COMPARATIVE CYTOTOXICITY ASSESSMENT OF TITANIUM PLATES ANODIZED WITH PHOSPHORIC ACID AND HYDROFLUORIC ACID AND *Psidium guajava* LEAF EXTRACT

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INTRODUCTION: Titanium is commonly used in implants, but the release of its ions can lead to cellular damage. Anodization forms a protective oxide layer, mitigating these effects. Nevertheless, conventional acid-based methods, while effective, pose environmental and occupational safety challenges. OBJECTIVE: This study evaluates the cytotoxicity associated with using *Psidium guajava* leaf extract as an alternative anodization electrolyte. A comparative cytotoxicity assessment was performed between titanium plates anodized with conventional acids and those treated with *Psidium guajava* leaf extract. MATERIALS AND METHODS: The cytotoxicity of the extract was assessed in human osteosarcoma cells (Saos-2) and murine embryonic fibroblasts (NIH-3T3) cultured in DMEM supplemented with 10% FBS. An indirect assay was conducted in microplates using confluent cell monolayers incubated with extraction medium (EM) for 24 and 96 hours (37°C, 5% CO_2). The EM was obtained by immersing 1 cm × 1 cm titanium plates in culture medium for 24 hours at 37°C. As a negative control, only DMEM with 10% FBS was used. In the direct assay, cells were seeded directly onto titanium plates under the same conditions. Non-anodized titanium plates were used as negative controls. Cell viability was determined using the Neutral Red uptake assay. Statistical analysis was performed using ANOVA followed by Tukey's post-hoc test ($p \leq 0.05$). RESULTS AND CONCLUSION: Indirect assays showed that titanium plates anodized with different electrolytes maintained 100% viability (equivalent to the negative control) for both cell types and exposure times. Direct assays demonstrated that anodization increased cell viability by an average of 27,1%, with no significant differences among electrolytes, cell types, or exposure times. This effect is attributed to the increased surface roughness of the biomaterial. According to ISO 10993-5 standards, biomaterials with cell viability equal to or greater than 70% are considered non-cytotoxic. The observed results indicate that the use of aqueous *Psidium guajava* extract as an anodization electrolyte did not alter the cytotoxicity profile of anodized titanium, presenting itself as a promising alternative to conventional acids in this process.

Keywords: Cytotoxicity; NIH-3T3; Titanium plates; *Psidium guajava*; Saos-2

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