Getting Artificial Bone From Corn-Cob Ash and Mussel Shells With Bioceramic Method

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In recent years, calcium silicate ceramic has been accepted as a candidate material for being used as a bone substitute biomaterial due to its good bioactivity. Calcium silicate containing bioceramics are the subject of research as a potential use material in the field of bone tissue regeneration due to their role in important metabolic events of new bone formation and superior bioactivity compared to hydroxyapatite. In vivo and in vitro studies show that calcium silicate ceramic material forms a bone-like apatite layer in simulated body fluid (SBF) and chemically integrates with living bone tissue. In this study, for the production of three-dimensional artificial tissue containing calcium silicate, silica was initially produced from corn cobs, and dicalcium silicate synthesis was successfully carried out by combining it with CaO obtained from mussel shells, and a layered three-dimensional artificial tissue was successfully produced. Calcium disilicate synthesis was carried out at 1200 ºC for an hour. It was determined that the grain size of silica obtained from corn seeds is less than 100 nm, and nanomaterial synthesis was implemented. In this study, the starch consolidation method was used for the production of artificial tissues containing dicalcium silicate. This method is both financially beneficial and very easy to apply. Moreover, it allows the production of some complex bone structures and biomaterials with high porous structural content. As a result of the SEM-EDX analysis conducted on the obtained ceramic silica, it was found that the amount of Si, O, Mg and C contained in the synthesized ceramics is sufficient for the production of biomaterial used instead of a bone and it is possible to use it as a biocompatible artificial bone tissue.

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