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Subacute ruminal acidosis in high yielding Buffaloes and its management

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Abstract
In pursuit of maximum milk production per head, dairy producer over fed grain diets that are high in starch and low in fiber to the high yielding buffaloes. These diets increase the risk of Subacute Ruminal Acidosis (SARA), which is a metabolic disease in high-producing buffaloes leading to decrease in ruminal pH to < 5.6. Other factors include inadequate ruminal buffering and adaptation to high carbohydrate diets, lack of coarse fiber and feed sorting. The affected animals resolve ruminal acidosis and return to normal pH by selecting long forage particles, sorting a mixed ration and reducing overall feed intake leading to decreased production. Consequently, it may result in rumenitis, reduced absorptive capacity of rumen, diarrhea, milk fat syndrome, laminitis, liver abscess, increased culling rate and death. In the present study nine buffaloes were found to be suffering from SARA, on basis of ruminal pH testing. All the animals fully recovered after treatment with sodium bicarbonate, ionophores and probiotics.

Keywords: Subacute Ruminal Acidosis, Probiotics, Buffering, Monensin

Introduction
Subacute ruminal acidosis (SARA) arises when a highly palatable, high-energy diet is given to large ruminants in which ruminal environment is not adapted to this type of substrate. This will lead to increase in short-chained fatty acids. Eventually, this may result in a transient nadir of ruminal pH below 5.5. The critical threshold of the ruminal pH can be identified at 5.5 some hours after concentrate feeding (Nordlund *et al*., 1995, Garrett *et al*., 1998, Oetzel, 2000) [8, 1, 2]. Probably SARA has to be understood as a maladaptation of the reticulo-ruminal environment. It occurs in two types of situations. First, recently calved, lactating cows are given a diet considerably differing from that in the dry-period. A diet change carried out too rapidly or without proper transition management will put the animals at risk. Secondly, inaccurate calculation of dry-matter-intake (DMI) leading to wrong roughage/concentrate ratio. The consequences of SARA are diverse and complex. Laminitis is regularly connected to SARA and the negative impact of organic acids on the ruminal wall may lead to parakeratosis enabling translocation of pathogens into the bloodstream provoking inflammation and abscessation throughout the ruminant body. The ruminal wall and its papillae herein play an important role. The adaptational growth (parakeratosis) has been described (Dirksen *et al.*, 1984) [7]. Moreover, milk-fat depression (MFD) can be related to SARA. In order to achieve a proper diagnosis, SARA has to be understood as a herd-management problem. The prevention of SARA applies to the principles of ruminant feeding. Careful transition management from the dry to the lactation period and control of fibre-content and ration quality should be more yielding than the use of buffers or antibiotic drugs.

Case presentation
On an organized buffalo and cattle farm, having a total of 80 adult animals, nine buffalo, 2-3 weeks post-partum were showing signs of decreased overall feed intake, reduced milk yield, selective eating of roughage and loose feces with undigested grain particles in it. Recommended deworming schedule was regularly followed on farm. These animals were previously treated with sulfamethoxazole and other antibiotics orally but there was no response to treatment. The average yield of animals was more than 16 liters and animals were fed more than 9 kg of grains per head per day. On examination the physiological parameters were found to be normal. . Ruminal fluid was collected by rumenocentesis and its pH was found to be 5.2. Milk fat content of the affected animals was found to be 5.4%, which was significantly lower than normal animals.

These animals were treated successfully by adding sodium bicarbonate at the rate of 200g per head in feed along with supplementation with Monensin (@400mg per head per day) and probiotics (Bolus having live yeast culture, live *Lactobacillus* culture) for seven days.

Results and Discussion

Resumption of normal feed intake, feed digestion and improvement in milk yield along with milk fat percentage was noticed after the treatment of these animals. Average ruminal fluid pH after seven days of treatment was found to be 5.9. Average fat content increased upto 6% in the treated animals. The adaptation of the ruminal mucosa to a concentrate-rich diet takes about 4–6 weeks to develop (Nordlund *et al*., 1995, Nocek, 1997) [8, 4]. Best prevention of any fermentative disorder in the forestomach has to be seen in proper feeding management (Garry, 2002) [6]. Nocek *et al*., 2002 [5] revealed an effective elevation of the ruminal pH by administration of direct fed microbials (DFM). Three microbials, *Enterococcus faecium*, *Lactobacillus plantarum* and the yeast *Saccharomyces cerevisiae* in different concentrations were administered intraluminally. At a level of 105 cfu/ml they proved to reduce diurnal ruminal acidity and improve digestion of cornsilage fed in this trial. The microbes here are lactate producers, which are thought to stimulate lactate-users thus effectively prevent an accumulation of lactic acid and contribute to a higher pH level. Similarly in our study the feeding of lactate producer flora also helped in reducing the severity of SARA. Supplementation with inophores is also documented to reduce cases of SARA. The use of ionophores-like lasalocid or monensin has proved to be effective against acidosis (Nagaraja *et al.*, 1981).

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