# Rumen Fermentation In The Rumen Improves Physiological Properties

The process of fermentation in the rumen of the sheep informs the approaches of improving physiological attributes of the sheep, which associates with the improved availability of nutrients and materials that provide required properties. This study looked into the three articles that investigate the role of rumen in sheep. Harrison et al., (1976) looked into fermentation of excellent microbial communities. Parker et al. (1989) used the improved technology to assess the release of chromic oxide in the rumen. De Barbieri et al. (2016) determined the physiological attributes associated with inoculation of rumen microorganisms the animals.

## ARTICLE SUMMARY 1

Short chained fatty acids mainly produced in the rumen are mainly influenced by diet. With grain the molar proportion of propionate (pr) is usually high while with forages its usually low and is linked with proportions of acetate. (pr) is inversely related to rumen dilution rate and can be increased. Various workers have compared the yields of microbial nitrogen (N) from different diet patterns and have found higher yield with propionate opposed to acetate and to resolve this we have used the saliva infusion technique.

Some of the experimental methods used to determine this are animal management where mature wethers are used , diet and infusion treatment, statistical analysis, rumen fermentation, this were the methods used and the measurements are used to make conclusion of the experiment on the topic. From this we see all carbohydrate fermented in the rumen is degraded to hexose or hexose precursorlg and thus the total carbohydrate apparently digested in the rumen may be considered as moles of “hexose” fermented. As the diet contained essentially no amino acids, all the amino acids flowing into the

In the results gotten from this experiment it is clear that it’s possible to alter the pattern of rumen fermentation by infusion of artificial saliva into the rumen of sheep fed a semi purified diet. The changes induced by the intraruminal infusion of artificial saliva, and the subsequent extension of this work to the incorporation of the mineral salts of saliva in the diet,21 have been shown to influence the efficiency with which the micro flora of the rumen synthesize protein per mole of hexose fermented. In the present experiment both the total number of viable bacteria and the particular species23 were influenced by the intraruminal infusion and the altered dilution rate, the net outcome of this improved efficiency of microbial synthesis being an elevated flow of total amino acids into the duodenum.

In the present experiment, the higher dilution rate and the increased efficiency of microbial protein synthesis were associated with a change in the molar composition of the volatile fatty acids in the rumen; propionic acid declined from 32 to 20%, acetic acid increased from 58 to 66% with the intraruminal infusion of artificial saliva The molar proportion of propionic acid was negatively correlated with D rate, in agreement with previous results.3 However, in contrast to the results of Jshaque et aL4 the results of this experiment demonstrate a more efficient synthesis of microbial protein with a predominantly acetate and a low propionate pattern of rumen fermentation. The efficiency of microbial protein synthesis in vivo is not constant and can, with the pattern of fermentation in the rumen, be manipulated in a manner which alters the nature and quantity of nutrients absorbed from the alimentary tract of the ruminant.

With the new technology after 13 years, the next article assesses the release of chromic oxide in the rumen, the compound that is used a marker for indigestible feeds in sheep rumen. The compound helps determine the rate and quantity of feed intake, which can happens in the field while the sheep is grazing. Such an approach was made possible based on previous development mentioned hence made it possible to undertake the assessment.

## ARTICLE SUMMARY 2

**Abstract:**

This experiment aimed at ascertain in the amount of feed intake in gazing animals. This was conducted by having a controlled release capsules release chromic oxide (Cr2O3). ). The experiment studied the effect of herbage type and level of intake on the release of chromic oxide from intraluminal controlled release capsules in sheep (Parker et al., 1989).

CRC technology is used to release a uniform amount of indigestible chromic oxide into the sheep’s rumen in a period of about 20-30 days to estimate the intake of herbs in grazer. The paper will present the outcome of rumen-fistulated sheep, which were fed different herbages five times. They had three daily allowances (Parker et al., 1989).

In this paper, two studies took place in sheep to investigate the influence of herbage and its intake on the chromic oxide that is released from the CRC. The purpose of the first experiment was to ascertain the variation in the rate of Chromic oxide release form CRC within the sheep using five sheep of 14 months in age. During this period each sheep was treated with a selenium-fortified anthelmintic for internal parasite control and other elements to prevent copper control for 10 days (Parker et al., 1989).

The second experiment ran at the same time with the first one, and had an objective of finding the quantitative pattern of the release of chromic oxide from CRC in sheep using 4 unrelated types of herbage, giving three allowances, on sixteen 14-month-old sheep. The sheep were fed at approximately maintenance allowance for a 10-day period.

The experiments proved that with 50% chromic oxide matrix, 7.00 mm of orifice and 6 cm core, they can release Cr in sheep for a minimum period of 100 days. The pattern of the release changed on the 42nd day when the sheep were changed from an indoor feeding to outdoor grazing. This is because the CRC was subjected to a different environment other than of the rumen (Parker et al., 1989)

Overtime, there was a slight reduction in the release of Cr which may be attributed to the reduction in tension in the spring since there was an extruded matrix. However, the variations in terms of the release of Cr from CRC could not be considered to be very significant, that is to say that CRC in the same environment (rumen) display similar results. Similarly, in the second experiment, the results indicated with a change in the types of feeds. There was a consistent difference in the CRC, which is highly expected depending on the results seen in experiment 1 (averaged 62 ± 1 mg Cr/day in experiment 1 and 97.4 ± 2.6, 100.2 ± 2.8, and 103.8 ± 3.6% in experiment 2 (Parker et a., 1989).

There was no significant diurnal variation in the faucal Cr concentration. Other experiments in the past have recorded significant diurnal variation when chromic oxide was administered (Parker et a., 1989). The low variation in this experiment was accounted for the continuous release of chromic oxide in the rumen of the sheep. The low marker Cr concentration as compared to the environmental levels should not be an issue since by using commercial CRC, there is likely to be 50-60% higher release. This is attributed to the 65% chromic oxide matrix and a much bigger orifice (Parker et at., 1989).

Chromium should appear in the faeces of the sheep within 24 h of CRC insertion in intact sheep. At the same time, it is until 5-8 days later for the steady state levels of Cr to be achieved. It is clear that the CRC plunger travel remains in line across the different feeding levels and herbage types (Parker et at., 1989).

In this next experiment it considered modifying the rumen by providing ewes with lipids differing in rumen-availability. It determined the physiological attributes associated with inoculation of rumen microorganisms the animals, which made possible the fistulation of the animal. This study applied the concept earlier developed in evaluate parameters. It concluded dietary fat can affect rumen development and fermentation of the lambs.

## ARTICLE SUMMARY 3

The article titled Positive Consequences of Maternal Diet and Post-Natal Rumen Inoculation on Rumen Function and Animal Performance of Merino Lambs was published in the Elsevier Journals in 2015. The authors of the article set out to establish whether the neonatal modification of the microbial inoculum that routinely enter the gastrointestinal tract may alter the rumen microbiome, thereby consequently altering the pre- and the post-weaning rumen fermentation and growth of lambs (Barbieri et al, 2015). In particular, the authors set out to establish whether the modification of rumen by providing ewes with lipids that differ in rumen-availability in late gestation and lactation would affect the performance of the lamb offspring. In addition, the authors set out to determine whether the cross-inoculation of neonatal lambs with the digesta from sheep on an alternate diet would correspondingly modify the fermentation, size as well as the characteristics of developing rumen and the performance of the lambs.

In carrying out the survey, the researching team brought together 300 Australian Merino hogget ewes of the Elite Commercial Flock of Chiswick. The ewes were paddock-mated in May 2013, before being shorn in mid-pregnancy and scanned for pregnancy later. From the group, 36 ewes with singleton along with eight non-pregnant ewes heavier than 35.5 kg and with condition scores greater than 2.25 units were selected for the research (Barbieri et al, 2015). The research took six months; one month being before the first day of lambing and continued for five months after lambing. The research was carried out in four stages. Stage one was from one month pre-lambing until such a time that lambing was done. Stage two lasted from lambing until weaning whereas stage three lasted two weeks after weaning and only lambs were used. The same applies for stage four, which lasted seven weeks and involved lambs only (Barbieri et al, 2015). The research team carried out the first, second and third stages indoors with individual pens being used during stage one and stage three while mothers and lambs were combined during the second stage. The fourth stage of the research was done outside with grazing and treatment being done along the paddocks.

In the course of carrying out the research, the effect of the two major factors; the diet as well as artificial inoculation of the lamb with contrasting rumen fluid and lamb performance was studied. Another aspect that was studied in the course of the research was the physiology of the lamb.

The first finding of the survey was that the diet type had no effect on both the body weight and the condition score of maternal ewes at any time from one month prior to lambing until such a time that weaning was done (Barbieri et al, 2015). In addition, the survey established that the average daily meal intake of donor ewes was somewhat influenced by the diet, as the sheep that were supplemented using protected fact ate more than those with CO within their diet. Nonetheless, their body-weight, conditional score as well as rumen fermentation parameters were not affected by the changes in diet.

## Conclusion:

It is evident that the rumen fermentation improves physiological properties. The process of fermentation in the rumen of the sheep informs the approaches of improving physiological attributes of the sheep, which associates with the improved availability of nutrients and materials that provide required properties. Barbieri et al. (2015) aimed to establish the possibility of improving growth, development, and physical attributes like wool development in the lambs by inoculation. Barbieri et al, (2015) establish whether the neonatal modification of the microbial inoculum that routinely enter the gastrointestinal tract may alter the rumen microbiome, thereby consequently altering the pre- and the post-weaning rumen fermentation and growth of lambs. All the experiments supported that rumen fermentation improves physiological properties.

## References

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