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Oxidative stress in ruminant health and production

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Abstract

This paper examines the role that oxidative stress plays in some physiological functions and we discuss the implications of the impairment of oxidative status on ruminant health and production. Oxidative stress is an active field of research in ruminant medicine and has been implicated in numerous disease processes including sepsis, mastitis, acidosis, ketosis, enteritis, pneumonia, respiratory, and joint diseases. Studies in cattle have been sporadic and mainly concerned with mastitis, pneumonia, and retained placenta. More recently, studies have been focused on metabolic diseases that affect dairy cows during the peripartum period. Numerous and rapidly evolving methodologies for evaluating oxidative stress are available to researchers and clinicians, each with their own distinct advantages and disadvantages. Differences in models and methodologies make it difficult to make meaningful comparisons, even for studies that seem quite similar superficially. With this in mind, it is the goal of this paper to summarize the present knowledge of oxidative stress in ruminant medicine and to examine the basis of and evidence for the role of oxidative stress in ruminant health and production. Clarity of understanding of the pathophysiology of oxidative stress in ruminants will allow the design of specific antioxidant therapies. Future research should focus on the establishment of a reference panel of biomarker of oxidative stress to be used in ruminant medicine. The development of an oxidative stress index as an approach in ruminant and veterinary medicine is also discussed.

Biography

Pietro Celi has completed his Ph.D from the University of Western Australia, Perth, in 2002. In 2006 he was awarded the Australian Society of Animal Production Young Scientist Award. Dr Celi research interests focus on animal physiology with particular interest in oxidative stress biomarkers. He currently works at the Faculty of Veterinary Science, The University of Sydney, as Senior Lecturer in Ruminant Production and Health. He has published over 100 peer reviewed journal, book chapters and conference papers and serving as an editorial board member in Journal of Veterinary Science & Technology and Immunopharmacology & Immunotoxicology.