Effect of Deep Frying Oil on Oxidative Stress and Blood Pressure in Spontaneously Hypertensive Rats

Yi-Fa Lu and Pei-Ling Yen,
Department of Nutritional Science, Fu Jen University, Taipei, Taiwan

Ingestion of deep frying oil has been reported to cause physiological and histological changes in experimental animals’ tissue, increase the oxidative stress and might lead to death. The purpose of this study was to investigate the effect of deep frying oil on oxidative stress and blood pressure in spontaneously hypertensive rat (SHR) and Wistar Kyoto (WKY) rats. Deep frying oil was prepared by frying fresh soybean oil at 180±5°C for 8 hrs each day, at four consecutive days. Male SHR and WKY rats were fed diets containing 15% fresh soybean oil (F) or deep frying oil (D) for 10 weeks. Results showed that rats ingested D diet had lower feed efficiency and higher relative liver and kidney weight but had no significant influence on the blood pressure whether in WKY rats or SHR. WKY rats fed D diet significantly increased the urinary TXB₂ and 8-iso PGF₂α excretion, but not in the urinary 6 keto PGF₁α excretion. Diets containing deep frying oil increased SH-group depletion of red blood cells from SHR; increased plasma TBARS and nitric oxide content in both SHR and WKY rats; increased hepatic TBARS of WKY rats; decreased SHR and WKY rats plasma trolox equivalent antioxidant capacity (TEAC). The D diet had no effect on plasma renin activity and aldosterone content and also on tissue angiotension-½T-converting enzyme activity. In fatty acid composition, SHR and WKY rats fed D diet increased saturated fatty acid and the ratio of 20:4 n-6 to 18:2 n-6 in plasma and liver, especially elevated 20:4 n-6 fatty acid; reduced 18:1 n-9, 18:2 n-6 and 18:3 n-3 fatty acids in liver. In conclusion, the ingestion of deep frying oil seemed not to influence blood pressure and its correlated parameters, but altered the eicosanoids metabolism in WKY rats and elevated oxidative stress in both SHR and WKY rats whether hypertension or