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Protective effects of White tea (Camellia sinensis) on metabolic functions and oxidative stress in rat model

Rahul Kumar, Anjali Kanojia
Department of Zoology, J K College, India

Objectives: Oxidative stress and hyperlipidemia are associated risk factors for developing hypertension. White tea (WT) is very similar to green tea (GT) but it is exceptionally prepared only from the buds and young tea leaves of Camelia sinensis plant while GT is prepared from the matured tea leaves. Camellia sinensis is a well-known medicinal plant that has been used for its anti-cancer, neuroprotective, and hepatoprotective effects.
This study aimed at investigating the role of ethanolic extract of WT in preventing the development of hypertension, oxidative stress and hyperlipidemia in a rat model of nitric oxide deficiency.

Methods: Female Wistar rats were co-treated with Nω-Nitro L-arginine methyl ester (L-NAME) (40 mg/kg) and ethanolic extracts of WT (100, 200 mg/kg body weight) for 4 weeks. Twenty-hour urine samples were collected weekly during the study. At the end of the study serum, heart and kidneys were harvested for biochemical and histopathological analysis.

Results: The higher dose (200 mg/kg) of the extract was more effective in preventing increase in systolic ($p<0.001$) and diastolic ($p<0.05$) blood pressure. At the end of the treatment period WT treated rats had significantly ($p<0.01$) higher concentration of creatinine in urine and significantly lower proteinuria compared to L-NAME control rats respectively. Creatinine clearance and glomerular filtration rate were lower in the L-NAME control group compared to all treatment groups. WT (200 mg/kg) prevented L-NAME-induced decrease in serum angiotensin II concentration, significantly decreased malondialdehyde concentration in serum ($p<0.05$) and kidneys ($p<0.001$). It also significantly ($p<0.001$) decreased low-density lipoprotein concentration while increasing the concentration of high-density lipoprotein cholesterol. It showed cardio- and reno-protective effects and significantly ($p<0.01$) prevented collagen deposition in these target organs.

Conclusions: These findings demonstrate the potential of WT in protecting rats from developing hypertension, hyperlipidemia and oxidative stress.