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THE INFLUENCE OF TRIMETHYLGLYCINE ON THE UNTRAINED AND TRAINED HORSE EXERCISING TO FATIGUE

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Because fatigue has been associated with the accumulation of lactate, there is considerable interest in methods which reduce lactate accumulation during intense exercise. The compound N,N-dimethylglycine (DMG) has been theorized to prevent lactic acid build-up during exercise; however, inconsistent findings have been reported. Despite the controversial effectiveness of DMG, it continues to be marketed as an ergogenic aid for horses. The purpose of this study was to evaluate the effect of trimethylglycine (TMG) (Finnsugar Bioproducts, Helsinki, Finland), a relative compound to DMG, in untrained and trained horses before, during and after a high-intensity exercise test. Eight mature untrained Thoroughbred horses (5 geldings, 3 mares) were randomly assigned to the control or the TMG treatment group. TMG was top-dressed on the morning grain ration at a rate of 80 mg/kg body weight for 14 days prior to, but not including the day of, the exercise trial. Horses performed an incremental exercise test on a high-speed treadmill beginning at 6 m/s on a 10% grade and increasing 1 m/s every minute thereafter until the horse fatigued. Following the exercise test, treatment groups were switched and the horses were tested a second time. After a 60 day conditioning program, horses were tested again with the same treatment protocol, this time as trained individuals. The addition of TMG did not alter the effect of exercise on plasma lactate, glucose, free fatty acids or triglyceride concentrations during exercise in the untrained horse. However, plasma lactate concentrations were lower at 10 minutes ($P<0.10$) and 60 minutes ($P<0.05$) post-exercise when untrained horses received TMG (Figure 1). In addition, plasma free fatty acids were lower ($P<0.05$) before exercise and at 12 hours post-exercise when untrained horses recieved TMG (Figure 2). After training, no differences ($P>0.05$) due to TMG supplementation were observed in any of the blood or exercise variables measured before, during or after exercise. However, training affected ($P<0.05$) all variables measured, including prolonging ($P<0.05$) time to fatigue and reducing ($P<0.05$) lactate accumulation. The results of this experiment suggest that supplemental TMG may have a beneficial effect on post-exercise lactate oxidation in the untrained horse. However, this finding was not supported by a similar affect on lactate metabolism in the trained horse. Although the horses exhibited a training effect, TMG supplementation produced no additive effects in the trained horse. Therefore, based on the results of this study, TMG appears to offer no benefit to the horse as an ergogenic aid.

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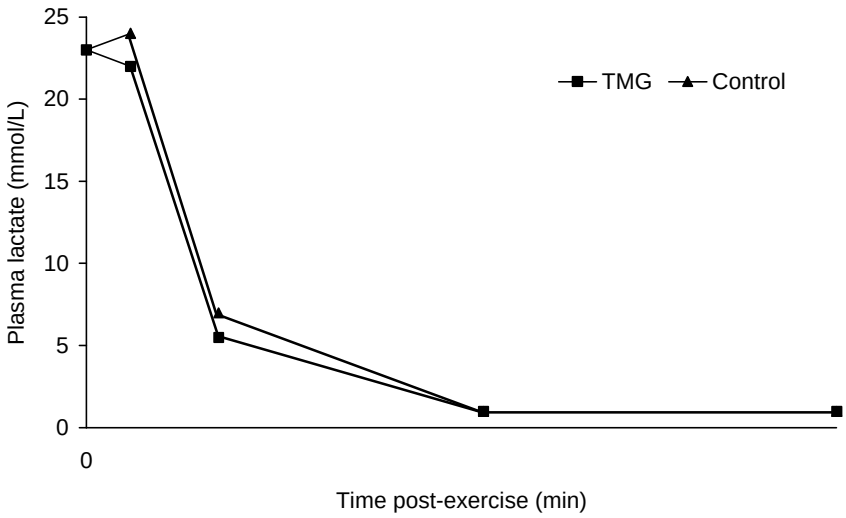

Figure 1. The effect of TMG on the post-exercise plasma lactate concentration in the untrained horse (*P<0.10; **P<0.05) (from Warren *et al*., 14th ENPS, Ontario, CA, January 1995)

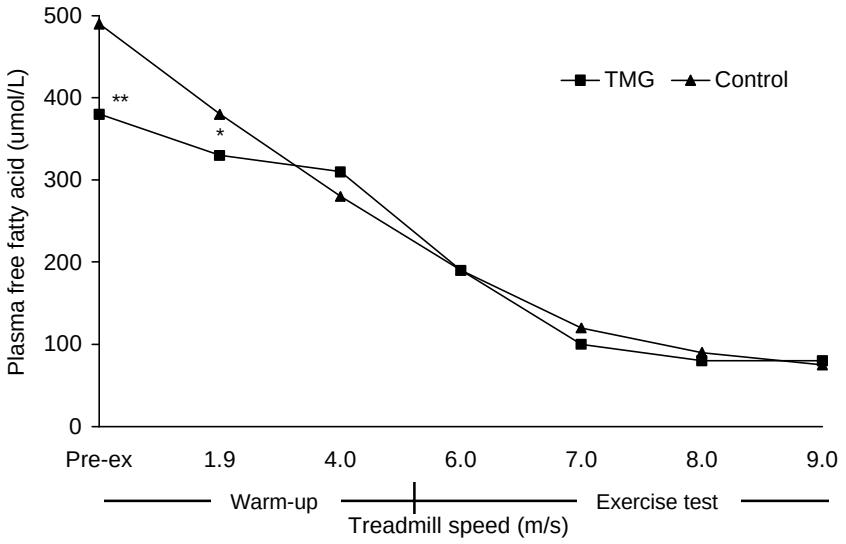

Figure 2. The effect of TMG on the plasma free fatty acid concentration before and during exercise in the untrained horse (*P<0.10; **P<0.05) (from Warren *et al*., 14th ENPS, Ontario, CA, January 1995)