

# Effects of Astaxanthin and L-Carnitine Supplement on Muscle Damage and Incidence of Equine Tying-Up Syndrome

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Continuous administration of astaxanthin and L-carnitine supplement has preventive effects on the onset of tying-up syndrome and thus may contribute to maintaining performance in Thoroughbred horses. Authors' addresses: Hidaka Training and Research Center, Japan Racing Association, 535-1 Nshicha, Urakawa, Hokkaido 057-0171, Japan (Sato, Omura, Ishimaru, Korosue, Endo, Murase and Nambo); Life Science Division, Fuji Chemical Industry Co, Ltd, 55 Yokohoonji, Kamiichi, Nakaniikawa, Toyama 930-0397, Japan (Yamashita); e-mail: Fumio\_Sato@jra.go.jp. \*Corresponding and presenting author. © 2013 AAEP.

## 1. Introduction

Tying-up syndrome is the most common muscle disorder in training horses. We focused on both the strong antioxidant effect of astaxanthin and the enhancement of muscle fatty-acid oxidation of L-carnitine. The effects of dietary administration of astaxanthin and L-carnitine supplement on serum markers of exercise-induced muscle damage and the onset of tying-up syndrome in training horses were investigated.

## 2. Materials and Methods

A supplement group ( $n = 31$ ) received daily supplementation with astaxanthin (75 mg) and L-carnitine (3000 mg) for 8 weeks; a control group ( $n = 32$ ) received no supplementation. Blood samples were collected after exercise training before supplementation and 3 days and 8 weeks after starting supple-

mentation. The symptoms of tying-up syndrome in both groups were retrospectively evaluated.

## 3. Results

Within the control group, creatine kinase activity at 8 weeks was significantly increased compared with 3 days; no significant change was observed in the supplement group. After 8 weeks, creatine kinase activity in the supplement group was significantly lower than that in the control group; lactate dehydrogenase-5 also tended to be lower in the supplement group. The incidence of tying-up syndrome in the supplement group was significantly lower than that in the control group.

## 4. Discussion

Continuous dietary administration of astaxanthin and L-carnitine attenuates exercise-induced muscle damage and prevents the onset of tying-up syndrome in Thoroughbred horses.

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*Research Abstract*

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## NOTES