Degradation of the lamellar basement membrane by matrix metalloproteinase enzymes (MMP) represents a critical early event in the pathogenesis of equine laminitis. Under normal physiological states, controlled dissolution allows the growth of the hoof; however, when excessive activation of these enzymes occurs, it leads to separation of the epidermal from the dermal laminae. This study compared the gene expressions of MMP-2 and MMP-9 during clinical development of carbohydrate (CHO)-induced laminitis when saline or buffer solution was administrated intracecally. Horses were randomly divided among four treatment groups: control (WS), buffer control (WB), CHO-induced laminitis (CS), and CHO-induced laminitis with buffer treatment (CB). The buffer was administered 8 h after CHO. Tissues were collected 48 h after CHO, which was immediately after euthanasia. The quantification of MMP-2 and MMP-9 mRNA was made by reverse-transcription polymerase chain reaction (RT-PCR). Values obtained for MMPs were normalized against the β-actin values, and mRNA-fold differences were compared with it using a ΔΔCt method.

Expression of MMP-2 and MMP-9 was greater in laminitic tissues (CB, CS) than in non-laminitic tissues (WB, WS). MMP-2 expression in the CS and CB group was 2.25-fold and 1.18-fold greater than the WS group, respectively. The WB group represented 0.32-fold the MMP-2 expression of the WS group. MMP-9 expression in the CS group was up 17.79-fold higher than the WS group, and in the CB group, MMP-9 expression was up 5.06-fold higher than the WS group. The WB group represented 0.72-fold the MMP-9 expression of the WS group. We concluded that intracecal administration of buffer solution may be useful in the management of horses fed high levels of carbohydrate. Although
the increased MMP-2 and MMP-9 gene expressions were not completely prevented by administration of the buffer solution, the expression of both MMPs had decreased compared with controls receiving only saline after CHO. Further studies may elucidate the therapeutic potential of this buffer treatment in the prevention of naturally acquired carbohydrate-related laminitis.