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Antioxidant and Free Radical Scavenging Activities of Sumac (*Rhus coriaria*) and Identification of Gallic Acid as Its Active PrincipleF. Ferk^a, A. Chakraborty^a, T. Simic^a, M. Kundl^b, S. Knasmüller^a^aInstitute of Cancer Research, ^bInstitute of Environmental Health, Center of Public Health, Medical University of Vienna, Austria

It is known that certain spices are rich in antioxidants. Sumac (*Rhus coriaria*) is widely consumed in Middle-Eastern countries. We tested its DNA-protective effects in a human intervention trial. Eight participants consumed 3 g of sumac for 3 days. We found strong protective effects in single cell gel electrophoresis assays (SCGE) with endonuclease III (ENDO III), formamidopyrimidine glycosylase (FPG) and hydrogen peroxide in human peripheral lymphocytes. H₂O₂-induced DNA migration was reduced by 30%, oxidized pyrimidines 36% and oxidized purines 41%, respectively, after the intervention. Subsequent in vitro experiments indicated that gallic acid (GA) is the active principle of sumac. GA is also contained in certain plants (mango, rhubarb, strawberries). In a subsequent trial, 8 participants consumed GA (0.2 mg/kg BW/d) for 3 days and strong protective effects were observed with this phenolic compound which is very rapidly absorbed in the GI tract. The reduction of DNA migration induced by H₂O₂ was 40%, ENDO III 58%, FPG 52%. Comparisons show that GA is 50 times more protective than the vitamins C and E. The protective effects of sumac and GA were also investigated in animal experiments. Eight male rats per group were fed 3 days with sumac (0.02 g/kg BW/d) and GA (0.2 mg/kg BW/d). After irradiation in a ⁶⁰Co source (7.74 Gy / 1 min), the animals were killed immediately and protective effects were seen in lymphocytes, brain, liver, colon and lung. Taken together, our findings indicate that GA is a “super-antioxidant” which protects against ROS-induced DNA-damage.