MS-5-P-1617 Structural examination of bioactive, low cost and environmentally friendly biogenic hydroxyapatite

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The incidence of bone fractures worldwide is constantly increasing, due to increasing traffic accidents and natural disasters. Filling of bone defect is a significant question in every day clinical work. Hydroxyapatite (HAp) is a one of most used biomaterial. The natural-biological origin HAp have several important advantages: worldwide availability in almost unlimited supply, very low cost of raw materials, utilization of very simple and inexpensive apparatuses, rapid and very efficient transformation from raw materials into HAp.

We prepared the nanostructured HAp from eggshells or seashell in different forms as powder or polymer/HAp composite fibers. High efficient attritor milling was used for HAp production at 5 or 10 h. Structural characterization, mainly morphology, grain size, structure and elemental composition of different types of HAp powders were studied. Structural observation confirmed the average grain size about few 100 nm. Elemental composition of HAp prepared from eggshells showed higher magnesium (Mg) content. On the other hand, HAp prepared from seashell showed the higher sodium (Na) and strontium (Sr) contents.

In co-operation with Gangneung-Wonju National University, Korea we compared the biological behavior of different HAp; prepared from eggshell, seashell or synthetic commercial HAp. In vivo and in vitro studies showed that the recycled HAp form eggshell and seashell showed more regenerated bone volume than that the synthetic HAp. This biogenic HAp can be considered a possible useful bone graft materials.

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Fig. 1: SEM images of nanosized HAp prepared from eggshells

Fig. 2: SEM images of nanosized HAp prepared from seashells