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Effect of Nutritional Treatments on the Productive Performance of Brown Swiss Male Calves

2. Carcass Characteristics

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FIFTY-EIGHT Brown Swiss calves of about 9 months age and 189 kg live body weight were divided into four experimental groups of 15, 16, 14 and 14 animals respectively for groups I, II, III and IV. Two levels of feeding (medium and high) with two levels of concentrate : roughage (3:1 and 2:1) were tested. So, the four experimental animal groups represented, medium level of feeding with 3C : 1R ratio, medium level with 2C : 1R ratio, high level with 3C : 1R ratio and high level with 2C : 1R ratio, respectively for groups I, II, III and IV. The experiment lasted until animals reached 550-600 kg. For about 17 months). Three animals from each group were slaughtered at 450-500 kg and at 550-600 kg. to study the effects of plane of nutrition and changes of live body weight on carcass characteristics.

Results showed that the average slaughter age of the four experimental groups was nearly similar and was about 21 months at the first slaughter and 26 months at the second slaughter.

Averages of dressing percentage were higher for groups received the high level of feeding than those of the medium level. However, dressing percentages were not significantly affected by C :R ratios.

Animal groups received the high level of nutrition showed higher values of boneless weight and percentage of boneless and lower values of bone percentage than those received the medium level. The different ratios of C:R did not affect significantly neither boneless meat percentages nor bone percentage.

The present results indicated that as the live weight increased, percentage of boneless meat and meat : bone ratio significantly increased and bone percentage significantly decreased.

The data showed that neither levels of feeding nor C:R ratios had significant effects on the eye muscle area. The same results were obtained regarding fore-and hind quarters percentages.

At the first slaughter, no significant differences in chemical composition of the eye muscle were observed neither between the two levels of feeding nor between the two C:R ratios, however, ether extract content was higher with groups received ration of 3C : 1R ratio than those received ratio of 2C : 1R ratio. At the second slaughter, fat content of the eye muscle increased significantly by increasing level of feeding.

Data concerning the effect of plane of nutrition and changes of live body weight on non-visceral and visceral offals were also investigated.

The effect of plane of feeding on the carcass traits have been studied by many workers. Henrickson, *et al.*, (1965) on Hereford bullocks and Finzi, *et al.*, (1968) on Brown Alpine cattle found non significant effect of high and moderate planes of nutrition on dressing percentage. Callow, (1961) found that a high plane of nutrition has often been shown to increase the proportion of fat in carcass without any effects on muscle : bone ratios. On the other hand, Guenther, *et al.*, (1965) found that Hereford steers fed on high plane of nutrition always had less bone percentage than contemporaries given diet of lower energy content. Moreover, Preston, *et al.*, (1963) showed that increasing the ME contents of the diet gave fatter carcass as measured by chemical composition of tenth rib cut. Also, Waldman, *et al.*, (1971) indicated that the effect of high level of feeding was to increase the proportion of *longissimus dorsi* muscle fat and decrease the proportion of moisture and protein than medium level.

With respect to the effect of concentrate : roughage ratios of the rations on carcass traits, Lister, *et al.*, (1968), and Preston and *Willis*, (1969) reported that dressing percentage increased as the concentrate part in ration increased. However, Levy, *et al.*, (1976) and Ferret, *et al.*, (1962) found no effects of C:R ratios on dressing percentages. Swan and Lamming, (1970), found that the percentage of carcass fat increased from 14.9 to 19.2 with increasing concentrate in the diet from 30 to 7%. El-Ashry, *et al.*, (1972), reported that the boneless meat percentage did not significantly differ when Friesian calves were fd 50 and 80% concentrate containing ratios.

The present work was conducted to study the effect of two planes of feeding (moderate and high levels) and two ratios of concentrate : roughage (3:1 and 2:1) on the dressing percentage, boneless meat percentage and chemical composition of meat of Brown Swiss male calves.

Material and Methods

Fifty-eight male Brown Swiss calves of about 9 months of age and 189.0 kg live body weight were divided into four experimental groups of 15 animals in groups I, II and 14 animals in groups III, IV. The averages initial ages and weights of the animals were, 275.6, 284.0, 276.0 and 261.6 days ; 190.5, 189.0, 187.5 and 187.4 Kg, respectively for groups I, II, III and IV. Four experimental treatments were tested. The treatments included two levels of feeding; medium (allow 0.8 kg daily gain/animal) and high (allow 1.2 kg daily gain/animal). Within each level of feeding two ratios of concentrate (C) : roughage (R) were used ; 3:1 and 2:1 on starch equivalent (SE) basis. So, the four experimental animal groups represented ; meduim level of feeding with 3C : 1R ratio (I), medium level with 2C : 1R ratio (II), high level with 3C : 1R ratio (III) and high level with 2C : 1R ratio (IV).

Calves were tied to individual feeding stalls and allowed to drink three times daily. At the end of the growth period, three animals from each group were slaughtered at average weights from 450-500 kg. The rest of the animals were fed the same treatments until reaching 550-600 kg. Also, three more animals from each group were slaughtered at these final weights to study the effects of plane of nutrition and changes of livebody weight on carcass characteristics.

The experimental ration consisted of a local Co-op-concentrate feed mixture, berseem hay and rice straw. The co-op-feed mixture consisted of 40% undecorticated cotton-seed cake, 26% wheat bran, 20 corn, 7% cane molasses, 4% rice bran, 2% limestone and 1% salt.

Chemical composition of the feedstuffs used is given in Table 1. Animals were fed according to El-Ashry allowances (1980).

Table (1):- The chemical analysis of feedstuffs used (%)

Feedstuffs	Moisture %	On dry matter basis				
		Crude protein %	Crude fiber %	Ether extract %	Ash %	NFE %
Co-op feed mix.	11.6	21.0	20.2	2.9	13.6	42.3
Rice straw	9.1	2.3	36.7	1.2	19.6	40.2
Hay	12.0	12.8	25.1	2.7	13.0	46.4

Results and Discussion

The average slaughter age of the four experimental groups was nearly similar and was about 21 months at the first slaughter and 26 months at the second slaughter.

a) *Dressing out percentage*

Results of Tables 2 and 3. indicated that averages of dressing percentages at the first and second slaughters based on either fasting live weight or empty weight were higher for groups received the high level of feeding than those of the medium level. However, the differences were significant ($P < 0.05$) in the case of the dressing percentage of the first slaughter calculated on empty weight basis. Zalewski, *et al.*, (1977), found that dressing percentage of Polish Black-and-White calves was about 1% unit more on high plane of feeding compared to moderate plane of nutrition. Finzi, *et al.*, (1968), Platikanov, *et al.*, (1971) and Shimizu, *et al.*, (1976) showed that carcass yields were not significantly different on high or low plane of nutrition. However, Guenther, *et al.*, (1965) found that dressing percentage of half-sib Hereford steers was higher significantly on high than on high than on moderate plane of nutrition.

The present results showed that dressing percentages were not significantly affected by C:R ratios either at the first or the

second slaughter. These results are in agreement with those obtained by Theurer, *et al.*, (1973), Levy, et al., (1976) and Ferret, *et al.*, (1982).

TABLE 2. Mean weights (kg) of carcasses, dressing and boneless meat percentages and carcass composition for different groups. (First slaughter).

Item		Group I	Group II	Group III	Group IV
Fasting weight (kg)		452.33	450.33	494.33	470.00
Empty weight (kg)		402.65	399.23	438.02	418.52
Hot carcass weight (kg)		250.33	258.67	286.67	275.50
Dressing percentage (%):					
Based on fasting weight	*	55.10	59.93	60.69	61.03
	**	55.35	57.42	57.99	58.63
Based on empty weight	*	65.24	67.61	68.46	68.55
	**	62.14	64.78	65.42	65.84
Boneless weight (kg)		202.80	211.08	236.26	225.97
Percentage of boneless (%)		81.01	81.60	82.39	82.02
Bone weight (kg)		45.84	45.14	47.44	47.21
Percentage of bone (%)		18.31	17.45	16.55	17.14
Meat:bone ratio		4.53	4.77	5.12	4.85
Eye muscle area cm^2		102.37	112.98	107.43	102.12
Left side carcass weight (kg)		126.33	129.00	141.67	138.00
Fore-quarter(FQ)weight (kg)		68.00	68.17	75.67	73.50
Percentage of (FQ) %		53.84	53.08	53.45	53.26
Boneless meat of(FQ)weight(kg)		53.84	54.95	63.43	60.05
Hind-quarter(HQ)weight(kg)		58.33	60.50	66.00	64.50
Percentage of (HQ) %		46.16	46.92	46.55	46.74
Boneless meat of(HQ)weight(kg)		47.83	51.00	55.67	53.67

* Carcass with liver, heart, kidneys and testes.

** Liver, heart, kidneys and testes were excluded.

b) *Boneless meat*

The averages of absolute and relative weights of boneless meat of the whole carcass, the hind quarter (HQ) and fore quarter (Eq) for the different groups at the first and second slaughters are shown in Tables (2) and (3). The data indicated that groups received the high level of feeding had higher values of boneless weight and percentage of boneless in both the first and second

slaughters. However, the differences were significant only regarding the second slaughters. Karadjole, *et al.*, (1978), indicated that on high plane of nutrition, significantly higher carcass yield was obtained with more fat and less bone, however, muscle meat was not affected. Drennan, (1979) found that plane of nutrition did not affect the overall carcass composition or distribution of lean meat, fat or bone in carcass.

Table (3):- Mean weights (kg) of carcasses, dressing and boneless meat percentages and carcass composition for different experimental groups. (second slaughter).

Item		Groups			
		I	II	III	IV
Fasting weight (kg)		594.00	537.33	546.67	609.33
Empty weight (kg)		525.62	464.28	477.12	526.53
Hot carcass weight (kg)		362.00	314.67	324.67	368.33
Dressing percentage (%):					
Based on fasting weight	*	63.26	60.88	61.95	63.03
	**	60.87	58.43	59.40	60.38
Based on empty weight	*	71.50	70.50	70.98	72.94
	**	68.79	67.66	68.06	69.88
Boneless weight (kg)		302.05	262.07	275.17	312.06
Percentage of boneless (%)		83.44	83.21	84.76	84.67
Bone weight (kg)		56.28	48.01	45.96	51.63
Percentage of bone (%)		15.56	15.37	14.16	14.06
Meat:bone ratio		5.36	5.45	6.00	6.04
Eye muscle area (cm^2)		114.11	110.28	104.90	109.57
Left side carcass weight (kg)		181.83	156.67	162.83	185.50
Fore-quarter(Fq)weight (kg)		100.33	85.50	87.83	101.33
Percentage of (Fq) (%)		55.09	54.48	53.94	54.55
Boneless meat of (Fq)weight (kg)		83.83	71.33	74.83	85.83
Hind-qaurter(Hq)weight (kg)		81.50	71.17	75.00	84.17
Percentage of (Hq)	(%)	44.91	45.52	46.06	45.45
Boneless meat of(Hq) weight(kg)		69.00	60.17	63.83	71.83

* Carcass with liver, heart, kidneys and testes.
** Liver,heart, kidneys and testes were excluded.

No significant differences were found between boneless meat percentages for groups fed the different C:R ratios at both the first and second slaughters. These results are in close agreement with those reported by Ellis (1965), Wise, *et al.*, (1968), Levy, *et al.*, (1976) and Stepanov, *et al.*, (1982).

It is found that bone percentage significantly ($P < 0.05$) decreased as the level of feeding increased. Guenther, *et al.*, (1965), Martin, *et al.*, (1966), Swan and Lamming, (1967), Kelly, *et al.*, (1968) and Andersen (1975) reported a reduction in carcass bone with increasing level of feeding. Bone percentages observed in this experiment were not affected significantly by the ratios of C:R.

It has to be pointed that the high level of feeding had a significantly ($P < 0.05$) higher muscle : bone ratio than that of the moderate level. These results are in accordance with those observed by Guenther, *et al.*, (1965) and Butterfield, *et al.*, (1971. On the contrary, Callow (1961) and Henrckson *et al.*, (1965), showed no difference in muscle : bone ratio in carcass from steers fed different planes of nutrition. No significant differences were found among groups fed 3 : 1 or 2 : 1 concentrate : roughage ratios regarding muscle : bone ratio. This trend agreed with McCullough (1970) and Levy and Holzer (1971).

The correlation between liveweight (at the first and second slaughters) and boneless meat percentage, bone percentage and meat : bone ratio were studied. A positive correlation between liveweight and boneless meat percentage, and between liveweight and meat : bone ratio was found. As the live weight increased, percentage of boneless meat and meat : bone ratio increased significantly ($P < 0.01$). On the contrary, as the liveweight increased the bone percentage significantly ($P < 0.01$) decreased. Such results are in accordance with those of Kropf and Grof (1959), Tullah and Martiz (1965), Berg and Butterfield (1968), Takeshita, *et al.* (1973) and Geay, *et al.* (1975).

The present data indicated that neither levels of feeding nor C:R ratios had significant effects on the eye muscle area (*Longissimus Dorsi*) between the 9*th* and 10*th* rib. These results are in full agreements with those of Hironaka and Kozub, (1973) and Russo, *et al.* (1983). However, Lamming, *et al.* (1966), Hiner and Bond (1971) and Sully and Morgan, (1982) found that steers fed high level of feeding had larger eye muscle area at the 12-13 rib than those of steers on low level of feeding.

c) *Fore and hind quarters*

Data of Tables 2 and 3 showed that there were no significant differences either between levels of feeding or between C:R ratios groups in fore-and hind quarters percentages. The correlation studies indicated that as animals weights increased, forequarter percentages significantly ($P < 0.05$) increased while those of hindquarter significantly decreased ($P < 0.05$). These results are in agreement with those reported by Fredeen, *et al.*, (1971) who found that there was a tendency for hindquarter to decrease by increasing liveweight.

1) *Chemical composition of the tenth rib*

Chemical analysis of the longissimus dorsi muscle at the 10*th* rib for calves of different groups at the first and second slaughters is presented in Tables 4 and 5. The data indicated that at first slaughter, no significant differences in chemical composition were observed neither between the two levels of feeding nor be-

Table (4):- Chemical composition of the Longissimus dorsi muscle. (First slaughter)

Item	Allowances for 0.8kg daily gain		Allowances for 1.2kg daily gain	
	G.I C:R 3:1	G.II C:R 2:1	G.III C:R 3:1	G.IV C:R 2:1
Moisture %	74.15	75.15	73.69	74.63
Crude protein %	22.10	21.20	22.13	21.65
Ether extract %	2.15	1.86	2.61	2.03
Total ash %	0.97	0.99	0.95	0.98
Glycogen(by difference) %	0.63	0.80	0.62	0.71
Composition on dry basis:				
Crude protein %	85.49	85.35	84.19	85.35
Ether extract %	8.33	7.49	9.87	8.01
Total ash %	3.76	3.98	3.62	3.86
Glycogen(by difference)%	2.42	3.18	2.32	2.78

tween the two C:R ratios, however, ether extract content was higher with groups received ration of 3C : 1R ratio than those received ration of 2C : 1R ratio. These results are in agreement with that of Andersen, (1975). Regarding the second slaughter, data of Table (5) showed also that neither level of feeding nor C:R ratios significantly affected chemical composition, however, fat content increased significantly ($P < 0.05$) by increasing the level of feeding. Garrett, (1971), Waldman, *et al.*, (1971) and Radloff, *et al.*, (1974) reported that high plane of nutrition increases the percentage of fat.

Table (5):- Chemical composition of the Longissimus dorsi muscle.(Second slaughter) .

Ite m		Groups			
		I	II	III	IV
Moisture	%	76.29	76.10	74.08	74.72
Crude protein	%	19.64	19.86	19.90	19.92
Ether extract	%	2.18	2.10	3.88	3.38
Total ash	%	0.97	0.96	0.99	1.03
Glycogen (by difference)	%	0.92	0.98	1.15	0.95
Composition on dry basis:					
Crude protein	%	82.95	83.12	76.87	78.87
Ether extract	%	9.09	8.77	14.87	13.30
Total ash	%	4.11	4.01	3.82	4.05
Glycogen	%	3.85	4.10	4.44	3.78

It has been clearly shown (Table 5) that by aging, the fat content increased which indicated that deposition of fat in red meat occurred only at older ages, when marked amounts were already accumulated under the skin and around the internal organs. These results agree with those of De Ramos (1969), Kondratenva, (1971) and Antal (1977).

e) *Offal components*

The absolute and relative weights of offal components into non-visceral and visceral offals are shown in Tables 6 and 7. Analysis of co-variance of the present data indicated no significant differences for non-visceral offal components weights as a percentage of fasting live weight between animals fed high level of feeding and those fed moderate level except that head percentage of the second slaughter was significantly ($P < 0.05$) higher for the high than that of the moderate level of feeding. There were no significant differences between animals fed the different C:R ratios.

Table (6):- Mean absolute weights (kg) and weights of offal components as a percentage of fasting live weight for different groups. (First slaughter).

Item	G.I		G.II		G.III		G.IV	
	kg	%	kg	%	kg	%	kg	%
Non-visceral offal:								
Head	24.16	5.34	24.10	5.35	25.67	5.19	24.90	5.30
Feet	11.22	2.48	10.93	2.43	11.85	2.40	11.54	2.45
Tail	1.58	0.35	1.84	0.41	1.87	0.38	1.73	0.37
Hide	34.83	7.67	31.50	6.99	33.33	6.73	34.17	7.27
Visceral offal:								
Lungs and Trachea	4.47	0.99	3.49	0.77	4.08	0.83	3.79	0.81
Oesophagus	0.47	0.10	0.46	0.10	0.51	0.10	0.46	0.10
Diaphragm	2.22	0.49	2.22	0.48	2.38	0.48	2.07	0.44
Heart	1.83	0.41	1.67	0.37	1.88	0.38	1.80	0.38
Liver	5.33	1.18	5.04	1.12	5.24	1.05	5.37	1.14
Kidneys	1.08	0.24	0.96	0.21	1.08	0.22	1.09	0.23
Splean	1.12	0.25	0.93	0.20	0.96	0.19	0.83	0.18
Genital tract	2.37	0.53	2.90	0.64	2.56	0.52	2.10	0.45
Testes	0.70	0.16	0.70	0.16	0.73	0.15	0.64	0.14
Stomach full	52.00	11.48	54.00	11.99	60.17	12.14	52.33	11.15
Stomach empty	12.02	2.65	12.04	2.67	12.93	2.62	12.40	2.64
Intestines full	20.27	4.48	19.47	4.32	19.13	3.88	22.50	4.78
Intestines empty	10.71	2.37	10.33	2.29	10.03	2.04	10.96	2.33
Kidneys fat	1.96	0.43	1.40	0.31	2.84	0.57	0.98	0.21
Stomach fat	1.73	0.38	1.51	0.34	3.28	0.66	1.14	0.24
Intestines fat	1.22	0.27	1.40	0.31	2.07	0.42	1.12	0.24

The correlation between liveweight increased the non-visceral offal components percentages did not differ significantly. These results agree with those found by Seebeck (1967).

Table (7):- Mean absolute weights (kg) and weights of offal components as a percentage of fasting live weight for different groups.
(Second slaughter) .

Item	Groups							
	I		II		III		IV	
	kg	%	kg	%	kg	%	kg	%
Non-Visceral offal:								
Head	32.97	5.56	31.00	5.79	28.27	5.17	30.63	5.02
Feet	14.60	2.46	13.93	2.61	12.90	2.36	14.11	2.32
Tail	2.35	0.40	2.03	0.38	1.77	0.32	2.33	0.38
Hide	44.67	7.60	43.00	8.00	42.47	7.77	44.33	7.28
Visceral offal:								
Lungs and Trachea	5.25	0.88	4.22	0.79	4.38	0.80	4.83	0.79
Oesophagus	0.58	0.10	0.45	0.08	0.48	0.09	0.53	0.09
Diaphragm	3.37	0.57	2.85	0.53	3.07	0.56	3.32	0.55
Heart	2.47	0.42	2.44	0.46	2.50	0.46	2.78	0.46
Liver	5.92	1.00	5.78	1.07	5.92	1.08	6.98	1.15
Kidneys	1.25	0.21	1.27	0.24	1.17	0.22	1.40	0.23
Spleen	1.16	0.20	1.05	0.19	1.10	0.20	1.24	0.20
Genital tract	1.96	0.33	1.92	0.36	1.52	0.28	2.23	0.37
Testes	0.97	0.16	0.88	0.17	0.84	0.15	0.92	0.15
Stomach full	65.50	11.03	70.33	13.11	67.50	12.36	81.83	13.41
Stomach empty	14.40	2.43	14.11	2.63	13.21	2.41	16.11	2.64
Intestines full	28.67	4.79	27.17	5.08	24.67	4.51	28.83	4.73
Intestines empty	11.39	1.92	10.18	1.91	10.04	1.83	11.75	1.93
Kidneys fat	1.22	0.21	0.78	0.14	1.28	0.23	1.67	0.27
Stomach fat	2.79	0.47	3.26	0.59	4.86	0.89	5.24	0.86
Intestines fat	3.59	0.61	3.33	0.61	4.26	0.78	5.15	0.85

With respect to the visceral offal components, data indicated that neither level of feeding nor C:R ratios affected significantly weights of lungs and trachea, oesophagus, muscles of diaphragm, heart, liver, kidneys, spleen, genital tract, testes and full and empty stomach and intestines as a percentage of fasting liveweight basis. However, a significant difference was found in genital tract percentage between the two C:R ratios at the second slaughter.

Level of feeding had no significant effect on the fat of kidneys, stomach and intestines percentages at the first slaughter. Animals received the high concentrate ratio (3C : 1R) had significantly ($P < 0.05$) higher kidneys and stomach fat percentages than those on the high roughage ratio (2C : 1R). These results are in agreement with those found by Henning, *et al.*, (1979) and Knotek (1980).

It was found that by increasing age, the percentages of stomach and intestines (full and empty) did not differ significantly except intestines empty weight as a percentage of fasting liveweight, which decreased significantly ($P < 0.05$) by increasing live-weight.

Levels of feeding increased significantly ($P < 0.05$) stomach fat but no significant differences were detected either between levels of feeding or between C:R ratios on kidneys fat and intestines fat percentages at the second slaughter.

The present data showed that by advancing in age, kidneys fat significantly decreased ($P < 0.05$) and stomach fat and intestines fat significantly increased. These results are in harmony with those obtained by Luitingh (1962) and Seebeck (1967).

References

Andersen, H.R. (1975) Effect of slaughter weight and level of feeding on growth rate, feed conversation and carcass composition. **Livestock Prod. Sci., (1975), 341-355.**

Antal. J. (1977) Production of beef with a low content of **fat. Nut. Abst.** and Rev. 48, 72.

Berg, R.T., **and Butterfield, R.M.** (1968) Growth patterns of bovine muscle, fat and bone. **J. Anim. Sci., 27, 611.**

Butterfield, R.M. ; **Johnson, E.R., and Pryor, W.J.** (1971) A study of growth in calves-1-Carcass tissues. **J. Agric. Sci., 76, 458.**

Callow, E.H., (1976) Comparative studies of meat-7- A comparison between Hereford, Dairy Shorthorn and Friesian steers on four levels of nutrition. **J. Agric. Sci. 56, 265.**

De Ramos, M.B., (1969) The growth pattern of various body and carcass parts and proportions of beef steers as influenced by different planes of nutrition. **Nut. Abst. and Rev., 41, 685.**

Drennan, M.J., (1979) Compensatory growth in cattle-1- influence of feeding level during the first winter (9 to 14 months of age(on subsequent performance and carcass composition. **Nut. Abst. and Rev., 50, 530.**

El-Ashry, M.A. (1980) Lecturer in animal nutrition. Faculty of Agriculture. Ain Shams Univ. (In Arabic).

El-Ashry, M.A., **Mogawer, H.H. and El-Kishin,** S.S. (1972) Comparative study of meat production from cattle and buffalo male calves. **Egypt. J. Anim. Prod., 12, 99.**

Ellis, C.F. (1965) All concentrate feeding research. Feed stuffs **37, 50** (C. C. Wise **et al., 1968).**

Ferret, A. **Frigola, O. Ramon, J. Maymi, N. and Rebes, J.,** (1982) Production of beef bulls with part-roughage diets. (Utilization of maize silage). **Nut. Abst. and Rev., 53, 592.**

Finzi, A., **Giannotti, D., Mariani, P. and Trimarchi, G.,** (1968). Feeding trials with different plans of nutrition for production of fattened young Brown Alpine cattle. **Nut. Abst. and Rev., 38, 1344.**

Fredeen, H.T., Martin, A.H., **and Weiss, G.M.** (1971) Characteristics of youthful beef carcasses in relation to weight, age and sex-2- Carcass measurements and yield of retail product. **Canal. J. Anim. Sci., 51,** 279.

Garrette, W.N. (1971) Energetic efficiency of beef and dairy steers, **J. Anim. Sci., 32, 451.**

Geay, Y., Robelin, J., and Boecard, R. (1975) Fattening characteristics of Limousin cattle-1-Young cattle. **Nut. Abst. and Rev., 47, 254..**

Guenther, J.J., Bushman, D.H., Pope, L.E. and Morrison, R.D. (1965) Growth and development of the major carcass tissues in beef calves from weaning to slaughter weight, with reference to the effect of plane of nutrition. **J. Anim. Sci., 24 : 1184.**

Henning, A., Flachowsky, G. and Lonert, H.J. (1979) Studies of the use of pellets with coars feed fractions in calf rearing -6- Effect of various proportions of straw or solids derived from pig slurry on the slaughter data and the carcass composition of calves. **Nut. Abst. and Rev., 51, 260.**

Henrickson, R.L., Pope, L.S. and Hendrickson, R.F., (1965) Effect of rate of gain of fattening beef calves on carcass composition. **J. Anim. Sci., 24 : 507.**

Hiner, R.L. and Bond, J. (1971) Growth of muscle and fat in beef steers from 6 to 36 months of age. **J. Anim. Sci., 32, 225.**

Hironaka, R., and Kozub, G.C. (1973) Compensatory growth of beef cattle restricted at two energy levels for two periods. **Canad. J. Anim. Sci., 53, 709.**

Karadjole, I., Rako, A., Simunic, B., Premuz, F., Mullulec, K., Krizanovic, D. and Abram, K. (1978 Effect of different intakes of energy as roughage in feeds during fattening on fattening performance and quality of meat in fattening cattle. Nut. Abst. and Rev., 48 : 419.

Kelly, R.F. Fontenot, J.P., Graham, P.P., Wilkinson, W.S. and Kincaid. C.M., (1968) Estimates of carcass composition of beef cattle fed at different planes of nutrition. **J. Anim. Sci., 27 : 620.**

Knotek, S. (1980) Compensatory mixtures with gradually increasing proportions of straw for fattening beef cattle. **Nut. Abst. and Rev., 51, 92.**

Kondratenva, M.A. (1971) A comparison of the chemical composition of meat and interval fat in Simmental and Black Pied bulls. Nauch. Trudy Belorussk nauchnoissled Inst. Zhivot., 12, 72. (Russ).

Kropf. D.H. and Grof., R.L. (1959) The effect of carcass grade, weight and classification upon boneless beef yield. **J. Anim. Sci., 18, 85.**

Laraming, G.E. Swan, H. and Clarke, R.T. (1966) Studies on the nutrition of ruminants. -1- Substitution of maize by milled barley straw in a beef fattening diet and its effect on performance and carcass quality. Anim. Prod., 8, 303.

Levy, D., and Holzer, Z. (1971) The relative of concentrates and roughage for fattening cattle. Anim. Prod., 13, 569.

Levy, D. ; Holzer, Z., and Ilan, D., (1976) Effect of dietary energy content at different stages of growth on performance of intact male cattle. Anim. Prod., 22, 199.

Lister. E.E., Haemey, D.P. and Pigden. W.J. (1968) Performance of Holstein-Friesian steers fed on all concentrate ration diluted with ground hay. J. Dairy. Sci., 51, 1946.

Luitingh. H.C. (1962) Developmental changes in beef steers as influenced by fattening, age and type of ration. J. Agric. Sci., 58, 1.

Martin, T.G., Howard, R.D., Lance, G.T., Judge, M.L. and Albright, J.L. (1966) Effect of dietary regime on Holstein steers carcass. J. Anim. Sci., 20, 42.

McCullough, T.A. (1970) A study of the effect of supplementing a concentrate diet with roughages of different quality on the performance of Friesian steers. II-Growth rate, efficiency of feed conversion and carcass yield. J. Agric. Sci., 75, 337.

Platikanov, N., Cheshmedzhiev, B.V. and Zlatarev, G. (1971) Establishment of energy feeding standards for fattening young bulls. Comparison of methods of evaluting the energy value of feeds and diets. Nut. Abst. and Rev. 42, 1615.

Preston, T.R., Whitelaw, F.G., Aitken, J.N., MacDearmid, A. and Charleston, E.B. (1963) Intensive beef production. -1- Performance of cattle given complete ground diets. Anim. Prod., 5, 47.

Preston, T.R., and Willis, M.B., (1969) Sugar cane as an energy source of production of meat. Outlook in Agric., 6, 29.

Radloff, H.D., Riley, M.L. and Nygaard, L.J. (1974) Feedlot performance and carcass compositions of Holstein steers. Food Sci., and Tec. Abst., 12S 1674.

Russo, V., Bosi, P., and Gasini, L. (1983) Carcass characters of European and American Friesian given different levels of feeding. Nut. Abst. and Rev., 54, 351.

Seebeck, R.M., (1967) Developmental growth and body weight loss of cattle. 1. Experimental design, body weight growth, and the effects of developmental growth and body weight loss on the dressed carcass and the offal. Aust. J. Agric. Res., 18, 1015.

Shimizu, Y., Nlina, M. and Mori, T. (1976) Studies on fattening of beef cattle. 2. The dependance of the production of finishing steers on the final live weight. 3. Raising and finishing of Hereford steers applied with grazing. Nut. Abst. and Rev., 48, 182.

Stepanov, N. Epifanov, G., Agaev, Yu. and Dmitriev, A. (1982) Efficient use of concentrates for rearing and fattening of young cattle. Nut. Abst., and Fev., 53, 148.

Sully, R.J. and Morgan, J.H.L. (1982) The influence of feeding level and type of feed on the carcasses steers. Aust. J. Agric. Res., 33, 721.

Swan, H. and Lamming, G.E. (1967) Studies on the nutrition of ruminants. 2. The effect of level of crude fiber in maize-based rations on the carcass composition of Friesian steers. Anim. Prod., 9 : 203.

Swan, H. and Lamming, G.E. (1970) Studies on the nutrition of ruminants. 5. The effect of diets containing up to 70% ground straw on the live weight gain and carcass composition of yearling Friesian cattle. Anim. Prod. 12, 63.

Takeshita, K., Tanaka, S. and Yoshida, S. (1973) Changes in meat quality of dairy steers during fattening. Food, Sci. and Abst., 5, 22.

Theurer, B., Hale, W.H., Burt, J.G., Kartchner, R.J., Dryden, F.D. and Marchello, J.A. (1973) Ad libitum vs. restricted feed intake for beef cattle. J. Anim. Sci., 36, 1207.

Tullah, N.M., and Maritz, J.S., (1965) Comparative breed studies of beef cattle. 2. Changes in size and shape. 3. Carcass composition. Nut. Abst. and Rev., 35 : 38.

Waldman, R.C., Tyler, W.J. and Brungardt, V.H. (1971) Changes in the carcass composition of Holstein steers associated with ration energy levels and growth. J. Anim. Sci., 32, 611.

Wise, M.B., Harvey, R.W., Haskins, B.R. and Barrick, E.R. (1968) Finishing beef cattle on all concentrate rations. J. Anim. Sci., 27, 1149.

Zalowski, W., Stanzel, R., Kamieniecki, K. and Litwinczuk, K. (1977) Effect of diet on rate of growth and carcass composition of Polish Black-and-White Lowland cattle fattened to 450 Kg. Nut. Abst. and Rev., 48, 275.

تأثير المعاملات الغذائية على الاداء الانتاجى لعجول البـراون سويس

٢ ـ صـفات الذبيحـة

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استخدم فى هذه التجربة ٥٨ عجل براون سويس متوسط اعمارها ٩ أشهر ومتوسط اوزانها ١٨٩ كجم ، قسمت عشوائيا الى اربع مجاميع غذيت على اربعة معاملات غذائية تشمل مستويين غذائيين (متوسط يسمح بنمو يومى مقداره ٨ر ـ كجم ، وعالى يسمح بمعدل نمو يومى مقداره ٢ر١ كجم) وفى داخل كل مستوى غذائى يوجد نسبتين من المواد المركزة (م) الى المـواد الخشنة (خ) (٣ : ١ ، ٢ : ١) وبذلك تكون الاربعة مجاميع التجريبية على التوالى هى : مستوى متوسط مع ٣ (م) : ١ (خ) ، ومستوى متوسط مع ٢ (م) : ١ (خ) ، مستوى عالى مع ٣ (م) : ١ (خ) ومستوى عالى مع ٢ (م) : ١ (خ) . واستمرت التجربة حتى وزن ٥٥٠ ـ ٦٠٠ كجم وتم ذبح ثلاث حيوانات من كل مجمـوعة عند وزن ٤٥٠ ـ ٥٠٠ كجم وعنـد وزن ٥٥٠ ـ ٦٠٠ كجم لدراسة تأثير المعاملات الغذائية على صفات الذبيحة .

وأوضحت النتائج ما يلى :

١ ـ متوسط عمر الذبح كان تقريبا متساوى للمجاميع التجريبية المختلفة حيث كان ٢١ شهرا عند الذبح الاول ، ٢٦ شهرا عند الذبح الثانى .

٢ ـ متوسط نسبة التصافى كانت عالية فى المجاميع المغذاة على المستوى الغذائى العالى عن المغذاه على المستوى المتوسط ولم يكن لاختلاف نسبة المواد المركزة : المواد الخشنة تأثير على نسبة التصافى .

٣ ـ كانت نسبة التشافى أعلى فى حالة المجاميع المغذاة على المستوى الغذائى المرتفع عن المستوى المتوسط الا ان الفروق كانت معنوية عند الذبح الثانى .

٤ ـ لم يكن للنسب المختلفة للمواد المركزة الى المواد الخشنة تأثير معنوى على نسبة التشافى .

٥ ـ اوضحت النتائج انه كلما زاد الوزن الحى زادت نسبة التشـافى معنويا .

٦ ـ لم يكن لاى من المستوى الغذائى أو نسـبة المواد المركزة الى المواد الخشنة تأثير على مساحة العضلة العينية ونفس النتائج بالنسـبة لنسبة الارباع الامامية والخلفية .

٧ ـ أوضح التحليل الكيماوى للعضلة العينية عنـد الضـلع التاسـع والعاشر لحيوانات الذبح الأول ان نسبة الدهن كانت أعلى معنويا فى حالة الحيوانات المغذاة على مادة مركزة : مادة خشنة بنسبة ٣ : ١ عن الحيوانات المغذاه على نسبة ٢ : ١ بينما عند الذبح الثانى كانت نسبة الدهن أعلى معنويا فى حالة الحيوانات المغذاه على المسـتوى الغذائى العالى عن المغذاة على المستوى المتوسط .

٨ ـ تم أيضا جدولة نتائج تأثير كل من المستوى الغذائى ونسبة المـواد المركزة الى المواد الخشنة على الأوزان المطلقة والنسـبية لجميع الأسقاط الآتية : مجموعة الأعضاء غير الحشوية ـ مجموعة الاعضاء الحشوية ، مجموعة الدهون الحشوية لحيوانات الذبح الأول والذبح الثانى .