Anodized AZ91 magnesium alloy for temporary implants.

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Magnesium alloys provide potential advantages as a degradable biomaterial for osteosynthesis, because they provide good biocompatibility and high primary stability, while avoiding stress shielding. The primary interest in these alloys is their ability to biodegrade, however, their high corrosion rate in the physiological medium and the formation of gaseous hydrogen as a corrosion product limit their application. The superficial modification of these materials can be thought of as a tool to protect the metal and in turn create a bioactive surface for osseointegration. It is expected that the degradation of the metal accompanies the formation of bone tissue and that it maintains its mechanical properties until it fulfills its function. The corrosion rate of Mg alloys can potentially be controlled by changes in metallurgy, microstructure and surface treatments. One of the strategies of surface modification to promote osseointegration and inhibit corrosion is through anodizing treatments. These kind of passive layers have been developed and perfected on valve metals for use in implantology, and it is expected that the generation of the layers in basic medium on magnesium will allow generating a barrier that in turn is bioactive. The general objective of this work is to study the in vitro behavior of an anodized treatment in basic medium on magnesium alloy AZ91 in simulated physiological medium, for its possible use as a temporary implant. The chemical, morphological, electrochemical and topological characteristics of samples with and without anodizing at constant potential were analyzed in basic medium at different immersion times in simulated physiological solution. After a day of immersion, the anodized samples denoted the presence of phosphate compounds related to apatite, being a sign of bioactivity in a short time. The integrity electrochemical tests show that the anodizing process does not induce accelerated degradation in the samples and inhibits the evolution of hydrogen, thus considering a potentially useful modification for these implants.