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## تأثير العليقة الخضراء والعليقه الجافه المركزه على بكتريا الكرش في الماعز

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كانت تغلب على بكتريا الكرش الأنواع موجبة الجرام وكروية الشكل  
في حالة العليقه الخضراء . بينما معظم البكتريا السالبة الجرام ذات الأشكال  
المختلفة تزدهر على العليقه المركزه الجافه .

بعد ٦ ساعات من تناول العليقه الخضراء تناقصت كل أنواع البكتريا  
ماعدى العصويه سالبة الجرام والكوينز التي زادت .

بينما على العليقه الجافه بعد ٦ ساعات من تناول العليقه زادت  
البكتريا سالبة الجرام ماعدى الواديه الشكل والأسلوبيرا تناقصت .

بسم الله الرحمن الرحيم  
الحمد لله رب العالمين  
والصلاة والسلام على  
سيدنا محمد وآله الطيبين الطاهرين

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**EFFECT OF GREEN FODDER AND DRY CONCENTRATE RATION  
ON RUMEN MICROORGANISMS IN GOAT**  
(With 3 Tables and 3 Figures)

By  
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(Received at 7/7/1985)

**SUMMARY**

On green fodder, the Gram positive and coccoid form microorganisms were predominated. While most Gram negative and variable forms were flourished on dry ration. At 6 hours on green fodder, all forms of microorganisms decreased except Gram negative rods and Quins which were increased. On dry ration, at 6 hours Gram positive forms decreased and Gram negative increased except vibrio and oscillospira were decreased.

**INTRODUCTION**

It has been increasingly realized that more fundamental knowledge of ruminal microorganisms is needed to obtain more efficient rations and better control of metabolic disorders in ruminants (BRYANT, 1959). Little data is to be found on the significance of different types of rumen organisms in relation to the composition of the diet effects on the population in rumen.

BRYANT and BURKEY (1953); MAKI and FOSTER (1957); HUNGATE (1957); WARNER (1962) had shown that bacterial population in rumen of animals was conditioned to different diets.

The present paper has to study the pattern of changes in the various groups of microorganisms in goat rumen in relation to diet.

**MATERIALS and METHODS**

Four rumen fistulated Baladi goats were used. They were fed barseem as green fodder for period of 30 days and concentrates; Bran, Wheat straw and Sorghum for another 30 days as period of adaptation before taking samples.

Animals fed once per day at 9 o'clock in the morning. Samples from rumen content were collected twice daily at 6 and 22 hours after feeding.

Samples were collected in air tight screw capped bottles. One sample was fresh and the other was fixed with 10% formalin in ratio of one part of the sample to one part of 10% formalin.

1) Fresh samples were incubated at 37°C with 1% starch to demonstrate the iodophilic micro-organisms.

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2) Fixed films were stained as follow :

- Gram's stain as general bacterial stain.
- Spores were stained by Ziehl - Neelsen's carbol-fuchsin, decolourised by 5-10% sulphuric acid and counterstained with methylene blue.
- Capsules were demonstrated by method of MUIR (1962).

3) For counting : On a fixed slide, we make differential count for 300 microorganisms from different field, twice daily for each case according to MOIR and MASSON scheme (1952).

### RESULTS and DISCUSSION

The nutritional economy of ruminant animals depends on the absolute numbers of microorganisms present in the rumen. The pattern of change in concentration of different groups of micro organisms was studied in relation to diet.

On green fodder, the Gram positive and coccoid form microorganisms were predominated. While most Gram negative and Gram variable forms were flourished on dry ration (Table 3 & Fig. 2). This finding was supported by CHENG and COSTERTON (1975) and COSTERTON (1979).

On green ration, coccoid form and Quins oval predominates due to the high percent of crude fibers in the solid fraction of barseem. SUPERTEIGM, 1951; BRYANT and BURTREY, 1953 and BRYANT and DOETSCH, 1954, stated that Gram positive monococci represented by rumino coccus albus and rumino coccus flavifociens were usually cellulose digester forms. Quins oval increased after feeding as it grow on fresh clover and grasses (CLARK, 1979).

On dry concentrate ration, the percent of Gram negative microorganisms were increased specially Gram negative rods, diplo-cocci, spiral, Vibrio and Selenomonas and Gram variable streptococcus (Tables 2, 3 & Fig. 2, 3). This finding was supported by OSBOURN, TERRY, CORELL and OUTEN, 1970; JOURNET, 1971 and STEWART, 1977. They stated that in ruminant maintained on green forage diet and changed to concentrate diet with large amount of starch, the cellulose producing population were decreased and amylase producing species proliferated.

The Gram negative rods were usually represented by Bacteroids amylophilus and Bacteroides ruminicola, as they were the main Gram negative starch digester rods (HALMIN and HUNGATE, 1956 and LEWIS, 1957). Gram variable streptococcus and Gram negative diplococci were increased. Strepto coccus increased in rumen where there is increased grains (HUNGATE, 1957). It is one of starch digester microorganisms which posses amylases (BRYANT, SMALL, BOURMA and ROBINSON, 1958).

Streptococcus bovis ferment large number of different carbohydrates with the formation of lactic acid (HOWARD, 1959). The Gram negative diplococci was usually represented by peptostrepto-coccus Elsdenii. It was in direct relationship with lactic acid content of rumen on concentrate diet (GUTIERREZ; DAVIS, TINDABLE and WARWICK, 1959). The spirillum was glucose and starch digester (KARULOV and KROTHOVA, 1971). Vibrio was represented by Butrivibrio fibrisolveno. It mainly utilizes starch in addition to cellulose (MAKIE and FOSTER, 1957; GILL and KING, 1958; MERGERITA and HANGATE, 1963). Selenomonas ruminatum was a starch digester microorganisms (HUNGATE, 1957).

On green fodder, at 6 hours after feeding, all forms of microorganisms decreased except Gram negative rods and QUINS OVAL (Tables 1, 3 & Fig. 1, 3).

The decrease in number of all forms of micro organism on feeding green fodder was due to diluting effect of barseem, as it contains high moisture content.

## DIET AND RUMEN MICROORGANISMS

The Gram negative rods were usually bacteroid forms which act as glucose digester, specially bacteroides succinogen which digest cellulose beside glucose (KORULOV and KROTHOVA, 1971). Where most of the dry matter of Barseem is rich in soluble carbohydrates and fibers. Quins oval grow on fresh clover and grasses (CLARKE, 1979).

On green fodder, at 22 hour both Gram positive and Gram negative mono-cocci, Diplococci and Vibrio were increased (Tables 1, 3 & Fig. 1, 3) as the main rumen content at that time was mainly cellulose.

On concentrate rations, at 6 hours Gram negative monococci, rods and spiral forms were increased which act as starch digesters. The number of streptococcus, Gram positive rods and vibrio decreased as they were utilized by special species of protozoa like Entodinium to check the progressive increase of lactic acid producing bacterial; strepto-coccus bovis; on concentrates (HUNGATE, DOUGERTY, BRYANT and CELLO, 1952; MANN, MASSON & OXFORD, 1954 and MANN, 1970).

From above, it is clear that rumen microorganisms are a well balanced system. On green fodder, where Gram positive and coccoid form increased, the Gram negative and rod forms decreased. Vice versa occurs on concentrates.

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Table (1) The percentage of different types of bacteria in the rumen of goats fed on green (Barseem) ration.

Type of bacteria	Green ration																	Total mean										
	At morning																		Mean									
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th			Animal No 1 1st	Animal No 2 1st	Animal No 3 1st	Animal No 4 1st	Mean				
<b>Monococci</b>	Small Gr (-)	14	16	18	23	13	23	19	20	22	24	30	27	20.8±1.5	11	22	26	20	22	18	18	16	18	16	28	16	19.3±1.4	20±0.99
Small Gr (+)	20	19	6	4	12	13	2	10	11	6	8	16	10.6±1.7	11	8	2	3	13	18	13	14	13	2	3	8.1±1.8	9.3±1.24		
Large Gr (-)	1	1	-	6	-	-	4	3	5	2	2	1	1.9±0.4	2	-	3	-	-	1	1	2	-	2	-	0.8±0.3	1.37±0.35		
Large Gr (+)	2	-	6	8	2	-	10	5	4	2	1	-	3.3±1	1	-	6	7	-	12	4	3	4	-	-	3.1±1.1	3.2±0.7		
<b>Diplo</b>	Small Gr (-)	5	6	8	4	14	12	7	8	6	7	10	7.3±1.1	2	5	10	-	9	8	7	5	9	4	4	5	5.7±0.9	6.45±0.69	
Small Gr (+)	12	10	6	1	17	13	2	9	7	10	3	7	8.1±1.4	6	4	6	7	12	5	10	10	3	12	8	6	7.4±0.9	7.75±0.79	
Large Gr (-)	1	2	-	5	-	-	-	3	2	4	-	-	1.4±0.5	-	1	-	-	-	1	4	2	-	-	3	-	0.9±0.4	1.17±0.32	
Large Gr (+)	1	1	-	6	3	-	-	1	1	3	6	1	2	2.1±0.6	-	-	-	-	-	6	1	-	-	-	-	0.6±0.5	1.33±0.4	
<b>Sarcina</b>	Small Gr (-)	-	1	1	-	-	-	2	-	-	-	-	2	0.5±0.2	-	1	-	2	-	-	4	-	-	1	-	2	0.8±0.4	0.66±0.21
Small Gr (+)	-	3	-	1	-	-	-	2	3	-	-	-	-	0.8±0.4	-	2	-	-	-	-	2	-	-	-	-	-	0.3±0.2	0.54±0.2
<b>Chain</b>	Short Gr (+)	-	1	-	-	-	-	1	2	1	-	-	-	0.3±0.2	1	-	-	-	-	6	-	1	-	1	-	-	0.6±0.5	0.45±0.26
Long Gr (+)	-	1	-	-	-	-	-	1	-	-	-	-	-	0.2±0.1	-	-	-	-	-	1	-	-	-	-	-	-	0.2±0.1	0.16±0.08
<b>Rods</b>	Small Gr (-)	26	22	21	18	24	21	18	15	14	9	27	16	19.3±1.5	41	36	26	20	23	28	8	15	22	18	26	24	27.9±2.5	21.52±1.53
Small Gr (+)	6	5	4	-	-	-	-	5	6	6	2	12	3	3.6±1	4	6	-	9	10	2	7	-	-	2	-	8	4±1.1	3.79±0.44
Small Gr (-)	3	-	3	12	4	4	4	9	6	5	10	-	4	5±1.1	5	9	12	12	4	14	4	14	11	20	14	11.6±1.6	8.29±1.10	
Large Gr (-)	-	2	-	-	-	-	-	2	3	2	6	-	2	1.4±0.5	-	-	-	2	-	-	1	1	2	-	-	-	0.5±0.2	0.95±0.3
Large Gr (+)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Filamentous form</b>	Gr (-)	-	-	4	-	-	-	4	1	-	-	-	1	1.1±0.5	-	-	1	-	2	-	-	-	-	-	-	-	0.2±0.1	0.62±0.25
Spiral Gr (-)	-	4	6	-	4	6	4	4	6	5	5	4	3	3.9±0.6	6	2	-	3	1	-	4	4	2	7	4	8	3.4±0.8	3.66±0.47
Vibrio Gr (-)	8	7	11	8	7	11	6	6	5	4	13	6	5	7.6±0.8	7	4	6	9	5	3	3	4	4	6	4	10	5.4±0.7	6.49±0.55
Quin's oval Gr (-)	-	-	-	-	-	-	-	2	-	1	-	-	-	0.3±0.2	2	-	2	1	-	-	5	5	1	1	-	-	1.4±0.5	0.82±0.29
Solenomonas Gr (-)	1	-	6	1	-	-	6	3	1	1	2	1	1	1.9±0.6	-	1	-	5	2	2	2	2	5	5	-	4	2.3±0.6	1.61±0.4
Oecillospira Gr (-)	-	-	-	-	-	-	-	-	1	-	-	-	-	0.1±0.1	2	-	-	3	-	-	1	-	-	1	-	-	0.6±0.3	0.33±0.15





**Table (3) The percentage of different types of bacteria in the rumen of goats fed green (Barseem) and dry concentrate (wheat and grain sorghums) ration.**

	Table (3)																						
	Monococci		Diplococci		Sarcina		Strept.		Rods		Filament form		Spiral		Vibrio		Quino oval		Seleno monos		Oscillo-spira		
	Gr+	Gr-	Gr+	Gr-	Gr+	Gr-	Gr+	Gr-	Gr+	Gr-	Gr-	Gr-	Gr-	Gr-	Gr-	Gr-	Gr-	Gr-	Gr-	Gr-	Gr-	Gr-	
Green ration (Barseem)	Early at morning	13.9	22.7	10.2	8.7	1.3	0.5	5.0	24.3	1.1	3.9	7.6	0.3	1.9	0.1								
		+1.13	+1.6	+1.42	+1.0	+0.94	+0.26	+1.13	+1.15	+0.47	+0.6	+0.8	+0.18	+0.6	0.08								
	Afternoon	11.2	20.1	8.0	6.6	1.1	0.8	4.5	35.5**	0.2	3.4	5.4	1.4*	2.3	0.6								
	+2.64	+1.5	+1.13	+0.97	+0.4	+0.5	+1.14	+2.8	+0.11	+0.75	+0.53	+0.53	+0.53	+0.57	+0.29								
Mean	12.5**	21.4	9.1*	7.7	1.1	0.7	4.8	29.8	0.6	3.7	6.5	0.8	2.12	0.4									
	+1.20	+1.04	+0.89	+0.55	+0.30	+0.27	+0.77	+1.91	+0.22	+0.47	+5.4	+0.29	+0.39	+0.15									
Dry Concentrate ration	Early morning	7.6	18.2	6.1	7.7	0.7	2.2	5.1	36.6	0.4	4.2	8.2	0.7	2.2	1.2								
		+1.45	+1.37	+0.96	+0.83	+0.29	+1.15	+1.42	+1.99	+0.18	+0.88	+1.9	+0.29	+0.6	+0.66								
	Afternoon	7.3	18.8	6.0	8.5	1.0	1.2	2.5	38.5	0.3	5.6	6.3	0.9	2.3	0.4								
	+0.83	+1.44	+1.14	+0.89	+0.29	+0.32	+0.68	+2.8	+0.18	+0.91	+0.95	+0.38	+0.5	+0.34									
Mean	7.4	18.2	6.1	8.2	0.8	1.7	3.6	37.7*	0.4	5.0	7.1	0.8	2.3	0.8									
	+0.74	+0.96	+0.73	+0.60	+0.26	+0.51	+0.73	+1.74	+0.13	+0.62	+0.95	+0.24	+0.36	+0.34									

\* (P/ 0.05)      \*\* , \*\* (P/ 0.01)

Morning : 22 h. after feeding

Afternoon : 6 h. after feeding

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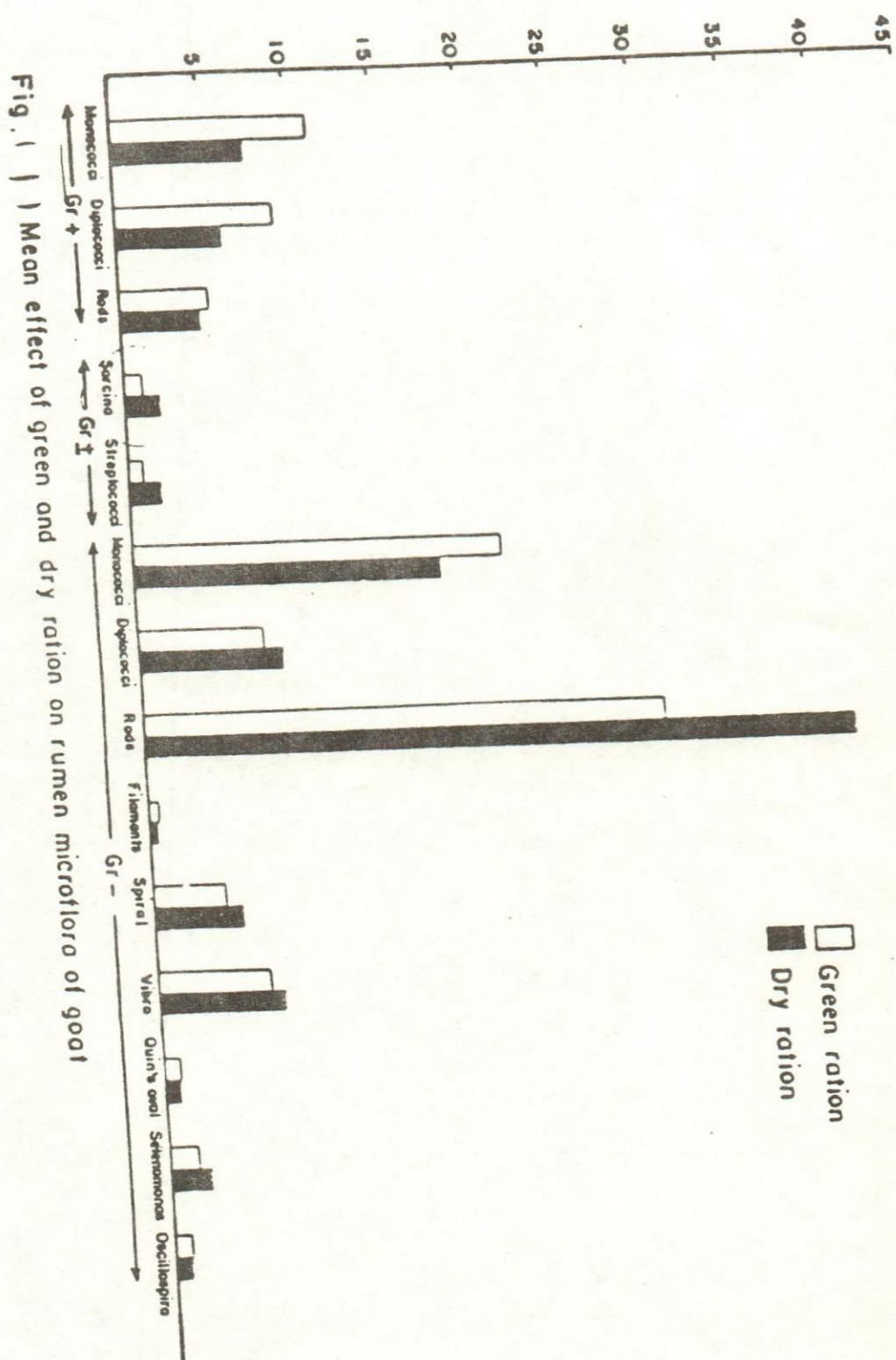
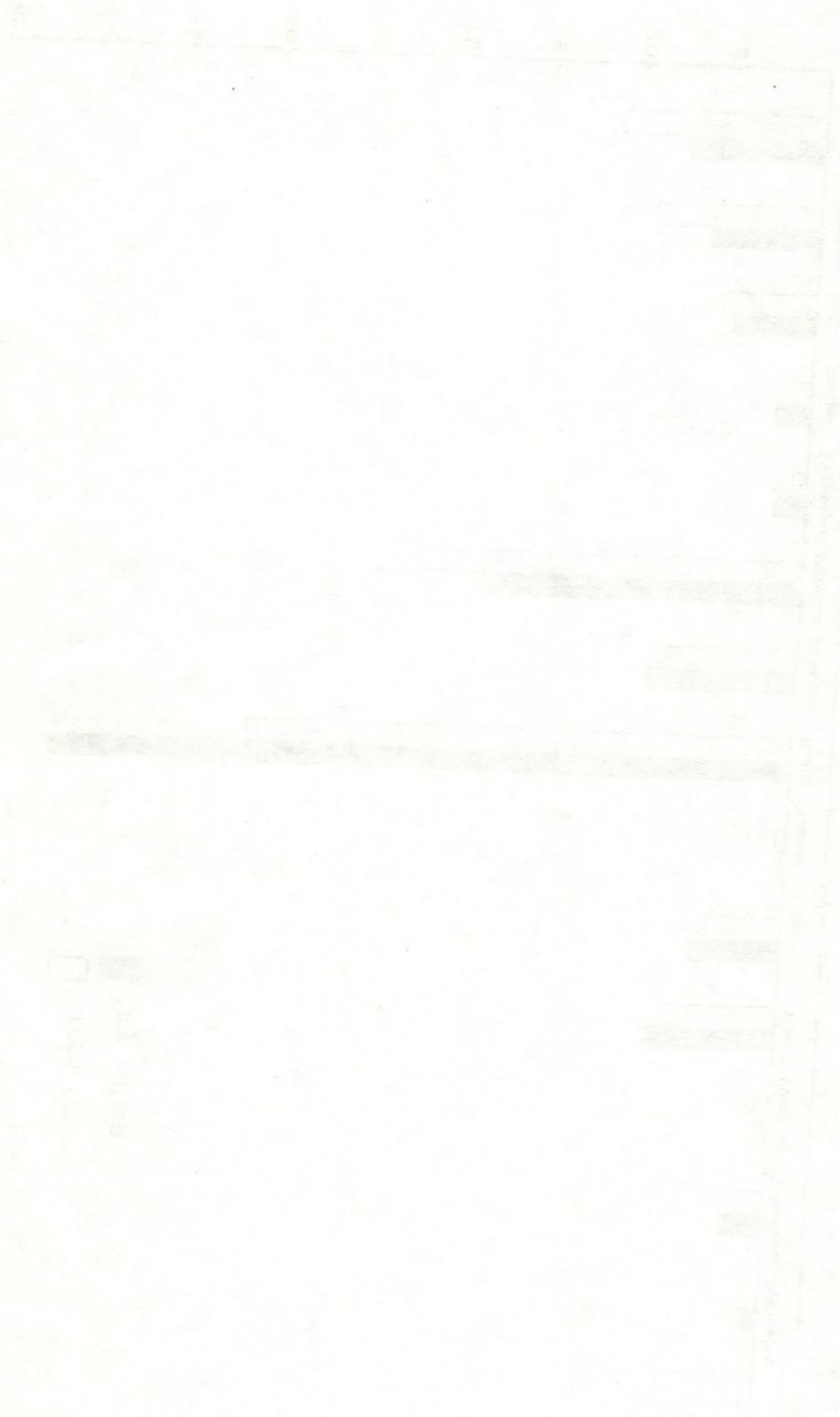


Fig. 1 | Mean effect of green and dry ration on rumen microflora of goat



The following table shows the results of the experiment. The data is presented in a table format, with columns for the different variables and rows for the individual measurements. The values are given in the units specified in the table.

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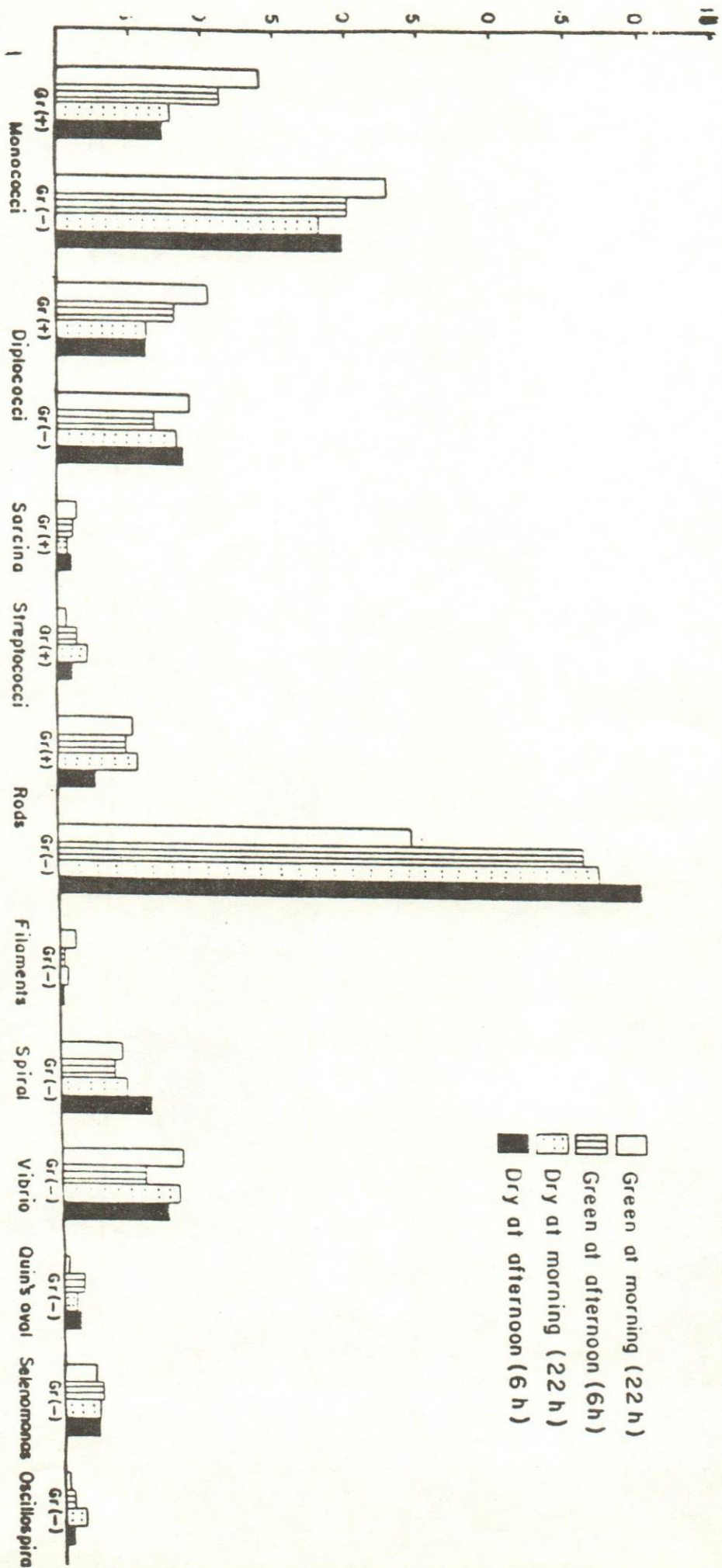


Fig. ( 2 ) Rumen microflora under green and dry ration in goat

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The table consists of approximately 10 columns and 15 rows. Due to extreme fading, the content is completely unreadable. It appears to be a ledger or account book with various entries.

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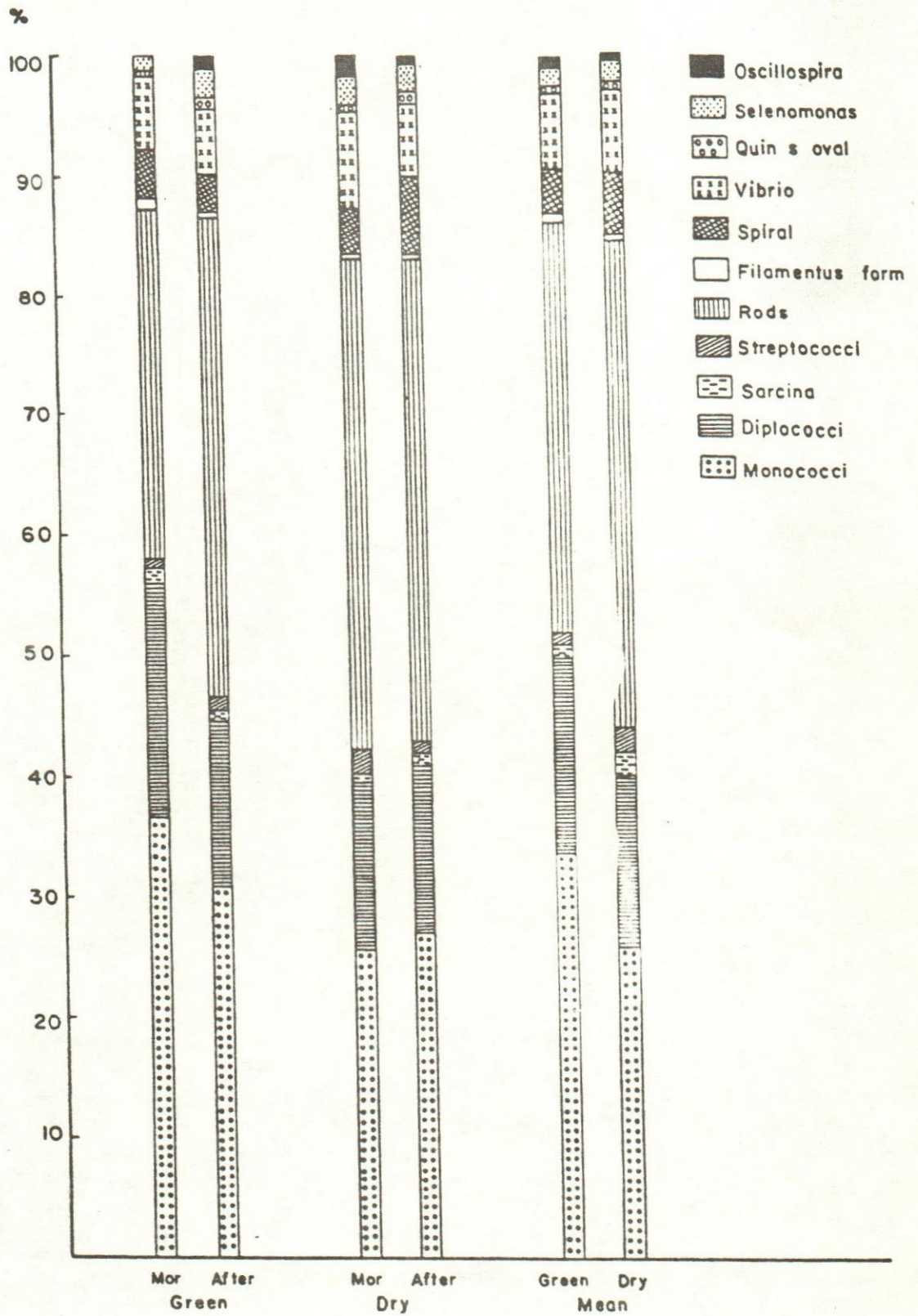


Fig.(3) Changes in the average percent of different types of microflora (bacteria) in rumen content of goat .