COCOA BEAN HUSK EXTRACT PROTECTS AGAINST GENOTOXICITY AND ENHANCES NEURONAL VIABILITY

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INTRODUCTION: Cacao is extensively cultivated in tropical regions; however, up to 90% of the fruit's weight, including the husk, is discarded during processing. The use of agro-industrial byproducts in toxicological research has gained attention as a sustainable and innovative strategy. Among these, cacao husk stands out due to its potential for sustainable utilization and applications in human health. This byproduct is notably rich in bioactive compounds such as phenolic compounds, theobromine, and caffeine, which have been associated with anti-inflammatory, antioxidant, antidiabetic, neuroprotective, and cardioprotective properties. Therefore, cacao husk emerges as a promising candidate for the development of health-related products, and evaluating its safety and efficacy is essential for potential nutraceutical use. **OBJECTIVE:** To evaluate the genomodulatory effect and the modulation of cell viability and proliferation induced by the aqueous extract of cocoa bean husk (cascau) at different concentrations. **MATERIALS AND METHODS:** The GEMO assay was employed to determine genoprotective capacity. This test evaluates genome-modifying effects (genotoxic or genoprotective) using standard DNA, the fluorescent dye PicoGreen, and hydrogen peroxide (H_2O_2) as a DNA-damaging agent. To assess cell viability and proliferation, the Neutral Red assay was used, which measures lysosomal integrity based on the uptake of the Neutral Red dye by viable cells. Human neuronal cells were cultured under standard conditions and treated with *cascau* at concentrations of 0.3, 1, 3, 10, 30, 100, and 300 µg/mL, diluted in 2% DMSO. After 24 and 72 hours of treatment, cells were incubated with the dye at 37 °C for 3 hours. Absorbance was measured at 540 nm and was inversely related to cytotoxicity. **RESULTS AND CONCLUSION:** The extract exhibited genoprotective activity at all tested concentrations. In the presence of H_2O_2, *cascau* significantly reduced DNA damage. No reduction in cell viability was observed at 24 hours. At 72 hours, increased proliferation was observed at 3, 10, and 100 µg/mL. Despite the inherent limitations of in vitro studies, these preliminary findings suggest that cascau possesses genoprotective properties and does not exhibit neurotoxicity, supporting its relevance as a plant-based antioxidant ingredient.

Keywords: Cocoa; Toxicity; In vitro