# Pembuatan Food Grade Packaging dari pati jagung menggunakan filler hibrid serat batang pisang dan selulosa bakteri = Food Grade Packaging from hybrid banana pseudostem fibre bacterial cellulose filled corn starch

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Abstrak

Plastik food grade yang biodegradable namun tetap kuat dan tahan air seperti plastik sintetis merupakan topik riset yang banyak digemari dewasa ini. Pada penelitian ini, dalam rangka meningkatkan kekuatan mekanik dan ketahanan air bioplastik filler alami, selulosa bakteri ditambahkan untuk menghasilkan bioplastik filler hibrid. Filler serat batang pisang dan selulosa bakteri dalam jumlah tertentu didispersikan dalam air distilasi di ultrasonic processor. Selanjutnya, pati dimasukkan dan campuran dipanaskan hingga pati tergelatinisasi. Campuran kemudian dicetak dan dikeringkan. Hasil penelitian menunjukkan bahwa persentase filler 10% merupakan nilai optimum yang menghasilkan kekuatan mekanik paling tinggi. Komposisi filler hibrid yang menghasilkan bioplastik paling kuat adalah 25% serat batang pisang dan 75% selulosa bakteri, dengan kuat tarik 4,599 MPa dan modulus 174,1 MPa. Meskipun demikian, kekuatan mekanik bioplastik filler hibrid masih kalah dibandingkan dengan bioplastik filler tunggal. Di sisi lain, penambahan selulosa bakteri terbukti meningkatkan ketahanan air, dengan laju transmisi air 3,8958 g/m2/jam pada bioplastik filler 10% serat batang pisang dan 35% selulosa bakteri. Karakteristik bioplastik dikonfirmasi dengan analisis SEM, FTIR, dan XRD. Dari soil burial test selama 9 hari, didapatkan bahwa filler serat batang pisang menurunkan kecepatan biodegradasi bioplastik sebesar 6.9%.
.....Food grade bioplastic has become a popular research topic these days. However, further study still needs to be conducted, to develop bioplastic that has comparable mechanical and water barrier properties with synthetic plastic. In this research, to improve the mechanical and water barrier properties of plant cellulose filled bioplastic, bacterial cellulose is added to create hybrid filled starch bioplastic. The filler banana pseudostem fibre and bacterial cellulose were first dispersed in distilled water, starch was added and mixture was heated until gelatinization occured. The mixture was then casted and dried in the oven. Research proved that 10% was an optimum filler percentage, which resulted in the highest mechanical strength of bioplastic. The hybrid filler composition that gave the best mechanical properties was 25% banana pseudostem fibre and 75% bacterial cellulose, with tensile strength 4.599 MPa and modulus 174.1 MPa. However, bioplastic with hybrid filler was not as strong bioplastic with single filler. On the other hand, the addition of bacterial cellulose proved to give positive effect to water barrier properties, bioplastic filled with hybrid 10% banana pseudostem fibre and 35% bacterial cellulose had water vapour transmission rate 3,8958 g/m2/hour. The mechanical and water barrier properties of bioplastic was confirmed with SEM, FTIR, and XRD analysis. Soil burial test for 9 days proved that banana pseudostem filler decreased 6,9% of corn starch bioplastic biodegradation rate.