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Induced-oxidative stress and red palm oil (RPO) supplementation for 4 and 6 weeks in animal model: Any benefit?

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RPO is a dietary vegetable oil with a large fraction of fatty acids and a minor fraction reputed for excellent phytonutrients, the later gives a nice oxidative stability. A well-established number of studies have investigated the beneficial effects of antioxidant-rich dietary products against oxidative stress in animal health. In the current study, adult male, 2-3 month-old-Wistar rats obtained from the Department of Physiology, (University of Stellenbosch, Cape Town, South Africa) were used throughout the study. In all experiments, animals were fed on a daily basis (standardized food pellets and/or supplemented with RPO concentrate (7g/Kg diet)) for 4 and 6 weeks and had free access to water. Animals were housed individually in order to have a close control to monitor their diet intake at 25˚± 3˚C, with 12h light/dark cycle and 50% ± 5% humidity. The body weights of the rats were measured at the beginning and end of each experiment. The experimental groups were subjected to oxidative stress (OxS) induction and received chronic intraperitonial injection of 0.5 ml (20 μM/100 g of body weight) organic tert-butyl hydroxyperoxide tbHP solution (70% in water). The control groups received chronic intraperitonial injection of 0.5 ml placebo (sterile phosphate buffer saline PBS 1X solution). Injections (tbHP or PBS) were repeated every second day for the last two weeks of the experiment. Injections were made using sterile 1 ml disposable syringes and 26 G sterile hypodermic needles. The intake of food were monitored and analyzed by giving to each group 25 g of standard rat chow and/or 0.175g of red palm oil (7g RPO/Kg) per day. The results of RPO supplementation on plasma total antioxidant capacity at baseline and at the end of the experiment showed that FRAP and ORAC values for RPO supplemented and un-supplemented groups did not differ significantly. SOD and GPx data for RPO supplemented and un-supplemented groups did not differ significantly. However, an increase was observed in GSHt level in RPO supplemented groups. Following 4 weeks of RPO dietary supplementation, MDA level in oxidative stress control (group B) was significantly higher $P<0.05$) than normal control (group A). Similar results were obtained after 6 weeks of RPO dietary supplementation. This increase in oxidative status proved that the model used to induce oxidative stress worked. There was a significant decrease between MDA level of group C (4WK RPO + t-BHP) subjected to oxidative stress and its corresponding control group B (t-BHP). Likewise, group F (6WK RPO + t-BHP) result was significantly lower than control group B. No differences were observed between the groups A (CTRL Normal), C (4wk RPO) and F (6wk RPO) which were not exposed to OXs. This study shows that RPO is capable of reducing oxidative stress in animal and thus create the need for further research.

Biography

O.O Oguntibeju is an Associate Professor and Group Leader (Nutrition and Chronic Disease Research Unit), Oxidative Stress Research Centre in the Department of Biomedical Sciences, Faculty of Health & Wellness, Cape Peninsula University of Technology, Bellville, South Africa. He lectures and supervises postgraduate students and collaborates with other scientists nationally and internationally. As an academic and researcher, he is involved in the field of nutrition and oxidative stress in cardiovascular disease, diabetes and HIV/AIDS. He reviews manuscripts for over 30 national and international scientific journals and has authored and co-authored over 60 scientific publications. He has received various awards such as the Research Excellence Award at his current university and has presented papers at national and international conferences. Prof O.O Oguntibeju holds a master degree in Biochemistry and a doctoral degree in Biomedical Science. He is a Chartered Scientist (CSci) and Fellow of the Institute of Biomedical Science, London.

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