Analisis sifat mekanis Magnesium setelah proses Equal Channel Angular Pressing (ECAP) melalui uji tarik dan uji kekerasan dalam cairan fisiologis : in vitro = Analysis of the mechanical properties of Magnesiu after Equal Channel Angular Pressing (ECAP) processed by tensile and hardness testing in physiological fluid : in vitro

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Abstrak

Magnesiummerupakan suatu material yang berpotensi digunakan sebagai biomaterial logam yang dapat terdegradasi. Syarat magnesium dapat digunakan sebagai material implan biodegradable adalah laju degradasimagnesiumharus sesuaidenganlaju penyembuhandarijaringan yang terlibat.Umumnya magnesium memiliki laju degradasi yang cepat, hal ini merupakan kekurangan magnesium yang tidak diinginkan.Aplikasimagnesiumsebagai implanyang terdegradasiterhambatkarena tingkattinggidegradasilingkungan fisiologisdan kerugiankonsekuen dalamsifat mekanik. Oleh karena itu, proses Equal Channel Angular Pressing (ECAP) yang dilakukan padamagnesium diharapkan akanmengurangiukuran butir yang dapat menurunkanlaju degradasidan meningkatkansifat mekanis magnesium.
Tujuan: Menganalisasifat mekanismagnesium ECAP dalam cairan fisiologis.
Metode:Sifat mekanis magnesium ECAP dianalisis setelah dilakukan perendaman dalam larutan DMEM dengan menggunakan masing-masing sepuluh sampel magnesium ECAP dan lima sampel magnesium untuk uji tarik dan uji kekekrasan. Sifat mekanis di analisis menggunakan nilai ultimate tensile strength (UTS) pada uji tarik dan vickers hardness number (VHN) pada uji kekerasan.
Hasil: Kekuatan dan kekerasan magnesium meningkat setelah proses ECAP.
.....Magnesium has thepotential to be used asdegradable metallic biomaterial. For magnesium to be used as biodegradable implant materials, their degradation rates should be consistent with the rate of healing of the affected tissue, the release of the degradation products should be within the body?s acceptable absorption levels. Conventional magnesium degrades rapidly, which is undesirable. The successful applications of magnesium as degradable implants are mainly inhibited due to their high degradation rates in physiological environment and consequent loss in the mechanical properties. Equal channel angular pressing (ECAP) was applied to a pure magnesium. This processes will be decreasing grain size, decreasing degradation rates and increasing mechanical properties.
Purpose: To analyze the mechanical properties of magnesium ECAP in physiological fluid.
Method:The mechanical properties were obtained from immersion test in a DMEM solution, within ten magnesium ECAP specimens and five specimens of pure magnesium as a control. Mechanical properties were analyzed using the value of ultimate tensile strength (UTS) with tensile testing and vickers hardness number (VHN) with hardness testing.
Results:The ultimate tensile strength and hardness magnesium increased after ECAP, and the mechanical properties of the magnesium ECAP decreased in physiological fluid.