

ABSTRAK

Batu kapur merupakan salah satu potensi batuan yang banyak terdapat di Indonesia. Batu kapur dapat dimanfaatkan dalam dunia kesehatan yaitu sebagai biomaterial untuk pembuatan implantasi tulang. Salah satu biomaterial buatan yang digunakan dalam teknologi implantasi tulang adalah biokomposit. Sebelum pengaplikasian biokomposit dalam teknologi implantasi tulang harus mengetahui komposisi yang tepat antara bioplastik dan biokeramik supaya implant tulang memiliki sifat mekanik yang baik, oleh karena itu dilakukan beberapa pengujian seperti *shrinkage*, *tensile test*, *flexural test*, dan SEM-EDX guna mengetahui mikrostruktur dan unsur yang terkandung dalam biokomposit. Dalam penelitian ini menggunakan 4 variasi perbandingan suspensi CaCO_3 : bioplastik (*Corn Starch*) yaitu 20:80 (w/w)%, 30:70 (w/w)%, 40:60 (w/w)%, 50:50 (w/w)%. Dimensi spesimen *tensile test* sesuai dengan standar ASTM D638 tipe 4, dan untuk dimensi spesimen *flexural test* sesuai dengan standar ASTM D790. Sampel diberikan kode seperti kode spesimen A untuk komposisi 20:80 (w/w)%, kode spesimen B untuk komposisi 30:70 (w/w)%, kode spesimen C untuk komposisi 40:60 (w/w)%, dan kode spesimen D untuk komposisi 50:50 (w/w)%. Berdasarkan hasil dari pengukuran *shrinkage* menunjukkan bahwa spesimen B memiliki nilai rerata *shrinkage* tertinggi yaitu sebesar $18 \pm 0,011\%$ untuk spesimen *tensile test*, dan $16 \pm 0,022\%$ untuk spesimen *flexural test*. Hasil dari *tensile test* dan *flexural test* juga menunjukkan bahwa spesimen B memiliki nilai rerata tertinggi yaitu *ultimate tensile strength* sebesar $0,11 \pm 0,015$ MPa dan *flexural strength* sebesar $0,02 \pm 0,012$ MPa. Sedangkan dari pengujian mikrostruktur yaitu SEM-EDX didapatkan hasil berupa morfologi spesimen berbentuk *spheroid* dan unsur dominan yang terkandung dalam spesimen yaitu C sebesar 35,38 % berat, N sebesar 11,74% berat, O sebesar 50,13 % berat, dan Ca sebesar 2,74 % berat.

Kata kunci : Biomaterial, Biokomposit, Komposisi, CaCO_3 , *Corn Starch*.

ABSTRACT

Limestone is one of the many potential rocks found in Indonesia. Limestone can be used in the world of health, namely as a biomaterial for the manufacture of bone implants. One of the artificial biomaterials used in bone implantation technology is biocomposite. Prior to the application of biocomposites in bone implantation technology, it is necessary to know the correct composition between bioplastics and bioceramics so that bone implants have good mechanical properties, therefore several tests were carried out such as shrinkage, tensile tests, flexural tests, and SEM-EDX to determine the microstructure and elements involved. contained in the biocomposite. In this study using 4 variations of the ratio of suspense CaCO_3 : bioplastic (corn starch), namely 20:80 (w/w)%, 30:70 (w/w)%, 40:60 (w/w)%, 50:50 (w/w)% . The dimensions of the tensile test specimen are in accordance with the ASTM D638 type 4 standard, and the dimensions of the flexural test specimen are in accordance with the ASTM D790 standard. Samples are given codes such as specimen A code for composition 20:80 (w/w)%, specimen B code for composition 30:70 (w/w)%, specimen C code for composition 40:60 (w/w)%, and specimen code D for composition 50:50 (w/w)%. Based on the results of the shrinkage measurement, it showed that specimen B had the highest average shrinkage value of $18 \pm 0.011\%$ for the tensile test specimen, and $16 \pm 0.022\%$ for the flexural test specimen. The results of the tensile test and flexural test also showed that specimen B had the highest average value, namely the ultimate tensile strength of $0.11 \pm 0.015 \text{ Mpa}$ and flexural strength of $0.02 \pm 0.012 \text{ Mpa}$. Meanwhile, from the microstructure test, namely SEM-EDX, the results were in the form of a spheroid-shaped specimen morphology and the dominant elements contained in the specimen were C by 35.38% by weight, N by 11.74% by weight, O by 50.13% by weight, and Ca by 2.74% by weight.

Keywords : *Biomaterial, Biocomposite, Composition, CaCO_3 , Corn Starch.*