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RETINOL CONTENTS IN LIVER OF CALVES TO 18 MONTHS OF AGE FROM DIFFERENT BREEDS

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Summary,

Investigated is the content of retinol in livers of 135 calves from 5 different breeds. The animals were devided by sex and age : sucklings, 6, 12, 15, and 18 months.

Established is a correlation between the retinol content and the slaughter weight of the animals. It was found that the retinol was within the limits of 12579 to 21826 I.U. to 100 g fresh liver, taken as a mean for all age groups.

The data obtained in these investigations are given in tables and graphs.

СОДЕРЖАНИЕ РЕТИНОЛА В ПЕЧЕНИ ТЕЛЯТ РАЗЛИЧНЫХ ПОРОД ВОЗРАСТОМ ДО 18 МЕСЯЦЕВ

Резюме

Исследовано содержание ретинола в печени 135 телят пяти различных пород. Животные разделены по полу и возрасту на группы: сосуны, 6-, 12-, 15- и 18-месячные.

Установлена зависимость между содержанием ретинола и убойным весом животных. Обнаружено, что ретинол находился в границах от 12597 до 21826 м.е./100 г свежей массы в среднем для всех возрастовых групп.

Данные, полученные при этих исследованиях, указаны в таблицах и графиках к тексту.

DER RETINOLGEHALT DER LEBER BEI KÄLBERN VERSCHIEDENER RASSEN IM ALTER VON 18 MONATEN

Zusammenfassung,

Untersucht wurde der Retinolgehalt der Leber bei 15 Kälbern verschiedener Rassen.Die Versuchstiere waren Saugkälber im Alter von 6, 12, 15 und 18 Monaten, auch nach Geschlecht eingeteilt.

Dabei wurde Anhängigkeit zwischen dem Retinolgehalt und Schlachtgewicht ermittelt. Im Durchschnitt lag der Retinolgehalt bei allen Altersgruppen in den Gränzen von 12579 bis 21826 I.E. 100 g frische Masse.

Die Versuchsergebnisse wurden in Tabellen und Abbildungen aufgefürt.

Data for retinol content in the separate animal tissues and organs is very scarce. Significant are the differences in the investigations of different authors for the retinol content in the livers of calves and beef (table 1)

Kislaitis et al (1965)9/ announce that the retinol content in the liver of calves; beef and pig vary from 700 to 40.000 I.U. to 100 gr.

Very limited is data for retinol content in meat and organs of beef in connection with feed quality and feeding regime.

Table 1.

AUTHOR	Retinol I.U. to 100 gr	
	Calf	Beef
Harms (1942)[1/]	12100	61800
Moore and Payne (1942)[2/]	6300	15100
Simola (1945)[3/]	2790	69950
Kudrjashova (1948)[4/]	3900	14400
Watt and Merrill (1950)[5/]	22500	43900
Schweigert and Payne (1956)[6/]	-	50000
Sterling (1965)[7/]	-	18200 - 150600
Antila and Niinivaara (1966)[8/]	-	38959 - 101150

Antila et al (8) explain the relatively high value of retinol in the investigated by them liver with the feed influence, as all samples were taken while the cattle were on pastures in the summer.

Nakonetchnyi (4) finds differences in the quantity of retinol in the liver of beef during the different months of the year.(table 2)

Table 2.

Month of the investigation	Retinol I.U. to 100 gr		
	from	to	mean
june	40970	91500	63190
october	37500	50060	40370
december	2340	29500	14080

The authors of the present study undertook to follow the retinol content in liver of calves to 18 months of age from the basic breeds of cattle in this country.

Material and Methods.

Investigated is liver of 135 calves from the breeds "Bulgarian Simental", "Black spotted duch", "Bulgarian brown", "Bulgarian red", and "Grey Iskar" from the time of weaning to 18 months, all in egalized groups after the method of analogues (table 3). The animals were reared and fed under same conditions. Treatment of the analogue groups was made in the slaughter house, after a 24 hours no feed period.

The samples for retinol content were taken always from the

middle part of the liver, latest 2 hours after slaughter of the animals.

Table 3.

Breed	1 month		6 months		12 months		15 months		18 months	
	m	fm	m	fm	m	fm	m	fm	m	fm
Bulg Sim.	3	-	5	-	9	5	10	5	10	5
Black D.	-	-	5	-	5	-	-	-	5	-
Bulg Brown	-	-	-	-	5	5	-	5	5	5
Bulg Red	-	-	-	-	5	5	5	5	4	4
Grey Iskar	-	-	5	-	5	-	-	-	5	-

The retinol content was determined after the colorimetric method of Carr-Price (10,11). The calculations were made on ca libbated curve. All data were biometrically treated after the method of Merkurieva, while reliability of the difference was established after the tables of Student (12).

Results and Discussion.

Mean slaughter weights and mean weight of livers from the calves by breeds and age groups are given in table 4. From the data given in table 4 is seen, that highest slaughter weight and highest weight of liver have the calves to 18 months of age from the breeds "Bulgarian Simental", "Black spotted Dutch", and "Bulgarian Brown".

On table 5 are given the results for the quantities retinol in liver in accordance with breed, age and sex. In all breeds is noted decrease in the vitamine content with the animals of 18 months of age. Highest vitamine content is noted with animals of 12 and 15 months of age.(fig 1).

Very low is the retinol content in livers of 6 months old calves from the "Bulgarian Simental" breed, which can be explai ned with alteration of the feeding regime.

The mean quantity of retinol found in livers of calves in accordance with age, with the different breeds and sex is within the limits of 12597 to 27 217 I.U. to 100 g gresh liver (fig 2).

In other our investigations (13) with animals of 12 to 18 months of age from different breeds we have found, that with animals reared and fed under different regimes, the retinol con tent in the liver vary between the limits of 9660 to 27337 I.U. to 100 g fresh liver.

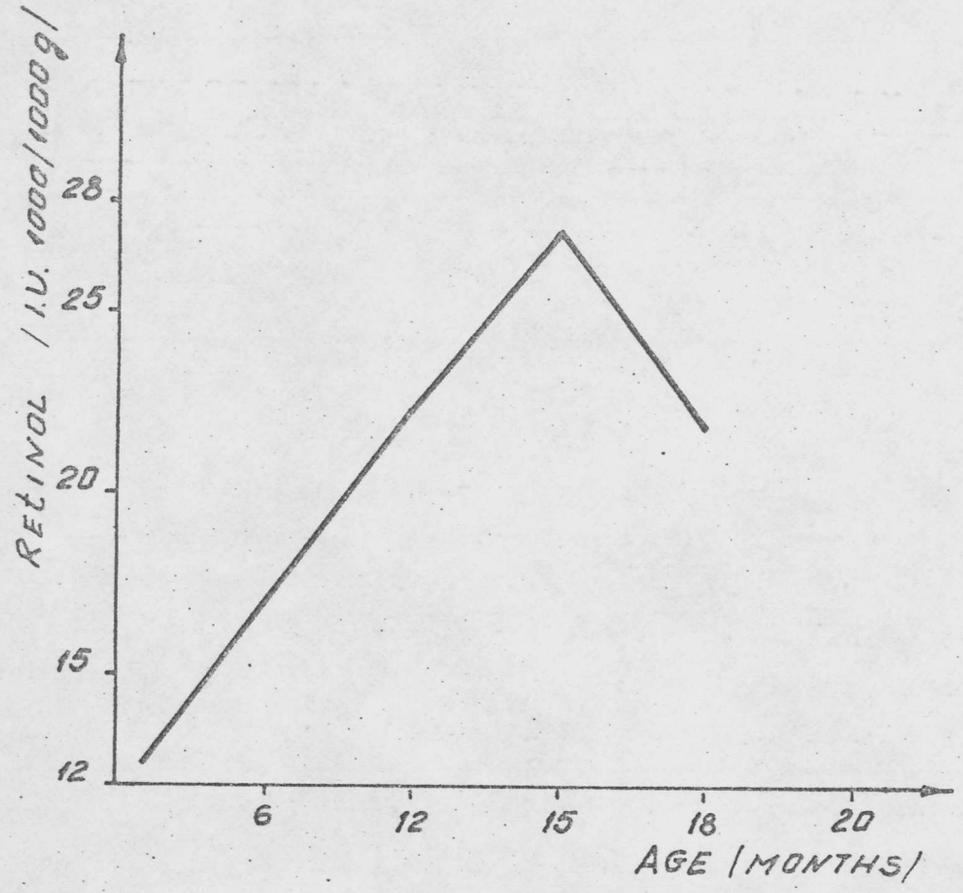
RETINOL /I.U. 1000/1000g/
28
25
20
15
12
6
12
15
18
20
AGE /MONTHS/

Fig. 1

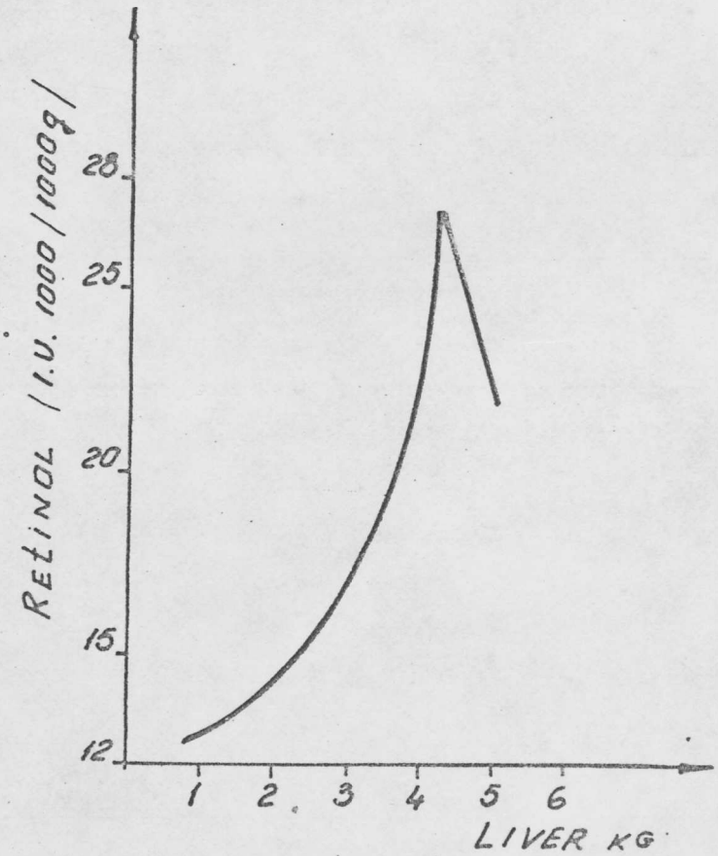
RETINOL /I.U. 1000/1000g/
28
25
20
15
12
1
2
3
4
5
6
LIVER KG

Fig. 2

Table 4.

Breed	Age									
	1 month		6 months		12 months		15 months		18 months	
	Sl wght/ liver wght		Sl wght/ liver wght		Sl wght/ liver wght		Sl wght/ liver wght		Sl wght/ liver wght	
B.S. m	27,9	0,787	93,0	2,38	197,0	4,38	234,2	4,45	293,7	5,38
fm	-	-	-	-	174,4	4,15	223,0	5,12	278,8	5,02
Bl.D.m	-	-	117,6	3,59	181,6	4,22	-	-	280,4	5,21
fm	-	-	-	-	-	-	-	-	-	-
B.Br.m	-	-	-	-	165,4	3,79	-	-	280,0	4,96
fm	-	-	-	-	162,2	3,94	179,6	3,60	234,6	4,46
B .R.m	-	-	-	-	173,0	4,06	211,8	4,87	247,0	4,46
fm	-	-	-	-	147,4	3,56	181,4	3,92	216,7	4,96
B.I. m	-	-	89,2	2,73	142,0	3,43	-	-	237,6	4,95
fm	-	-	-	-	-	-	-	-	-	-

The values for retinol in the liver vary according to live weight and age, on condition that the feed ration of the animals was unchanged. With feeding the animals with balanced rations during the different seasons of the year, the retinol content in the liver is almost the same with the different breeds and ages. With the growing of the calves, the quantity of retinol to gr tissue in the liver changes. This is most expressively seen with six months old animals.Possibly in this age body growing and de velopment of the animals, and also for the liver, is most inten sive.

Table 5.

Breed	Age				
	1 month	6 months	12 months	15 months	18 mnths
B.S. m	12597	7744	13949	28796	24214
fm	-	-	11089	30560	24001
Bl.D.m	-	16735	27452	-	19362
fm	-	-	-	-	-
B.Br.m	-	-	35542	-	16339
fm	-	-	19972	24402	23075
B.R. m	-	-	20874	25489	25396
fm	-	-	20874	26338	23705
B.I. m	-	26391	28645	-	18513
fm	-	-	-	-	-

For all groups P 0,01 to 0,001 in the limits of +0,002 to + 1,07
-0,03 to - 0,85

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