, 31.0cm at 7^{th}, 8^{th} and 10^{th} weeks of age for NW and DW group, respectively. These results can be attributed to the significant differences in body weight between two groups at the same ages as shown in Table 1. The higher body weight as regards to DW group is due to beneficial effects of doe rabbit milk as pointed out by Bednarz and Frindt, 1978. In addition, milk has a high protein nutritional quality. Also milk

proteins demonstrate a high metabolic utilization by the organism compared with other protein sources. On the other hand, there were no significant differences between two groups as for other physical body characters like head, fore leg, hind leg, ear loop and tail length as shown in Table 1. These results show that both body weight and girth can be considered as determinant characters for growth and development. Also these results could be confirmed by high correlation coefficient between body weight and girth as presented in Table 2. These correlations were 0.92, 0.89 between body weight and thoracic and abdominal circumferences. These data go along with Fraga et al., (1978) who found that body weight correlated with body composition.

Mortality rate percent reduced with prolongation of lactation period which can present one of delaying weaning effects. Many authors found that delaying weaning can improve a number of characters such as live-weight and food consumption (Adam, 1986). Whereas Petersen et al., 1992 found no effect from delaying weaning on live-weight of growing rabbits.

Blood metabolites did not differ significantly between two groups in most of studied criteria except for total protein content and Urea-N level as pointed out in Table3. The nutritional value of dietary proteins is usually related to their ability to achieve N and amino acid requirements for tissue growth and maintenance (Rennie et al., 1994& Young and Pellett, 1989). Also physiological properties of milk protein include acute regulatory effects. The compounds responsible for these activities include enzymes, immunoglobulins, mediators and hormone-like substances. These actions are linked to native proteins or to peptides cleaved from protein during digestion (Bos et al., 2000).

It could be concluded that delaying weaning of growing rabbits up to 60 days of age is better than normal weaning to encourage rabbit growth and to encourage related physical body characters especially body girth which leads to high marketing weight and low mortality rate.

Table1. Physical body characters of WNZ growing rabbits during the weaning period from birth until weaning and during the growth period from weaning up to 10 weeks of age.

Weaning period Days	Normal Weaning 35-Days						Delayed Weaning 60-Days					
Weaning period plus growth period (weeks)	1st	3rd	5th	7th	8th	10th	1st	3rd	5th	7th	8th	10th
No. of growing rabbits	50						50					
Body weight (g)	87.1	362	551	1090^{A}	1320^{A}	1710^{A}	98.5	392	591	1220^{B}	1488^{B}	1865^{B}
	19.2	25.3	27.5	32.4	36.5	38.2	16.4	20.3	25.1	30.7	32.6	36.4
Body Length cm	14.2	19.1	29.3	35.2^{A}	38.0^{A}	42.4^{A}	14.5	19.2	30.3	37.7^{B}	40.2^{B}	44.6^{B}
	1.9	2.3	2.5	3.6	4.3	4.7	1.7	2.1	2.4	3.3	4.5	4.8
Head Length cm	5.0	6.1	10 .2	11.1	12.0	12.3	5.1	6.3	10.5	11.3	12.2	12.4
	0.75	.69	1.15	.92	1.23	1.68	0.82	.55	.96	1.22	1.68	1.36
Fore leg Length cm	6.5	10	15	16	17	19	6.7	10.5	15.3	16.2	17.1	19.4
	1.75	1.22	2.3	1.56	1.46	2.34	1.34	1.45	2.16	1.89	2.67	1.6
Hind leg Length cm	8	10	17	20	22	25	8.3	10.1	17.4	20.5	22.1	25.6
	1.22	1.5	1.47	2.1	2.6	2.43	1.13	2.13	1.16	2.36	1.69	2.63
Ear loop Length cm	2.5	6	8	9	11	12	2.7	6.4	8.3	9.4	11.3	12.1
	.89	.92	.72	1.12	.56	1.57	.73	.87	.42	1.1	1.34	1.87
Tail Length cm	3	4	8	8.6	9	10	3.1	4.3	8.1	8.9	9.2	10.3
	.33	.21	1.12	1.64	1.35	1.34	.34	.67	1.67	1.34	1.58	1.43
Thoracic circumference cm	5	12.0	16.0	21^{A}	23^{A}	27^{A}	5.4	12.4	16.5	23.4^{B}	25.8^{B}	29.7^{B}
	.21	1.14	1.89	2.65	2.98	2.76	.33	1.12	1.33	2.16	2.80	2.91
Abdomen circumference cm	7	14	18	22^{A}	25^{A}	28^{A}	7.3	14.1	18.6	24.9^{B}	29.8^{B}	31.0^{B}
	1.26	1.24	2.18	2.56	3.14	3.67	1.13	1.24	2.23	3.11	3.14	2.16
Mortality rate	2	4	5	7	10	15^{A}	1.8	3.7	4.5	6	8	11^{B}

Means with two different letters are significant different at ($P \leq 0.05$).

Table2.Correlation coefficients between thoracic circumference and physical body measurements of growing White New Zealand rabbit does.

Traits	TC	AC	BW	BL	HL	FLL	HLL	ELL	TL
Thoracic Circumference (TC)		0.90	0.92	0.87	0.65	0.72	0.74	0.68	0.68
Abdominal Circumference (AC)			0.89	0.85	0.61	0.73	0.71	0.64	0.65
Body weight (BW)				0.84	0.75	0.76	0.73	0.62	0.58
Body length (BL)					0.75	0.66	0.64	0.75	0.51
Head length (HL)						0.73	0.76	0.79	0.54
Fore-leg length (FLL)							0.77	0.74	0.63
Hind-leg length (HLL)								0.78	0.55
Ear loop length (ELL)									0.65

All correlation coefficients were highly significant ($P \leq 0.05$).

Table 3. Means ±SE of blood serum metabolites of growing White New Zealand rabbits during lactation period and up to marketing age (10- weeks).

Blood Metabolites	Normal Weaning At 5 weeks					Delayed Weaning At 8 weeks				
	3rd	5th	7th	8th	10th	3rd	5th	7th	8th	10th
Total Protein (g/dl)	4.15	4.3	4.4	5.2^{A}	5.3^{A}	4.2	4.5	4.6	6.2^{B}	6.7^{B}
±SE	0.43	0.28	0.11	0.26	0.33	0.15	0.28	0.19	.47	0.52
Total Lipids	341	336	326	315	320	350	310	318	319	311
(mg/dl) ±SE	6.42	5.12	5.53	7.39	7.56	5.59	6.48	5.36	4.38	6.76
Creatinine	1.2	1.3	1.5	1.3	1.5	13	1.4	1.5	1.6	1.6
(mg/dl) ±SE	0.02	0.03	0.05	0.06	.07	0.07	0.02	0.03	0.05	0.07
Urea-N	12.5	14.2	15.46	16.2^{A}	18.3^{A}	13.42	14.8	15.76	18.9^{B}	20.66^{B}
(mg/dl) ±SE	0.26	0 .73	0.64	0.93	0.76	0.56	0.28	0.56	0.28	0.85
Blood Glucose	250	256	267	272	279.5	249	259	272	281	286
(mg/dl) ±SE	4.22	7.31	5.64	5.50	6.43	7.26	5.61	5.39	8.64	6.84

Means with two different letters are significant different at (P 0.05).

References

Adam, T., Borka, G., Pacs, I., Medgyes, I. and Hecser, G. (1986). Effects of age at weaning and transfer and environment at temperature on fattening performance of rabbits in large-scale units. Allat.Takarm., 35, 541-547.

Bednarz, M. and Frindt, A. (1978). Effect of age at weaning on growth to 10 weeks old 10 weeks old NZW rabbits. Rocznik Nauk Rolniczych, B, 99, 99 – 105.

Bos, C., Gaudichon, C. and Tome, Danie, T. (2000). Nutritional and physiological criteria in the assessment of milk protein quality for humans. J. American College of Nutrition, Vol. 19, No. 90003, 191-205.

Britton JR, Kastin AJ: Biologically active polypeptides in milk. Am J Med Sci 301: 124–132, 1991.

Duncan, D.B. (1955). Multiple range and multiple " F " Test. *Biometrics*,11 : 1 – 42.

Fraga, M. J., Torres, A., Pérez, E., Gálvez, J. F. and de Blas, J. C. (1978). Body composition in suckling rabbits. J. Anim Sci. 1978. 47:166-175

Gallois, M., Gidenne, T., Tasca, C., Caubet, C., Coudert, C., Milon, A. and Boullier, S. (2007). Maternal Milk Contains Antimicrobial Factors That Protect Young Rabbits from Enteropathogenic *Escherichia coli* Infection. Clinical and Vaccine Immunology, May 2007, p. 585-592, Vol. 14, No. 5.

Labas, F., Coudert, P. Rochambeau H. and Thebault, R. (1997). The reabbit, husbandry, health and production, FAO, Rome.

Larson, B. L. (Editor). 1995. Lactation. Iowa State University Press. (Chapter 5).

Petersen, J., Klausdeinken, F.-J. and Gerken, M. (1992). Influence of weaning age on development of live-weight and food consumption in young rabbits. J. Appl. Rabbit Res., 15: 856 – 863.

Rennie M. J., Smith, K. and Watt, P. W. (1994). Measurement of tissue protein synthesis rates in vivo: an optimal approach. Am J Physiol 266: E298–E307.

Schanbacher FL, Talhouk RS, Murray FA: Biology and origin of bioactive peptides in milk. Livestock Production Science 50: 105–123, 1997.

SPSS for Windows, 1997. Version 8.0, Copyright SPSS Inc.

Steel R G D and Torrie J H 1980 Principles and Procedures of Statistics. A Biometrical Approach, 2nd Edition. McGraw -Hill Book co. New York, USA.

Young V. R. and Pellett, P. L. (1989). How to evaluate dietary protein. In Barth CA, Schlimme E (eds): "Milk Proteins: Nutritional, Clinical, Functional and Technological Aspects." New York: Springer-Verlag, pp 7–36.