Role of antioxidants and trace elements in health and immunity of transition dairy cows

Jerry W. Spears a,*, William P. Weiss b

a Department of Animal Science and Interdepartmental Nutrition Program, North Carolina State University, Raleigh, NC 27695-7621, USA
b Department of Animal Science, The Ohio State University, Wooster, OH 44691, USA

Accepted 18 December 2007

Abstract

A number of antioxidants and trace minerals have important roles in immune function and may affect health in transition dairy cows. Vitamin E and b-carotene are important cellular antioxidants. Selenium (Se) is involved in the antioxidant system via its role in the enzyme glutathione peroxidase. Inadequate dietary vitamin E or Se decreases neutrophil function during the perparituant period. Supplementation of vitamin E and/or Se has reduced the incidence of mastitis and retained placenta, and reduced duration of clinical symptoms of mastitis in some experiments. Research has indicated that b-carotene supplementation may enhance immunity and reduce the incidence of retained placenta and metritis in dairy cows. Marginal copper deficiency resulted in reduced neutrophil killing and decreased interferon production by mononuclear cells. Copper supplementation of a diet marginal in copper reduced the peak clinical response during experimental Escherichia coli mastitis. Limited research indicated that chromium supplementation during the transition period may increase immunity and reduce the incidence of retained placenta.

© 2008 Elsevier Ltd. All rights reserved.

Keywords: Transition cow; Vitamin E; Selenium; Copper; Zinc; Chromium; b-Carotene