

G-Nut: Combination of Amazonian Compounds and Nanotechnology in Modulating Cellular Oxidative Stress

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INTRODUCTION: Aging and chronic non-communicable diseases (NCDs) are associated with increased oxidative stress and chronic inflammation. Bioactive compounds present in Amazonian foods, such as guaraná (*Paullinia cupana*) and Brazil nuts (*Bertholletia excelsa*), have been studied for their potential modulatory effects on these processes. **OBJECTIVE:** To evaluate the cytotoxic potential and antioxidant effects of the nano-structured supplement G-Nut, developed from these ingredients, as well as its free formula, in human peripheral blood mononuclear cells (PBMCs). **MATERIALS AND METHODS:** G-Nut was prepared in a 1:1 ratio of guaraná powder and Brazil nut oil, with 10% coenzyme Q10, using ultrasonic emulsification, filtration, and lyophilization. Chemical characterization was performed by high-resolution mass spectrometry (HRMS). PBMC samples were obtained from four healthy volunteers, isolated by density gradient, and cultured in RPMI-1640 medium. The cells were exposed to varying concentrations of the formulations (0.25 to 3 mg/mL). Cell viability was assessed by the MTT assay, while oxidative stress markers included nitric oxide (NO) production, lipid peroxidation (TBARS), and protein carbonylation, measured by colorimetric and spectrophotometric methods. None of the tested formulations showed significant cytotoxicity. G-Nut demonstrated superior antioxidant effects compared to the free formula, significantly reducing (NO) production, TBARS levels, and protein carbonylation, particularly at higher concentrations (1.5; 2.25; and 3 mg/mL). These effects are attributed to the synergistic action between the bioactive compounds of the Amazonian extracts and the nanoencapsulation with coenzyme Q10, which enhances the bioavailability and stability of the active substances. **RESULTS AND CONCLUSION:** G-Nut is safe and effective in vitro, representing a promising alternative for nutritional interventions aimed at modulating inflammatory and oxidative processes related to aging and NCDs. Additional studies are underway to evaluate its efficacy in more complex biological models.

Keywords: oxidative stress, bioactive compounds, Amazonian foods, coenzyme Q10, aging.