

**THE EFFECT OF THE CRUDE FIBRE LEVEL ON THE RATION  
ON THE YIELD AND QUALITY OF MILK BUFFALOES.**

*By*

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**SUMMARY**

Four lactating buffaloes were taken after the peak of the lactation period in a comparative feeding experiment using the "Swing over" method and two rations containing two levels of crude fibre. The control ration contained 16.12% crude fibre and the tested one 22.00% on dry matter basis. The energy level was kept constant during the whole experiment, while the protein was adequate.

The results indicate that raising the crude fibre in the dry matter of the ration from 16.12 up to 22.00% decreased significantly milk and fat yield to the extent of  $5.92 \pm 0.39\%$  and  $2.88 \pm 0.487\%$  respectively. The increase in the crude fibre level slightly increased fat percentage in milk, but practically had neither effect on the percentage of other milk nutrients nor on the quality of milk fat.

**INTRODUCTION & REVIEW OF LITERATURE**

Nowadays several investigations have indicated that the level of crude fibre in the ration of dairy animals had an effect on milk (Nordfeldt et al 1950) and fat percentage (2). The high level of crude fibre lowers milk yield (Henke and Charlies 1947, Henke and Otagaki, 1948, Lindsey and 1932, Abchibald and Nordfeldt et al 1950). This might be due to the fact that the higher level of crude fibre is associated with a depression in the feeding value. Henke and Otagaki (Henke and Charlies, 1947), reported that higher consumption of dairy animals was associated with higher milk yield when Napier grass was fed as the roughage. Henke and Maruyama (Curto, 1955), found that using Pine apple top as a substitute for Napier grass while keeping the concentrate ration constant, raised the milk yield for 5.5%. The crude fibre percentage in the dry matter of the ration was 12.4 when Pineapple tops were used, while it was 21.1 when Napier grass was fed. Lindsey and Abchibald 1932 found that the ration containing low allowances of concentrates and maximum amount of roughage, reduced the milk yield from 31.7 lbs. down to 27.7 lbs. Curto 1955 1955 reported that by a 50 - 71 % decrease of crude fibre content of the diet, an average drop of 0.6 occurred in the fat percentage of milk. This drop was checked by the addition of 4% straw or 500 gm. Na acetate to the diet.

Nordfeldt et al 1950 studied the effect of crude fibre level using four groups of three dairy cows each. They formulated four rations containing 12, 16, 18 and 22%. The best milk production obtained when the fibre content was decreased to 16% of the dry matter or below (12%). The rations with more than 16% fibre significantly lowered milk production.

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Therefore, it seems that the level of crude fibre in feeding dairy animals has an effect on milk yield and its composition.

### MATERIAL AND METHODS.

One experiment was performed including a control ration (low in crude fibre) and one tested ration (high in crude fibre). The design of the experiment followed the same « swing over » method already used (Crichton 1953 and Kellner, 1924).

**Animals** : Four buffaloes were chosen during their high lactation period shortly after the peak.

**Feeding** : The daily requirements of starch value and digestible protein were calculated in the same manner already used (Crichton, 1953 and Kellner, 1924) from a knowledge of the average weight, milk yield and fat percentage during the week before the experiment. The feeding value of clover hay and the two concentrate mixtures were obtained from digestibility trials with sheep. Concentrate mixture No. 1 (50% decorticated cottonseed cake, 30% fine wheat bran and 20% rice bran) had a feeding value of 70.37 S.V. as fed, containing 6.53% crude fibre, 21.73 digestible crude protein. Concentrate mixture No.2 (50% undecorticated cottonseed cake, 30% coarse wheat bran and 20% rice bran) had corresponding values of 54.18, 17.38 and 14.73 and clover hay contained 30.86, 23.15 and 8.78 respectively. The control ration was composed of one part of clover hay and one part of concentrate mixture No.1 in order to contain 16.12% crude fibre on dry matter basis. The tested ration was also composed of one part of clover hay and one part of concentrate mixture No.2 in order to contain 22.00% crude fibre on dry matter basis.

### RESULTS AND DISCUSSION.

From the digestibility trial results with the components of the control and tested ration, the feeding values and qualities of both rations were obtained as shown in table 1.

TABLE 1.

Item	Results as fed		Results in dry matter	
	Control	Tested	Control	Tested
dry matter % . . .	92.29	92.15	100.01	100.00
crude fibre. % . . .	14.85	20.27	16.12	22.00
digestible protein.%	15.26	11.76	16.54	12.67
Starch value . . . .	50.62	42.52	54.74	46.12
T.D.N. . . . .	58.64	52.90	63.48	57.39

The feeding value of the control ration per 100 kgs. was 1.19 times as much as that of the tested ration using the starch value system. This means that 100 kgs. from the control ration would equal 119 kgs. from the tested ration in feeding value.

**A.—The effect of crude fibre level in the ration on milk and fat yield**

The average milk yield with the control ration containing 16.12% crude fibre in the dry matter was 21.45, 17.88, 16.24 and 17.00 lbs, while the corresponding average milk yield was 15.91, 14.05, 13.07 and 13.48 lbs with the tested ration when feeding the animals on the same level of starch value but at a higher crude fibre percentage of 22.00% in the dry matter. The average milk yield was 13.38, 12.09, 11.69 and 11.95 lbs. respectively when the control ration was fed back after the tested ration. An average drop of  $5.99 \pm 0.396\%$  in the milk yield occurred which was highly significant. Therefore it could be concluded that increasing the crude fibre percentage in the dry matter to 22.00% caused a drop in milk yield which did not exceed 7%.

Regarding the change in fat yield, a significant decrease was found with an average percentage of  $2.88 \pm 0.487\%$ . The percentage decrease in fat yield was about half that in milk yield.

The results with buffaloes are more in accordance with the results of Henke and Maruyama (1948) who found that milk yield was raised by 5.51 when Napier grass containing 21.1% crude fibre was replaced by Pine apple tops containing 12.4% crude fibre.

**B.—The Effect of crude fibre level in the ration on milk composition and fat quality :—**

There was no practical differences in the percentage of milk nutrients except in the case of fat during the initial control ration, tested ration and the final control ration as shown in table 2 :

TABLE 2.—Effect on milk composition

Item	Initial control ration	Tested ration	Final control ration
Total solids . . . . .	16.73	16.90	16.83
Moisture . . . . .	83.27	83.10	83.17
Crude protein . . . . .	4.41	4.51	4.44
Fat . . . . .	7.10	7.50	7.40
Carbohydrates . . . . .	4.49	4.15	4.26
Ash . . . . .	0.73	0.74	0.73
Solids not fat . . . . .	9.63	9.40	9.43

There was an increase of 0.4 unit of fat percentage over the initial control ration. This increase in fat percentage during the tested period tended to lessen the drop in fat yield as deduced before.

In this connection Curto (1953) found that the decrease in crude fibre content (50-70%) resulted in a drop of 0.6 unit in fat percentage.

Regarding the effect of crude fibre on the quality of fat, there was no practical difference among fat constants during the three periods as shown in table 3 :

TABLE 3.—Effect on fat quality

Item	Initial control ration	Tested ration	Final control ration
Reichert Meissel No. . . . .	31.24	31.13	31.03
Poleneske No. . . . .	2.76	2.77	2.77
Iodine No. . . . .	45.83	45.66	45.43

This indicates clearly that with buffaloes the increase of the crude fibre level from 16.12 up to 22.00% in the ration has no effect on fat quality.

#### REFERENCES

1. **Crichton, M. A.** (1953).—The Conversation of grass. The Duthie Experimental Stock Farm and Rowett Institute, Aberdeen.
2. **Curto, G. M.** (1955).—Influence of raw fibre and acetate Contents of diet on milk contents Atti Soc. Ital. Sci. Vet. 329-332, (C. A. 50 14-8046. 1956).
3. **Henke, L. A. and Maruyama Charles.** (1947).—Pineapple Tops Vs. Green Napier grass for milking Cows. Hawaii Agric. Expt. Stat. (Cited in Nordfeldt et al, 1950.)
4. **Henke L. A. and Otagaki k.** (1948).—Effect of increased Concentrate feed on milk Production and live-weight. Hawaii Agric. Expt. Stat. (Cited in ref. No. 8).
5. **Kellner O.** (1924). "Die Ernährung der Landw Nulatiese". 10 auf. 5. 231-232.
6. **Kellner O.** (1926). "The Scientific feeding of Animals", 2nd Edit. Authorised translation by William Goodwin, Duckworth, London, W.C.P.
7. **Lindsey J. B. and Abchibald J. G.** (1932).—Two systems of feeding dairy Cows. Mass. Bull. 291. (Cited in Nordfeldt et al, 1950.)
8. **Nordfeldt, S., Iwanaga I.K Morita, L. A., Henke, L. A. and Tom A.H.S.** (1950).—Influence of Crude Fibre in the ration on the efficiency of feed utilization by dairy Cows J. Dairy Sci, 33 473-485,

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## تأثير مستوى الألياف الخام في العلائق على محصول وخواص اللبن والدهن في الجاموس

### المـلـخـص

أجريت تجربة لدراسة تأثير مستوى الألياف الخام في العلائق على محصول وخواص اللبن والدهن في الجاموس وقد قورن الفرق بين التغذية على عليقة تصل الألياف فيها ١٦ر١٢٪ وأخرى ٢٢٪ في المادة الجافة . أختيرت أربعة جاموسات حلابة عند النهاية العظمى للادرار في تجارب مقارنة مستخدما طريقة العودة عند ذى بدء . وظل المستوى الغذائي ثابتا طوال فترة التجربة وكان البروتين في العليقة كافيا - واتضح من النتائج أنه برفع الألياف الخام في العلائق من ١٦ر١٢٪ الى ٢٢٪ سبب تخفيضا مؤكدا في محصول اللبن والدهن بواقع ٥٩٢ ± ٣٩٦ر٪ و ٢٨٨ ± ٤٨٧ر٪ بالترتيب . كما وجد أن ارتفاع نسبة الألياف في العلائق سبب زيادة طفيفة في النسبة المئوية لدهن اللبن ولكن لم يؤثر عمليا على مكونات اللبن الأخرى أو خواص دهنه .