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Role of Antioxidants for Performance and Health in Athletes



Associate Prof. Dr. Chen Chee Keong,
Exercise and Sports Science Programme,
School of Health Sciences,
Universiti Sains Malaysia,
16150 Kubang Kerian, Kelantan,
Malaysia.
E-mail: ckchen@usm.my

Abstract. Free radicals are atoms or molecules with an unpaired electron. Once formed, they are highly reactive and can cause cellular damage in our body. Antioxidants, on the other hand, are substances that scavenge free radicals and offer protection from the damaging effects of free radicals. Oxidative stress occurs when the rate of production of free radicals exceeds the body's antioxidant capacity to detoxify them. Free-radical mechanisms have been associated with cellular differentiation, ageing, mutagenesis, pathophysiology of numerous diseases including cancer, atherosclerosis, rheumatoid arthritis and neurodegenerative disease. Epidemiological studies have established a positive correlation between the intake of antioxidants such as fruits and vegetables on the prevention of diseases like atherosclerosis, cancer, diabetes, arthritis and also ageing. Exercise-induced oxidative stress has also been demonstrated in numerous studies. For instance, significant increases in F₂ isoprostanes and lipid hydroperoxides following exhaustive exercise demonstrates that exhaustive exercise induces free radical production. Some investigators have postulated that free radicals might damage the sarcoplasmic reticulum resulting in reduced calcium release during depolarisation of the muscle and consequently lead to muscular fatigue. Studies that have shown positive effects of antioxidants on skeletal muscle endurance performance were continuous administration of N-acetylcysteine via venous infusion during exercise. In addition, other antioxidants such as pycnogenol, quercetin, beetroot juice, cashew apple juice, resveratrol and Montmorency powdered tart cherries have also been shown to improve endurance performance. My co-investigators and I have also carried out several studies on the effects of various nutritional supplements with antioxidant properties on endurance performance in our sports science laboratory, School of Medical Sciences, Universiti Sains Malaysia. These supplements include palm vitamin E, caffeine, panax ginseng, *Eurycoma Longifolia* Jack, honey and bee bread. The main findings of these studies will be discussed during my talk.

Biography. Dr. Chen Chee Keong is an Associate Professor in the Exercise and Sports Science Programme, School of Health Sciences, Universiti Sains Malaysia (USM). He was a health and physical education lecturer in a teacher training college before joining USM as a university lecturer in 2005. He obtained his Bachelor of Education (Physical Education) from Universiti Pertanian Malaysia; Masters in Sports Science (Health & Fitness) from University of Essex, United Kingdom; and PhD in Sports Science from USM. He was awarded a postgraduate prize for his PhD thesis by the Nutrition Society of Malaysia in 2005. His research interests include effects of exercise-induced oxidative stress, antioxidant supplementation on sports performance, health and fitness among sedentary population. To date, he has obtained 29 research grants as the principal or co-investigator. His academic work includes: i) Editor of 2 Conference Proceedings, ii) Co-author of 2 Chapters in a book, iii) 40 papers in international peer-reviewed journals, and iv) 7 full papers in international conference proceedings. He has been invited as a speaker in both international and national conferences. He was a former international volleyball referee. He is the immediate past President of the Asian Council of Exercise & Sports Science (ACCESS) and Associate Editor cum Section Editor for Exercise Physiology & Sports Nutrition for the Asian Journal of Exercise and Sports Science (AJESS). He has been the President of the Sports Science Society of Kelantan, Malaysia from 2007 -2015. He was the organising chairman of 5 International Sports Science Conferences organised by the Sports Science Unit and Exercise and Sports Science Program, USM. He was appointed as a visiting research fellow in the University of Essex, United Kingdom in 2013. He also serves as an editorial board member for international and national journals