Abstract

Introduction: Fruit beverages are commonly supplemented with milk, vitamins and/or minerals in order to improve their healthy effects by providing some bioactive components that can act additively or synergistically against oxidative stress. Aims: To test whether iron, zinc, and milk added to fruit beverages do not affect the cytoprotective effect against oxidative damage to Caco-2 cells through GSH-related enzymes induction and cell cycle progression preservation, in comparison with non-supplemented fruit beverage. Methods: Caco-2 cells were incubated 24 h with the bioaccessible fraction (BF) of eight fruit beverages with/without iron and/or zinc, and/or milk, and then challenged with H2O2 (5 mmol L-1 -2 h). Mitochondrial enzyme activities (MTT test), GSH-Rd and GSH-Px enzyme activities, cell cycle progression and caspase-3 activity were measured. Results and discussion: Fruit beverages prevented the deleterious effect of H2O2 on cell viability, with almost all samples reaching control basal levels. Only independent iron or zinc supplementation with/without milk exerted positive effects upon GSH-Rd activity. Both minerals with milk, afforded improved preservation of GSH-Px activity. All samples prevented the decrease in the G1 phase of cell cycle induced by H2O2, except iron supplemented samples with/without milk, but none of them avoided the increase in sub-G1 phase. However, this fact was not associated to caspase-3 activity, with a probable positive effect of zinc upon this parameter. Conclusion: Mineral and/or milk supplementation of fruit beverages helps in the prevention of oxidative stress in Caco-2 cells based on cell viability maintenance, GSH-related enzymes activation, cell cycle distribution preservation and inhibition of caspase-3 activation.

Keywords

Caco-2 cells, Fruit beverages, Minerals, Milk, Oxidative stress.