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## Therapeutic approach in field clinical case of hypophosphatemia in a pregnant cross bred dairy cow in Theni district of Tamil Nadu state

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### Abstract

Hypophosphatemia being a production disease not only drastically reduces milk production but also causes great losses in term of mortality and high expenses of treatment. A pluriparous 6 month pregnant dairy cow was referred with a history of coffee colored urine for past three days and other physiological parameters were normal. Based on clinical observation and laboratory findings the case was diagnosed as hypophosphatemia. The animal was treated with inj. Buffered phosphorus and inosine and sodium pyruvate sodium 50 ml i/v for 3 days, Inj. Multivitamin for 5 days and Sodium acid Phosphate 60 g orally for 10 days and the animal showed complete recovery on fourth day.

**Keywords:** therapeutic approach, field clinical case, hypophosphatemia, pregnant cross bred dairy cow

### Introduction

Hypophosphatemia is a well-known metabolic disorder of cattle and buffaloes resulted from deficiency of phosphorus or imbalance in Ca: P ratio. Phosphorus deficiency leading to hypophosphatemia may play a part in haemoglobinuria by decreasing red cell glycolysis and ATP synthesis. It is a sporadic disease and considered to be of dietary origin, as a result of prolonged feeding on barseem<sup>[5, 8, 10]</sup>. Chronic phosphorus deficiency is commonly caused by inadequate feed intake or inadequate phosphorus content in the ration over an extended time and also in grazing animals in arid regions with low phosphorus content in soil. The exact aetiology and pathogenesis of hypophosphatemia is not known as yet, variety of aetiological factors had been reported to be associated with disease in different parts of world. The pregnant animals are mostly affected during summer season possible due to consumption of cruciferous fodder or unavailability of phosphorus rich fodder<sup>[1]</sup>. The present report records a case of haemoglobinuria due to hypophosphatemia in a pregnant cross bred dairy cow and its successful therapeutic approach/ management.

### Case history and observations

A pluriparous six month pregnant dairy cow presented with history of passing coffee colored urine for the past three days and other feeding, watering habits and milk yield were normal. Detailed clinical examination revealed pale mucous membrane, normal rectal temperature, coffee colored urine, frequent urination, normal ruminal motility and no pain on abdominal palpation. Faecal and blood samples were negative for parasites. Hematology revealed that haemoglobin was 5.70 g per cent, total erythrocyte count was  $2.79 \times 10^3/\text{cmm}$ , packed cell volume 16.60%. Blood biochemistry showed that the serum Phosphorus was 1.64 mg/dl and serum Calcium was 48.14 mg/dl. Based on the history, clinical signs and laboratory findings, the case was diagnosed as hypophosphatemia.

### Treatment and Discussion

The animal was treated with buffered injection. Phosphorus and inosine and sodium pyruvate sodium (Inj. Phosphorus injection NOVISAC Intas Pharma, Ahmedabad, India) 50 ml i/v for 3 days. Inj. Multivitamin 20 ml i/m (V BVET FORTE-V SOL Pharma Private Ltd., Chennai) for 5 days and Sodium acid Phosphate (Sodaphos, Intas Pharma, Ahmedabad, India) 60 g orally for 10 days. The animal responded well for the treatment and there was complete recovery on fourth day with normal straw yellow coloured urine. In the present case, history of haemoglobinuria / Coffee colored urine helped to diagnose as Hypophosphatemia and it was confirmed by laboratory findings and treatment response.

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The clinical signs recorded in the present study are in agreement with previous reporters [9, 13]. Haematological analysis revealed significant decrease in haemoglobin, packed cell volume and total erythrocyte count. Similar findings have been recorded by earlier worker [9]. Serum biochemistry revealed significant decrease in inorganic phosphorus and is attributed to the deficiency of phosphorus in fodder and soil. Dietary phosphorus deficiency and/or rations containing cruciferous plants were suspected causes of severe hypophosphataemia and have been associated with hemolytic anaemia in cows [3]. Hypophosphataemia results in impaired glycolytic pathway and depletion of ATP in erythrocytes subnormal concentration of ATP predispose red blood cells to alter function and structure, a loss of normal formability and an increase in fragility, result to haemolysis [9]. Fodder grown on phosphorus deficient soil, draught condition and prolonged housing are considered as predisposing factor of disease [9]. Reported the low plasma phosphorus level of 1.8mg/dl as the phosphorus requirements are high during late gestation [14]. The pregnant animal could not meet out the requirement of phosphorus due to less dietary supplementation and it served as a predisposing factor for the onset of disease [12] and the same was documented decreased serum phosphorus in affected buffaloes as reported in the present study. Heavy drainage of phosphorus through milk and foetal development, particularly in high milk yielding animals, leads to hypophosphataemia as reported by [2]. The phosphorus deficiency can reduce the adenosine triphosphate content in red blood cells, influencing the structure and function of cell, thereby increasing fragility and haemolysis, which may lead to acute haemoglobinuria [4, 7]. In the present case, treatment with i/v Phosphorus was very effective and the clinical signs and haematological, serum bio chemical parameters were attained to a normal range after treatment as also observed by previous reports [6, 11, 13]. The treatment protocol as followed was to delimit any use of solutions containing phosphite or hypophosphite salts because the animal is unable to convert biologically inactive phosphite into phosphate, instead sodium acid phosphate was used.



Before treatment

After treatment

**Fig 1:** Haemoglobinuria / Coffee colored urine due to hypophosphatemia

## Conclusion

The present study, concluded that buffered phosphorus and inosine and sodium pyruvate sodium injection and supplementation of sodium acid phosphorus can be successfully used for the therapeutic management of haemoglobinuria due to hypophosphatemia in a pregnant crossbred dairy cow.

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