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ACCEPTABILITY AND DIGESTIBILITY OF DIETS MADE WITH VARIOUS SOURCES AND LEVELS OF FAT BY ADULT CATS

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INTRODUCTION

No specific amount or source of fat has been determined to be necessary in the diet of the cat. Fat adds to the caloric density and palatability of the diet, and serves as a source of fat soluble vitamins and essential fatty acids (NRC, 1978). A source of animal fat may be needed in the diet of the cat as a source of prostaglandin precursors (Rivers et al., 1975).

Commercial canned, semi-moist and dry cat diets contain relatively high amounts of fat, 15%, 9%, and 12% crude fat (dry matter basis) 1, and frequently experimental purified diets contain 25-30% fat (Morris and Rogers, 1978; Fox et al., 1793; Gershoff, 1962). Experimental rations have included various animal and vegetable fats including beef fat, pork fat, corn oil, cod liver oil, turkey fat (Morris and Rogers, 1978; Fox et al., 1973; Gisler and Ewing, 1964; Schenk and Cumberland, 1968; Greaves and Scott, 1960; Miller and Allison, 1958; Gershoff et al., 1959). Commercial diets also contain sources of fats of various origins.

Morris et al. (1977) reported the apparent digestibility of crude fat in a diet of beef and mutton to be 99%. Norvell (1976) found the apparent digestibility of crude fat in some commercial cat foods to be 85-94%.

Although fats from various sources are included in diets for cats at a relatively high level, there appears to be only one report by Beauchamp, et al. (1977) of the preference of the cat for fat substances in the diet. The present investigation was conducted to study the acceptability and digestibility of various diets when the amount and source of fat was varied.

1 Personal Survey

SUMMARY

Three experiments were conducted with adult cats to determine the acceptance and digestibility or purified diets containing various fats. In the first experiment, 12 cats (2-7 kg BW) were used to determine the acceptance of diets made with bleached tallow (BT) versus six alternate fats (chicken fat (CF), yellow grease (YG), lard (L), butter (B), unbleached tallow (UT), and partially hydrogerated vegetable fat (VF). Three groups each of four cats, individually housed, were tested during four consecutive two-week periods, giving a total of eight cats per choice. The diet made with BT was preferred over those made with B, CF ($P < .001$).

In a second experiment , 14 male and 10 female cats (2-5 kg BW) were used in a two-choice trial to determine the acceptance of diets made with 10%, 25% or 50% YG. Two groups of 12 cats each were used to test the inclusion of 25% vs 50% and 25% vs 10% YG. Diet made with 25% fat was accepted over diets made with 10% ($P < .001$) or 50% fat ($P < .02$).

In a third experiment 12 male and 12 female cats (2-5 kg BW) were used to study the digestibility of purified diets made with 25% CF, BT, UT, L and B and 10%, 25% and 50% YG. Each diet was fed to 6 cats in metabolism cages for a 5 day preliminary followed by a 5-day fecal and urine collection period. Chromic oxide was included in all diets as a marker. Digestibility coeficients were computed both by the marker and conventional food intake and fecal collection methods. Mean digestion coefficients (%) for dry matter (DM), crude protein (CP) ether extract (EE) and energy (E) for diets made with 25% CF, YG, L, B, UT, BT, 10% YG, 50% YG were: (DM) 90.6, 89.5, 90.8, 89.8, 87.1, 88,0, 87.4, 90.2;

(CP) 91.1, 91.5, 92.7, 92.0, 90.9, 90.8, 87.0, 94.8; (EE) 98.6, 98.0, 98.6, 97.5, 98.1, 98.2, 90.4, 97.9; (E) 93.8, 93.1, 93.7, 92.2, 89.5, 89.9, 88.6, 92.8. Mean digestion coefficients (%) calculated from total fecal collection versus chromic oxide for DM, CP, EE and E were: 88.5, v 89.9; 90.8 v 91.9; 98.0 v 97.3; 91.6 v 92.1.

(Key Words: Acceptability , Food Intake, Cat , Fat Digestibility).

DISCUSSION

Cats exhibit marked preference for diets based on certain fats as demonstrated by the greater intakes of diets made from BT over CF or B. This demonstrates that cats do show preference for some fats over others and the fat is a substance that illicits response toward a feedstuff as suggested by Beauchamp et al. (1977). Fat is present at a relatively high amount (25% of the dry matter) in small animals, such as rodents, which are components of feral cat diets (Scott, 1966). It appears likely that fat would be a substance that would enhance acceptability of rations fed to cats. It has also been reported by Mugford (1977) that cats favored a dry diet when the odor of meat was passed through it, and that food intake could be initiated by such an odor. There are no published data from commercial sources, on the effect of fat on the palatability of diets for cats. However, entensive use is made of supplemental fat, especially tallow, in some commercial cat diets, eg. directly added to canned diets and sprayed on dry diets. The work of Rivers et al. (1975) demonstrates the necessity for animal fat for cats.

Preference by the cats, for purified diets made with 25% YG over diets made with 10% or 50% YG, indicates that the response to level of fat is not linear over the entire range but an optima exists. This optima may be a result of enhancement of flavor or consistancy. The 10% fat diet was fairly powdery, while the 50% fat diet was very greasy in texture. Cats on a subsequent study (unpublished results) consumed more of a diet made with 40% BT than diets made from either 12% or 25% BT. There were no digestive upsets or diarrhea in cats given either the 40% or 50% fat diets.

5 Personal Survey

It has been reported by Forbes et al. (1946) that palatability increased as the fat level increased from 2-30% fat (corn oil plus lard) in isocaloric diets fed to rats. It has been previously reported by Humphreys and Scott (1962) that diets made with 64% fat (DM basis) are tolerated by the cat. Intake of diets of 25-30 % fat was greater than low fats diets (Greaves, 1965). The present study also confirms these findings.

The variability of choice between animals and by the same animal during the experiment peroid, might suggest further study in tests similar to those of Kitchell and Baker (1973). It has been shown that taste preference does vary with novelty of diet. In the comparison between diets made with tallow vs. chicken fat, in experiment A, tallow could be considered a novel flavor since the cats were previously fed diets made with chicken fat. Also since tallow was one of the choice diets during each of the consecutive periods, there could have been a bias toward diet made with tallow.

The mean apparent digestion coefficient of 98% of the ether extract of the six diets made with 25% fat is comparable to the digestion coefficients for ether extract reported for other simple stomached species: rats (98%), pigs (91%); guinea pigs (92%); chicks (92%); turkey poults (97%); and dogs (96%) (Hoagland and Snider, 1943; Hillcoat and Annison, 1973; Lloyd and Crampton, 1957; Young 1961; Whitehead and Fischer, 1975). As the digestion coefficients of ether extract for diets made with 25% and 50% YG were not significantly different it indicates that the cat can efficiently digest and hence tolerate diets where fat content supplies over 75% of the total calories.

In pigs, it has been shown that the apparent digestibility of fat increases with increasing levels in the diet (HIllcoat and Annison, 1973; Axellson and Erickson, 1950; Freeman et al., 1968). Although, the digestion coefficient for the ether extract portion of the diet was significantly ($P < .01$) greater for the diet made with 25% than 10% yellow grease, there was no significant difference between 25% and 50% yellow grease. It is possible that this difference of digestibility is due to the contribution of metabolic fecal fat.

The diet made with 10% yellow grease was also lower in energy, crude protein, and dry matter digestibilty.

The lower apparent dry matter and energy digestibility coefficients for the diets made with bleached and unbleached tallow compared to diets made with butter, lard, chicken fat and yellow grease might be due to the greater proportion of saturated fatty acids in these fats.

In pigs (Bayley and Lewis, 1965) higher apparent digestibility coefficients of diets made with soybean oil than beef tallow has been attributed to this difference in saturation. In calves, Roy (1970) showed that digestibility of beef tallow was lower than that of lard, which was lower than that of margarine. However, it was reported by Lloyd and Crampton (1957) that the degree of saturation or chain length of fatty acids does not have a significant effect on apparent digestibility of fats by dogs.

The digestibility of the individual fatty acids (table 8) shows no significant differences due to chain length, although there was a tendency for coefficients for the longer chain fatty acids to be slightly lower. Fatty acid digestion in chicks was reported by Whitehead and Fischer (1975) to vary with chain length. Palmitic acid from lard (95.6%) and yellow grease (82.4%) had a greater absorbability than from beef tallow (58.1%). Also oleic, linoleic and linolenic had decreasing absorbabilities.

The high digestibility coefficients of all the diets containing 25% fat or 50% fat demonstrate that the cat can utilize more fat than generally present in the commercial diets (10-15% fat). Voluntary energy intake for the high fat diets (80 kcal/kg BW) was comparable to that found by other workers for cats fed lower levels of fat (NRC,1978). Metabolizable energy per gram of diet (4.85 kcal/g) was higher than that reported by Norvell (1976) for Commercial cat diets.

The apparent digestion coefficient calculated from feed intake and total collection of feces or from the chromic oxide indicator method were not significantly different. This indicates that the chromic oxide marker technique as previously employed by Morris et al. (1974) is satisfactory for the measurement of digestibility in the cat.

Literature Cited

A.O.A.C. 1975. Official Methods of Analysis. Association of Official Analytical Chemists, Wash. D.C.

Arthur, D. 1970. The determination of chromium in animal feed and excreta by atomic absorption spectrophotometry. Canadian Spect. 15: 134.

Axellson, J. and S. Erickson. 1950. The availability of the method of determination by differences of the effect of individual feeds. K. Latbr. Ann. 17:161. Cited in- The Evaluation of Feeds Through Digestibility Experiments (B.H. Schnieder and W.P. Flatt. ed.) Univ. Ga. Press. 1975.

Bayley, H.S. and D. Lewis 1965. The use of fats in pigs feeding. II. Digestibility of various fats and fatty acids. J. Agr. Sci. (Camb) 64: 373.

Beauchamp, G.K., O.Maller, and J.G. Rogers. Jr. 1977. Flavor preferences in cats. (Felis catus and Pathera sp.). J. Comp. and Physiol. Psych. 91: 1118.

Forbes, E.B., R. W. Swift, R.I. Eliot, and W.H. James. 1946. Relation of fat to economy of food utilization. 1. By the growing albino cat. J. Ntr. 31:203.

Fox, L.A.D., R. Jansen, R. and K. L. Knox, 1973. Effect of variations in protein quality on growth, PER, NPR, and NPU in growing kittens. Nutr. Rep. Int. 7:621.

Freeman, C.P., D.W. Holme and E.F. Annison. 1968. The determination of the true digestibilities of interesterified fats in young pigs. Br. J. Nutr. 22:651.

Gershoff, S.N. 1962. Nutrient requirements of the cat. In Nutrient Requirements of Laboratory Animals 10:1-10. National Research Council No. 990. National Academy of Sciences. Wash. D.C.

Gershoff, S.N., Andrus, S.B. and Hegsted, D.M. 1959. The effects of carbohydrate and fat content of the diet upon the riboflavin requirement of the cat. J. Nutr. 68; 75.

Gisler, D.B. and D.E. Ewing. 1964. A free access dry ration for cats. Lab. Anim. Care. 14: 91.

Greaves, J.P. 1965. Protein and caloric requirements of the feline In Canine and Feline Nutritional Requirements (o. Graham-Jones, ed.) p. 33-45. Pergamon Press. London.

Greaves, J.P. and P.P. Scott. 1960. Nutrition of the cat. 3. Protein requirements for nitrogen equilibrium in adult cats maintained on a mixed diet. Br. J. Nutr. 14: 361.

Hegsted, D.M., S.N. Gershoff and E. Lentini E. 1956. The development of palatability tests for cats. Am. J. Vet. Res. 17: 733.

Hillcoat, J.B. and E.F. Annison 1973. The efficiency of diets containing maize oil, tallow or tallow acid oil in the pig. Proc. 6th Symp. Energy Met. EAAP Pub. No. 13. p. 177.

Hoagland, R. and G.G. Snider. 1943. Digestibility of some animal and vegetable fats. J. Nutr. 25: 295.

Humphreys, E.R. and P.P. Scott P.P. 1962. The addition of herring and vegetable oils to the diet of cats. Proc. Nutr. Soc. 21: xviii.

Kitchell, R.L. and G.G. Baker. 1973. Operant testing procedures for determining taste preferences in animals. Nottingham, Conf. Feed Manuf. (Ed. Swan, H. and Lewis, E.) p. 157-202.

Lloyd, L.E. and E.W. Crampton. 1957. The relation between certain characteristics of fats and oils and their apparent digestibility by young pigs, guinea pigs and pups. J. Anim. Sci. 26: 377.

Miller, S.A. and J.B. Allison. 1958. The dietary nitrogen requirements of the cat. J. Nutr. 64: 493.

Morris, J.G., J. Fujimoto, S.C. and Berry, S.C. 1974. The comparative digestibility of a zoo diet fed to 13 species of felid and a badger. Intl. Zoo Yearbook. 14:69.

Morris, J.G., J. Trudell and T. Pencovic, T. 1977. Carbohydrate digestion by the domestic cat (Felis catus). Br. J. Nutr. 37: 365.

Morris, J.G. and Q.R. Rogers. 1978. Arginine, an essential amino acid for the adult cat. J. Nutr. 108: 1944.

Mugford, R.A. 1977. External influences on the feeding of carnivores. In The Chemical Senses and Nutrition II. (M. Kare and O. Maller eds.) p. 25-48. Academic Press. New York.

N.R.C. 1978. Nutrient Requirements of Cats. National Research Council. Wash. D.C.

Norvell, M.A. 1976. John Stuart Research Laboratories, Quaker Oats Co., Barrington, IL. In NRC 1978. Nutrient Requirements of Cats. National Research Council, Wash. D.C.

Perodi, P.W. 1974. Variation in the fatty acid composition of milk fat: effect of stage of lactation. Aust. J. Dairy Tech. 29:145.

Rivers, J.P.W., A.J. Sinclair and M.A. Crawford. 1975. Inability of the cat to desaturate essential atty acids. Nature 258: 171.

Roy, J.H.B. 1970. The Calf: Nutrition and Health. p. 102. The Pennsylvania State Univ. Press. Univ. Park, PA.

Schneck, G.W. and Cumberland, V. 1968. The effect of 10 percent dietary fat addition on the growth rate of cats. Vet. Rec. 83, 486-488.

Scott P.P. 1966. Nutrition. In Diseases of the Cat. (G. T. Wilkinson, ed.) p. 1-31. Pergamon Press. London.

Sokal, R.R. and F.J. Rohlf. 1969. Biometry. The Principles and Practices of Statistics in Biological Research. W.H. Freeman and Co. San Fancisco.

Whitehead, C.C. and C. Fischer C. 1975. The utilization of various fats by turkeys of different ages. Br. Poultry Sci. 16: 481.

Young, R.J. 1961. The energy value of fats and fatty acids for chicks 1. Metabolizable energy. Poultry Sci. 40:1225.

TABLE 1. DIETS FOR EXPERIMENTS A AND C

	% of Diet
Soy protein	34
Corn starch	20
Cerelose	15
*Fat	25
Mineral premix[a]	4
Vitamin premix[b]	1
L-Methionine	0.7
Choline chloride	0.3
Solka floc	1

*Bleached tallow, unbleached tallow, yellow grease, lard, butter, chicken fat, and hydrogenated vegetable oil substituted in each of seven diets.

[a]Mineral Mix (%): $CaHPO_4$, 47.4; K_2HPO_4, 10.0; $CaCO_3$ 13.0; $MgSO_4$, 5.04. KCl, 7.5 NaCl, 13.9; $MnSO_4H_2O$, 0.48; $ZnSO_4,7H_2O$, 0.56; $CuSO_45H_2O$, 0.10; $Fe_6H_5O_7H_2O$, 0.60; pentacalcium orthoperiodate (29% I), 0.018; $SnCl_2$ $2H_2O$, 0.01; Na_2SeO_3, 0.003; $(NH_4)_6Mo_7O_44H_2O$, 0.005; $CrCl_3$ $6H_2O$20.032; $NiCl_26H_2O$, 0.030; NaF, 0.014; NH_4VO_3 $4H_2O$ 0.0025; α-cellulose, 1.31.

[b]Vitamins per kg diet: retinylacetate, 20,000 IU; cholecalciferol, 2,000 IU; D, L- αtocopheryl acetate, 160 IU, menaquinone, 15 mg; thiamin HCl, 25 mg; riboflavin, 10 mg pyridoxine, 10 mg; nicotinic acid, 100 mg; D-Ca pontothenate, 20 mg; myo-inositol, 200 mg; folic acid, 10 mg; biotin, 1 mg; cyanocobalamin, 50 g; ascorbic acid, 200 mg; taurine (an amino sulfonic acid), 100 mg.

TABLE 2. FATTY ACID COMPOSITION OF FAT ADDED TO DIETS FOR EXPERIMENTS A, B, AND C

CHAIN LENGTH	YELLOW GREASE	CHICKEN FAT	BLEACHED TALLOW	UNBLEACHED TALLOW	BUTTER	PARTIALLY HYDROGENATED VEGETABLE FAT	LARD
4:0					5.68		
6:0					3.03		
8:0	.25				1.62		
10:0	.16		.11	.09	2.96	.02	.08
12:0	1.02	.02	.52	.42	3.58	.27	.22
14:0	8.18	7.90	9.75	8.13	15.00	5.52	7.62
16:0	24.52	22.40	27.37	27.37	29.92	18.45	26.41
16:1	8.29	10.04	9.45	8.11	8.52	5.68	8.35
18:0	10.51	4.72	14.63	15.73	7.64	9.84	9.93
18:1	37.40	37.24	34.41	36.30	18.28	36.92	38.68
18:2	8.89	17.05	2.94	3.01	2.83	20.94	8.14
18:3	.79	.63	.81	.85	.96	2.36	.57

TABLE 3. COMPOSITION OF DIETS FOR EXPERIMENT A

Diet	Dry matter	Energy	Ether extract
	%	kcal/g diet (DM basis)	% (DM basis)
Bleached tallow	94.1	5.66	25.6
Unbleached tallow	94.5	5.67	25.9
Lard	95.2	5.70	25.8
Chicken fat	94.2	5.70	26.0
Yellow grease	94.7	5.67	25.4
Butter	93.9	5.62	25.6
Vegetable fat	94.8	5.72	26.1

TABLE 4. DIETS FOR EXPERIMENT B

	10% Fat	25% Fat	50% Fat
	Per Cent of Diet		
Soy Protein	29	34	43
Corn starch	27.5	20	.5
Cerelose	27.5	15	.5
Yellow grease	10	25	50
Mineral premix[a]	4	4	4
Vitamin premix[b]	0.7	0.7	0.7
Solka floc	1	1	1
Calorie-protein ratio	2.67	2.67	2.63

[a] Mineral mix (%): $CaHPO_4$, 47.4; K_2HPO_4, 10.0: $CaCO_3$, 13.0; $MgSO_4$, 5.04. KCl, 7.5; NaCl, 13.9; $MnSO_4H_2O$, 0.48; $ZnSO_47H_2O$, 0.56; $CuSO_45H_2O$, 0.10; $Fe_6H_5O_7H_2O$, 0.60; pentacalcium orthoperiodate (29% I), 0.018; $SnCl_22H_2O$, 0.01; Na_2SeO_3, 0.003; $(NH_4)_6M0_7O_44H_2O$, 0.005; $CrCl_3$, $6H_2O$, 0.032; $NiCl_2$ $6H_2O$, 0.030; NaF, 0.014; NH_4V0_3 $4H_2O$, 0.0025; α-cellulose, 1.31.

[b] Vitamins per kg diet: retinylacetate, 20,000 IU; cholecalciferol, 2,000 IU; D, L-α-tocopheryl acetate, 160 IU; menaquinone, 15 mg; thiamin HCl, 25 mg riboflavin, 10 mg; pyridoxine, 10 mg; nicotinic acid, 100 mg; D-Ca pantothenate, 10 mg; myo-inositol, 200 mg; folic acid, 10 mg; biotin, 1 mg; cyanocobalamin, 50 μg; ascorbic acid, 200 mg; taurine (an amino sulfonic acid), 200 mg; choline bitartrate, 3g.

TABLE 5. COMPOSITION OF DIETS FOR EXPERIMENT C.

Diets Made With	Dry matter %	Ether extract %	Gross energy kcal/g
25% Butter fat	93.6	25.9	5.70
25% Lard	94.2	26.7	5.77
25% Unbleached tallow	93.9	26.3	5.78
25% Bleached tallow	93.8	26.1	5.77
25% Yellow grease	93.9	25.6	5.70
25% Chicken fat	93.8	25.9	5.72
10% Yellow grease	92.7	9.5	4.78
50% Yellow grease	96.9	49.2	7.12

TABLE 6. MEAN DIGESTION COEFFICIENTS OF DIETS FROM EXPERIMENT C

Diet-made with fat %	Digestible energy %		Digestible ether extract %		Digestible dry matter %		Digestible crude prote %	
	TC[1]	Cr+3[2]	TC	Cr+3	TC	Cr+3	TC	Cr+3
Butter 25	91.4[e]	93.0[a,e]	97.2[a]	97.8[a]	88.9[a]	90.7[a]	91.3[a]	92.7[a]
Lard 25	93.4[e]	94.1[a,d]	98.5[a]	98.7[a]	90.3[a]	91.2[a]	92.3[a]	93.1[a]
Unbleached tallow 25	89.0[f]	90.2[b]	97.9[a]	98.2[a]	86.4[a]	87.8[b]	90.4[a]	91.4[a]
Bleached tallow 25	89.1[f]	90.6 [c,e]	98.1[a]	98.4[a]	87.1[a]	88.0[b,e]	90.1[a]	91.5[a]
Yellow grease 25	93.0[e]	93.2[a,f]	97.8[a]	98.3[a]	88.1[a]	90.9[a]	90.3[a]	92.6[a]
Chicken fat 25	93.2[e]	94.4[a,d]	98.5[a]	98.7[a]	89.7[a]	91.6[a,f]	90.3[a]	91.9[a]
Yellow grease 10	—	88.6[b]	—	90.4[b]	—	87.4[b]	—	87.0[b]
Yellow grease 50	—	92.8[a,f]	—	97.9[a]	—	90.2[a]	—	94.8[c]
X	91.6	92.1	98.0	97.3	88.5	89.9	90.8	91.9

1 conventional food intake and fecal collection method.

2 chromic oxide marker method.

Digestion coefficients with superscripts a,b vertically are significantly different ($P < 0.01$); digestion coefficients with superscripts c,d vertically are significantly different ($P < 0.01$).

e,f ($P < 0.05$).

TABLE 7. FATTY ACID COMPOSITION OF FECAL FAT FROM CATS ON DIETS INCLUDING VARIOUS FATS FROM EXPERIMENT C

Chain Length	25% Yellow Grease	10% Yellow Grease	25% Bleached Tallow	50% Yellow Grease	25% Butter	25% Lard
4:0	7.06	9.62	5.23	4.88	6.79	10.22
6:0	1.51	3.27	2.63	.24	4.23	2.89
8:0	0	0	0	0	.35	0
10:0	0	0.09	0	0	1.84	0.07
12:0	0.50	0.53	0.31	0.28	3.27	0.25
16:0	21.22	23.31	26.09	21.72	25.65	16.21
14:0	3.70	3.62	3.47	3.39	9.94	1.95
16:1	1.59	0.72	1.12	1.74	1.32	1.06
18:0	11.92	15.92	23.0	14.76	9.94	9.86
18:1	40.16	32.10	32.91	40.29	29.56	49.06
18:2	10.32	6.66	4.28	11.67	5.92	7.54
18:3	2.02	4.15	0.94	1.06	1.19	0.89

TABLE 8. MEAN APPARENT FREE FATTY ACID DIGESTIBILITY FROM EXPERIMENT C

Diet made with fat	%	$C_{12:0}$	$C_{14:0}$	$C_{16:0}$	$C_{16:1}$	$C_{18:0}$	$C_{18:1}$	$C_{18:2}$	C_{18}
Bleached tallow	25	99.0	99.4	98.4	99.8	97.4	98.4	97.6	98.1
Butter	25	98.5	98.9	98.6	99.7	97.8	97.3	96.6	98.0
Lard	25	98.5	99.7	99.2	99.8	98.7	98.3	98.8	97.9
Yellow grease	25	99.1	99.2	98.5	99.7	98.2	98.2	98.1	95.7
Yellow grease	25	96.6	97.1	93.8	99.4	90.1	94.4	95.1	65.9
Yellow grease	50	99.4	99.1	98.2	99.6	97.1	97.8	97.3	97.3
$\bar{X}$		98.5	98.8	97.8	99.7	96.6	97.4	97.2	92.1

Apparent f.a.a. Digestibility =

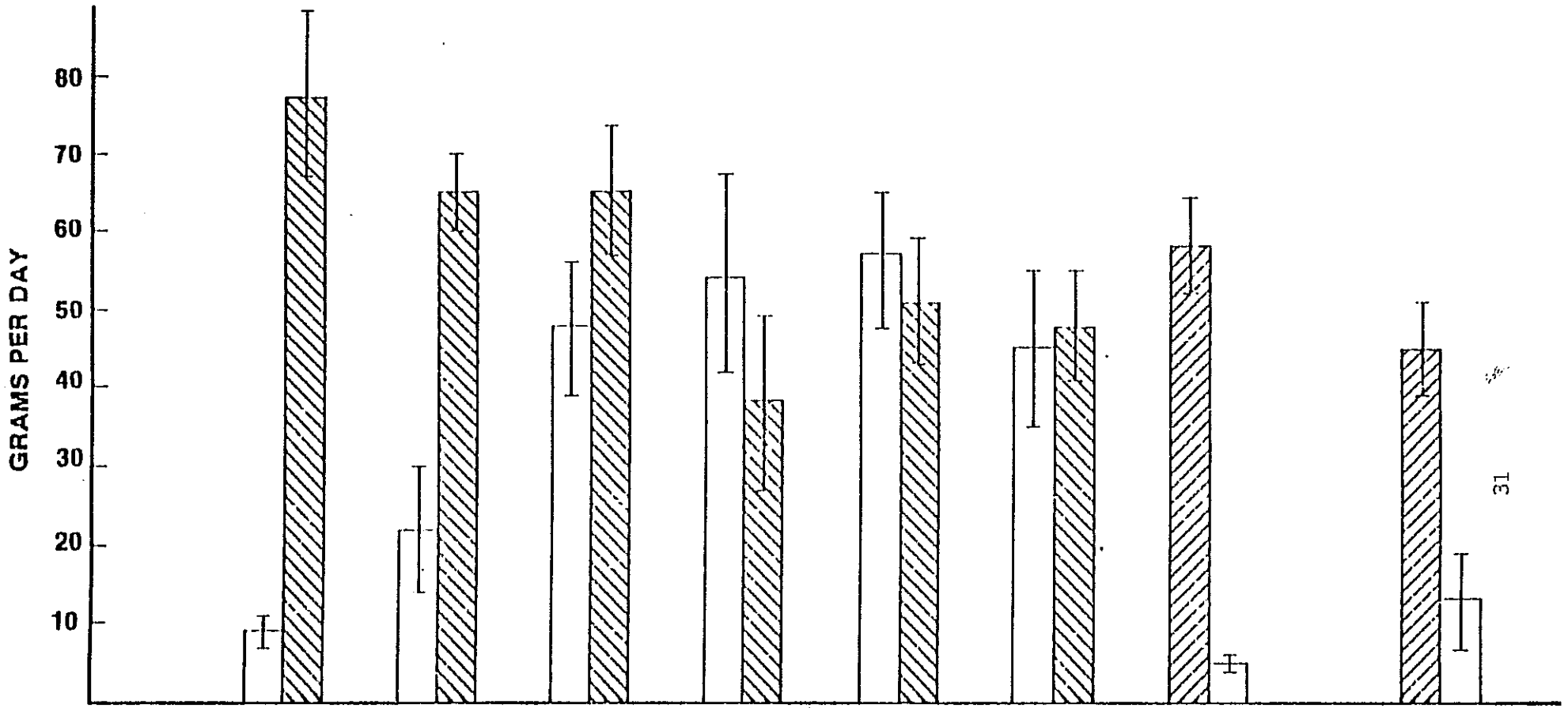
$$1 - \left(\frac{\%\text{Fat in feces} \times \%\text{F.A. in Fecal Fat}}{\%\text{ Fat in Feed} \times \%\text{F.A. in Feed Fat}} \times \frac{\%Cr_2O_3 \text{ in Feed}}{\%Cr_2O_3 \text{ in Feces}} \right) \times 10$$

TABLE 9. MEAN VALUES FOR PARTITION OF ENERGY OF CAT DIETS FROM EXPERIMENT (

Diet	Gross energy kcal/d	Digestible energy kcal/d	Metabolizable energy kcal/d	Metabolizable energy kcal/kg BW	Metabolizable energy kcal/g diet
Butter	284	257	238	77.6	4.78
Lard	338	315	294	86.4	5.03
Unbleached tallow	524	472.5	444.5	105.1	4.83
Bleached tallow	457.9	407.7	382.4	83.5	4.83
Yellow grease	300	276	256	74.0	4.87
Chicken fat	218	205	190	56.0	5.00

Figure Legend:

Figure 1. Acceptance of diets made with various sources and leveis of fat.



	CFvBT	BvBT	LvBT	UTvBT	YGvBT	VFvBT	25YGv10YG	25YGv5OYG
	n=8	n=8	n=8	n=8	n=8	n=8	n=12	n=12
choice ratio	0:8	0:7	2:5	5:2	6:2	3:2	12:0	10:1
	***P<.001	***P<.001	N.S.	N.S.	N.S.	N.S.	***P<.001	*P<.02