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Effect of bioactive compounds from beet leaf and stem extract on the prevention or reduction of LDL oxidation and oxidative DNA damage.

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Abstract

The objective of this study was to evaluate the antioxidant potential of lyophilized beet leaves through biochemical tests in the prevention or reduction of LDL oxidation and DNA damage. The results of the present study showed that 100 ppm beet leaf extract protects LDL oxidation 100% and maintained HUVECs viability in 48 hours when treated whith 1 ppm beet leaf extract and exposed to oxidized LDL. However as for DNA breakage, this protective effect was not observed.

Key words: *Bioactive compound, beet, Reactive Oxygen Species (ROS).*

Introduction

Obesity a few years ago became a disease with characteristics of subclinical inflammation associated with the condition of oxidative stress, which contributes to increase the individual's susceptibility to comorbidities[1]. The bioactive compounds with antioxidant activity present in the food have the capacity to modulate the production of reactive oxygen species (ROS) in the body, having a protective action against oxidative damage and reduction of inflammation[2]. Beet is described as containing a range of bioactive compounds with high antioxidant capacity and has been the subject of studies in the control of LDL oxidation[3]. Thus, the objective of this study was to evaluate the antioxidant potential of lyophilized beet leaves, through biochemical tests, in the prevention or reduction of LDL oxidation and DNA damage.

Results and Discussion

After the preparation of the serial beet extract, the following analyzes were performed: Determination of Antioxidant Activity and Total Phenolic (figure1); Oxidation capacity of LDL (figure2); Cell viability of the HUVECs by the MTT test (figure 3); Ability of inhibition of free radical cleavage of supercoil plasmid DNA (figure 4).

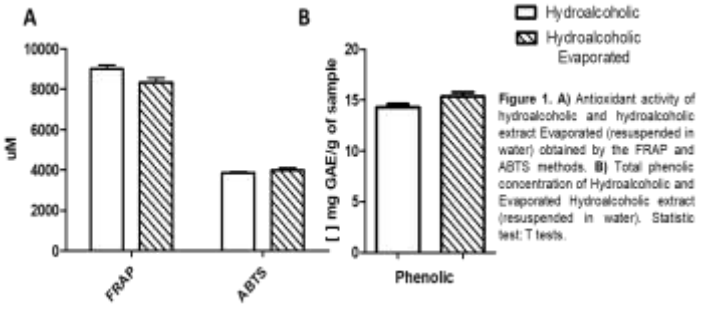

Figure 1. A) Antioxidant activity of hydroalcoholic and hydroalcoholic extract Evaporated (resuspended in water) obtained by the FRAP and ABTS methods. **B)** Total phenolic concentration of Hydroalcoholic and Evaporated Hydroalcoholic extract (resuspended in water). Statistic test: T tests.

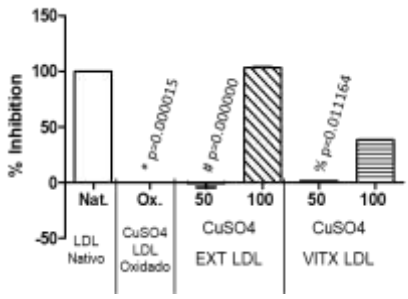

Figure 2. LDL-cholesterol oxidation capacity values submitted to different concentrations (50 and 100ug/ml) of beetroot extract (EXT LDL) and Vitexin (VITX LDL) (both with the presence of copper sulphate (CuSO4). Statistic test: ANOVA One-way. * differs from Nat. LDL Nativo ; # differs from CuSO4 EXT LDL 100ug/ml ; % differs from CuSO4 VITX LDL 100ug/ml.

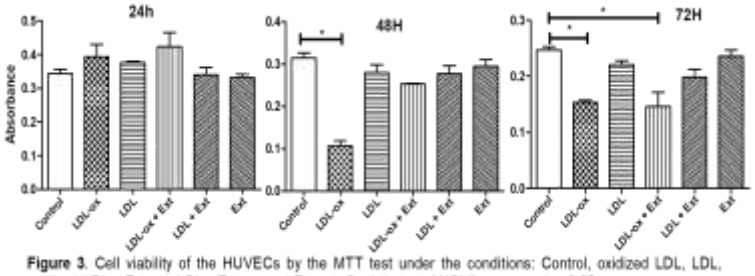

Figure 3. Cell viability of the HUVECs by the MTT test under the conditions: Control, oxidized LDL, LDL, oxidized LDL + Extract, LSL + Extract and Extract. Statistic test: ANOVA one-way, * p<0.05.

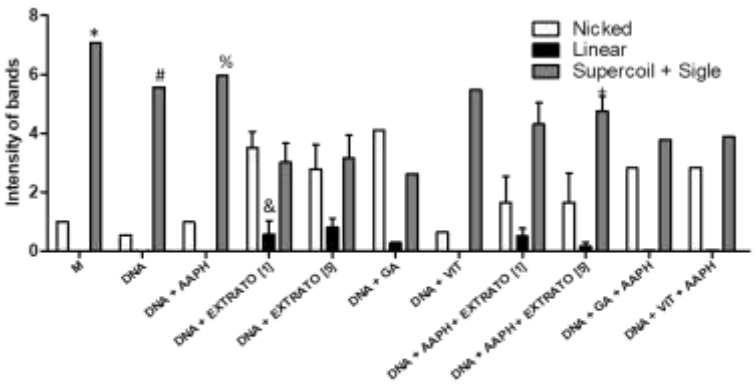

Figure 4. Intensity of the NICKED, SUPERCOIL, LINEAR bands, in the presence of beet leaf extract in different concentrations (1ppm and 5 ppm) and the controls gallic acid 20 ppm (GA) and vitexin 20 ppm (VITX) under conditions in the absence and in the presence of AAPH. Statistic test: ANOVA two-way, p<0.05. * differs from M Nicked; # differs from DNA Nicked; % deffers from DNA+AAPH Nicked; & differs from DNA+EXTRATO[1] Nicked; + differs from DNA+AAPH+EXTRATO[5] Nicked .

Conclusions

Beet leaf extract at 100 ppm concentration protects LDL oxidation by 100%. In addition, it was observed that the 1 ppm beet extract maintained HUVECs viability in 48 hours when exposed to oxidized LDL. However, as for DNA breakage, this protective effect was not observed.

Acknowledgement

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