

Strawberry *Fragaria x ananassa* Duchesne (cv. Romina) methanolic extract attenuates hydrogen peroxide induced DNA damage in human peripheral blood mononuclear cells *in vitro*

Abstract

Among berry fruits, strawberries are known for a wide array of beneficial biological activities, including antioxidant, antihypertensive, antibacterial, anti-proliferative, anti-inflammatory, anticancer, and anti-metastatic effects. The cultivar *Fragaria × ananassa* Duchesne (Romina) is particularly rich in bioactive constituents that may contribute to limiting DNA damage triggered by reactive oxygen species. In this study, we examined whether the methanolic extract of Romina strawberries (RE) exerted any genotoxic effect on human peripheral blood mononuclear cells (PBMCs) across concentrations ranging from 25 to 200 µg/mL using the comet assay. No evidence of genotoxicity was detected. Subsequently, the capacity of RE to counteract oxidative DNA damage in two experimental models was assessed. When PBMCs were pretreated with RE prior to hydrogen peroxide exposure, a slight reduction in DNA damage was observed, with only the 50 µg/mL concentration producing a statistically significant protective effect. To evaluate the extract's interventional capacity, cells were treated with RE following exposure to H₂O₂. In this post-treatment design, RE demonstrated a clearly stronger antigenotoxic response, reducing DNA damage at all tested concentrations, with the most pronounced effects at 100, 150, and 200 µg/mL. Overall, the methanolic extract of the Romina cultivar showed notable protective activity against H₂O₂-induced oxidative DNA damage *in vitro*.