ABSTRACT

Magnesium (Mg) is known as a biocompatible metal as it appears in natural human metabolism. Mg is widely used as a biocompatible orthopedic implant in biomedical field mostly as temporary appliances such as pins, screw, and bone plates. Joint produces synovial fluid (SF), which made of hyaluronic acid (HA), proteinases, and collagenases. Biocorrosion occurs when biometal interacts with SF. The objective of this research is to study the corrosion behavior of Mg ingot in an *in vitro* condition. The solution used for the study is artificial SF solution, which made of HA, Phosphate Buffer Saline (PBS) with the variation of Bovine Serum Albumin (BSA); 2 gr, 1.3125 gr, and 0.5 gr. Three sample variations with different concentrations of BSA were made. One of the best conditions from the variants was chosen for further SEM-EDS analysis due to its best result shown after performing Open Circuit Potential (OCP) and Tafel extrapolation measurements. Among the samples there is one sample with the lowest amount of BSA concentration that showed some fluctuations that indicated the formation and release of oxide layer on the Mg ingot. Hence, the selected sample was chosen to determine the element that was present before and after fluctuation at time interval of: initial (0 hour), $\pm$ 1 hour 56 minutes, $\pm$ 2 hours 49 minutes, and $\pm$ 21 hours 21 minutes. SEM-EDS analysis were performed to obtained the result from electrochemical methods that showed the presence of the elements such as magnesium (Mg), oxygen (O), carbon (C), Sodium (Na), Chlorine (Cl), Nitrogen (N), Phosphor (P), Sulphur (S).

Keyword: magnesium, artificial synovial fluid, bovine serum albumin, hyaluronic acid, phosphate buffered saline, corrosion behavior, open circuit potential, tafel extrapolation, SEM-EDS.