Ekstraksi Kolagen dari Kulit Ikan Salmon dan Sintesis Hidroksiapatit dari Tulang Ikan Tuna untuk Perancah Tulang = Extraction of Collagen from Salmon Skin and Synthesis of Hydroxyapatite from Tuna Bones for Bone Scaffold.

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Abstrak

Dalam penelitian ini dikembangkan kolagen dan hidroksiapatit untuk rekayasa jaringan tulang dari limbah pengolahan ikan. Kolagen diekstraksi dari kulit salmon norway (Salmon salar) meggunakan metode Acid Soluble Collagen (ASC) sementara hidroksiapatit disintesis dari tulang ikan tuna dengan menggunakan metode kalsinasi pada suhu 600°C dan 800°C. Material dievaluasi untuk sifat fisika-kimia, kolagen dievaluasi dengan fourier transform infrared spectroscopy(FTIR), differential scanning calorimetry (DSC), dan scanning electron microscopy with energy dispersive X-ray (SEM-EDX). Kolagen hasil ekstraksi memiliki morfologi dalam bentuk lembaran dengan yield 0,8%. Persentase karbon yang didapatkan dari kolagen yang diekstraksi adalah 47% dan termasuk dalam kelas standar, sementara persentase karbon/nitrogen yaitu 2,63% yang sedikit lebih rendah dari standar. Hidroksiapatit yang telah disintesis dievaluasi dengan fourier transform infrared spectroscopy (FTIR), scanning electron microscopy with energy dispersive X-ray (SEM-EDX), dan X-ray diffraction (XRD). Hidroksiapatit yang diperoleh setelah proses kalsinasi menunjukkan struktur yang serupa yaitu kristal bubuk. HAp yang dikalsinasi pada suhu 600°C dan 800°C tidak memiliki pita sesempit HAp standar, namun lebih sempit daripada HAp yang dikalsinasi pada suhu 600°C. Rasio atom Ca/P HAp 600°C dan 800°C yaitu 2,15 dan 2,01 secara berurutan. Penelitian menunjukkan bahwa kolagen dari kulit salmon dan hidroksiapatit dari tulang tuna memiliki kualitas baik dan aplikasi luas dalam rekayasa jaringan tulang.

.....In this research, collagen and hydroxyapatite were developed for bone tissue engineering from fish processing waste. Collagen was extracted from the skin of Norwegian salmon (Salmon salar) using the Acid Soluble Collagen (ASC) method, while hydroxyapatite was synthesized from tuna bones using the calcination method at 600°C and 800°C. Materials were evaluated for physico-chemical properties, collagen was evaluated by fourier transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), and scanning electron microscopy with energy dispersive X-ray (SEM-EDX). The synthesized hydroxyapatite was evaluated by fourier transform infrared spectroscopy (FTIR), scanning electron microscopy with energy dispersive X-ray (SEM-EDX), and X-ray diffraction (XRD). Extracted collagen have a sheet looking morphology with yield of 0.8%. The percentage of carbon obtained from extracted collagen is 47%, while the percentage of carbon/nitrogen is 2.63% which is slightly lower than the standard. The hydroxyapatite obtained after the calcination process shows a similar structure which is powder crystals. HAp calcined at 600°C and 800°C did not have a band as narrow as standard HAp, although HAp calcined at 800°C had narrower bands than HAp calcined at 600°C. The atomic ratios of Ca/P HAp at 600°C and 800°C are 2.15 and 2.01 respectively. The research findings indicate that collagen from salmon skin and hydroxyapatite from tuna bones are expected to have broad applications in bone tissue engineering.