Fecal pH and fecal score in local cattle

Rahman Kadhum Muhsen* **Hasanian Hisham Nasir Al-Autaish****
College of Veterinary Maedicine- University of Thi-Qar*
College of veterinary medicine – University of Basrah**

Abstract

The study was conducted at Thi-Qar province at period from 16-9-2016 to 15-1-2017. Nine hundred (900) fecal samples were taken rectally from cows. Fecal PH and fecal score were recorded. The results of this study revealed that , the mean of fecal pH and fecal score in our cattle was 7.76 ± 0.086 and 2.72 ± 0.16 respectively . There was no significant differences in fecal pH and fecal score between male and female and between mature and immature cattle ($P > 0.05$) . There was significant positive correlation between fecal pH and fecal score ($P < 0.05$) .

المستخلص

أجريت هذه الدراسة في كليه الطب البيطري وكليه الزراعة /جامعة البصرة . وأخذت نماذج البراز للابقار من المستقيم مباشرة للفترة من 16–9–2016 لغايه 15–1–2017 .وقد بينت نتائج الدراسة بأن ، متوسط الاس الهيدروجيني ودرجة البراز كان 7.76 ±0.086 و 2.72 ±0.16 على التوالي .لم يكن هناك اختلافات معنوية في حامضية البراز ودرجته بين الذكر والانثى وبين الماشية البالغة وغير البالغة (اكثر من 0.05)، وكان هناك ارتباط معنوي موجب بين حامضية البراز ودرجته (اقل من 0.05).

Introduction

The rumen is a very complex organ in the ruminant. There are a number of different micro-organisms in the rumen, with the main three groups being bacteria, protozoa and fungi. These organisms are, to a large extent, responsible for the fermentation process of the different feedstuffs to convert the non-usable feed particles to absorbable nutrients, for example volatile fatty acids (VFA). The PH in the rumen also plays an important role in the function of the rumen and its micro-organism population (1) .

Rumen PH fluctuates throughout the day and that could have an important effect on the fermentation and digestion in the rumen. Different rumen micro-organisms are active at different PH levels. The growth of fiber digesting bacteria, for example , is favored when rumen PH is between 6.0 and 6.9 while the growth of starch digesting bacteria is favored by a PH from 5.5 to 6.0. Thus, the high producing cow has to maintain a PH of near 6.0 for the optimal growth of all bacterial populations, which will result in a favorable VFA pattern and yield (3).

Materials and methods

The study was conducted Thi- Qar province. Nine hundred(900) fecal samples were taken rectally from cows at period from 16-9-2016 to 15-1-2017. Fecal PH was measured with a PH-meter. After the faecal sample was taken the cow was stimulated by hand internally in the rectum to encourage the excretion of more feces that dropped to the ground. From the fecal pile, the following could be observed:

- Fecal score (see fecal scoring system),

- Fecal PH,

The fecal samples were stored at cool place immediately after collection for later starch analysis.(2).

Table (1) Fecal Scoring System according to (3):

Score	Appearance
1	Very liquid in nature no rings or dimpling feces Puddles /runs.
2	Does not pile less than 2.5cm deep appearance of Rings.
3	Porridge consistency stand 3.5cm high 4-6 concentric rings /dimples.
4	Feces are thick dose not stick to shoes no dimpling or rings.
5	Firm feces balls 5-10cm high.

Results and discussion:

The pH of fecal samples range between 6.39 – 8.89 with mean of 7.76 ± 0.086 . This results can be considers within the normal value according to (4). The fecal pH in immature cattle ranged between 7.28 – 8.49 with mean of 7.82 ± 0.16 . In mature cattle , the range of pH was between 6.39 – 8.89 with mean of 7.74 ± 0.10 . There was no significant differences in mean of fecal pH between mature and immature cattle $P > 0.05$ (table 2) .

The fecal pH in male ranged between 6.89 – 8.17 with mean of 7.64 ± 0.12 , while the fecal pH of female ranged between 6.39 – 8.89 with mean of 7.8 ± 0.11 . There was no significant difference in fecal pH between male and female $P > 0.05$(table3).

There are several factors affect changes in rumen PH . The type of diet can cause a shift in the PH , with forage rations usually resulting in a PH of greater than 6.0 forage (fiber) stimulates a higher rate of saliva production and secretion. Saliva contains bicarbonate, which helps with buffering the rumen environment (4).

The physical form of feed (ground, pelleted or chopped) will affect the size of the feed particles. If the forage particle size is too short, the forage mat necessary in the dorsal rumen cannot be maintained. Fiber digestion will decrease and rumen PH is lowered . Saliva production is also reduced due to less cud chewing time. If concentrates are ground too finely, starch is exposed too rapidly to microbial digestion and increased degradation. The rumen PH drops and propionic acid and lactic production increases. Steam rolling, pelleting or grinding will change starch structure, which makes it more available in the rumen for fermentation (5).

The level of feed intake changes the rumen degradation and synthesis. Rumen PH can drop as more substrate, such as starch, becomes available for microbial use, thus increasing acid production. The amount of saliva produced per unit dry matter can also decline with a drop dry matter intake (DMI) (6).

Wet ration can reduce rumen PH due to less saliva production and rumination time. If the wet feed is silage ,less chewing is needed to reduce particle size, lowering rumination time. If the total ration moisture exceeds 50% due to ensiled and fermented feeds, DMI can be reduced (4).

The method of feeding may change the rumen environment. Total mixed ration (TMR), for example, may stabilize the rumen PH more than feeding concentrate and roughage separately by minimizing the feed particle selection, synchronizing degradable protein and fermentable carbohydrate availability and increasing the DMI. Although ruminal PH is a critical factor in indicating metabolic acidosis, it should be realized that it is not the only factor (6).

The fecal score of fecal samples ranged between 1 – 5 with mean of 2.72 ± 0.16 , which is considered within the normal limit according to Hall (1999) . The fecal score of mature cattle ranged between 1 – 4 with mean of 2.66 ± 0.15 , While the fecal score of immature cattle ranged between 1 – 5 with mean of 3 ± 0.58 . There was significant differences in fecal score between mature and immature cattle $P > 0.05$ (table 2) .

The fecal score of male ranged between 1 – 5 with mean of 2.9 ± 0.41,while the fecal score of female ranged from 1 – 4 with mean of 2.65 ±0.165 . There was no significant difference in fecal score between male and female $P > 0.05$ (table 3) .

There are several factors affecting the fecal score such as type of diets, physical form of feed , level of feed , proportion of green feed and method of feeding (4).

There was significant positive correlation between fecal pH and fecal score $P > 0.05$ (table 4) . There was no previous study to comparison .

Table 2 Fecal pH and fecal score according to age .

	Fecal score	Fecal pH
Mature cattle	2.66 ± 0.15	7.74 ± 0.10
Immature cattle	3 ± 0.58	7.82 ± 0.16
Total	2.72 ± 0.16	7.76 ± 0.086
P value	P > 0.05	P > 0.05

Table 3 Fecal pH and fecal score in male and female

	Fecal score	Fecal pH
Male	2.9 ± 041	7.64 ± 0.12
Female	2.65 ±0.165	7.8 ± 0.11
Total	2.72 ± 0.16.	7.76 ± 0.086
P value	P > 0.05	P > 0.05

Table 4 Correlation between fecal pH and fecal score .

	Score	pH
Score Pearson correlation Sig (1 tail)	1	1.45 2.33
pH Pearson correlation Sig (1 tail)	1.45 2.33	1

Referances

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