

## Microstructural and Corrosion Analysis of a Ti-Nb-Ta Biocompatible Dental Implant Alloy

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**Abstract :** Titanium alloys are often used for biomedical applications as hard tissue replacements, such as: orthopedic implants, spinal fixation devices and dental implants. Their advantages are well known and demonstrated: excellent mechanical properties, biocompatibility and good corrosion resistance, but it is also known that the main disadvantage of the metallic materials is their tendency of corrosion in in-vivo environments. In 1987, titanium was found to be the only metallic biomaterial that osseointegrates. The aim of this study was to investigate the microstructure and the corrosion behavior of the Ti-20Nb-5Ta wt% alloy. In this case Nb stabilizes the  $\beta$ -Ti structure and Ta is a highly passivating metal. The as studied alloy was melt under argon protective atmosphere in a levitation induction melting furnace, type FIVE CELES - MP25, with a nominal power of 25 kW and a melting capacity of 30 cm<sup>3</sup>. The microstructure of the as studied alloy was analyzed by using the electronic microscope Tescan Vega II-XMU. The phase structure of the as studied alloy was determined, as well as the crystalline grain size (100-200 $\mu$ ). To determine the corrosion behavior of the as studied alloy, the technique used was the linear polarization, with the PARSTAT 4000 potentiostat, produced by Princeton Applied Research; potentiodynamic curves were obtained with the VeraStudio v.2.4.2 software.

**Keywords :** corrosion resistance, microstructure, titanium alloys

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