

ANALISIS KEKUATAN *BENDING* MATERIAL KOMPOSIT SERAT ALAM TANDAN KOSONG KELAPA SAWIT DENGAN VARIASI FRAKSI VOLUME SERAT 9%, 11%, DAN 13%

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ABSTRAK

Perkembangan industri kelapa sawit di Indonesia yang sangat pesat seiring meningkatnya waktu mengakibatkan meningkatnya limbah sisa produksi olahan sawit seperti tandan kosong kelapa sawit yang sangat mengganggu bagi masyarakat yang tinggal di dekat area pabrik kelapa sawit. Limbah tandan kosong kelapa sawit dapat menimbulkan aroma yang tidak sedap, dan tak jarang limbah tersebut tanpa sengaja terbuang ke sungai sehingga mencemari air sungai dengan kandungan minyak yang masih tersisa didalamnya. Terdapat banyak penelitian yang menguji bagaimana kekuatan material komposit berpenguat serat tandan kosong kelapa sawit, tetapi kekuatan bending atau kemampuan material komposit berpenguat serat tandan kosong kelapa sawit dalam menahan beban tekuk terhadap variasi fraksi volume serat belum diketahui. Untuk itu, pada penelitian ini dilakukan fabrikasi material komposit berpenguat serat tandan kosong kelapa sawit dengan pengikat resin polyester Yukalac 157 BQTN-EX dan katalis MEKPO. Material komposit serat tandan kosong kelapa sawit difabrikasi dengan variasi fraksi volume serat 9%, 11%, dan 13% melalui metode vacuum bagging. Pengujian bending terhadap material komposit dengan masing-masing fraksi volume serat dilakukan melalui metode three point bending sesuai standar ASTM D7264. Hasil dari penelitian ini adalah proses manufaktur dan nilai kekuatan bending material komposit serat tandan kosong kelapa sawit dengan fraksi volume serat 9%, 11%, dan 13%. Melalui hasil pengujian bending diperoleh nilai tegangan bending rata-rata pada material komposit serat tandan kosong kelapa sawit dengan fraksi volume serat 9% adalah sebesar 42,65 MPa, 11% sebesar 72,81 MPa, dan 13% sebesar 94,27 MPa.

Kata kunci: *ASTM D7264, kekuatan bending, katalis MEKPO, material komposit, metode three point bending, metode vacuum bagging, resin polyester Yukalac 157 BQTN-EX, serat tandan kosong kelapa sawit*

BENDING STRENGTH ANALYSIS OF OIL PALM EMPTY FRUIT BUNCH NATURAL FIBER COMPOSITE MATERIALS WITH VARIATION OF FIBER VOLUME FRACTION 9%, 11%, AND 13%

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ABSTRACT

The rapid development of the palm oil industry in Indonesia over the time has resulted in an increase in waste from the production of processed palm oil such as empty palm oil bunches which are very disturbing for people living near the palm oil mill area. Oil palm empty fruit bunches waste can cause an unpleasant aroma, and not infrequently the waste is accidentally thrown into the river so that it pollutes river water with the remaining oil content in it. There are many studies that examine how the strength of the composite material reinforced with oil palm empty fruit bunches, but the bending strength or the ability of the composite material to withstand buckling loads against variations in fiber volume fraction is not yet known. For this reason, in this study, the fabrication of fiber-reinforced composite material from waste oil palm empty fruit bunches with a Yukalac 157 BQTN-EX polyester resin binder and MEKPO catalyst will be carried out. Oil palm empty fruit bunch fiber composite material was fabricated with variations in fiber volume fraction of 9%, 11%, and 13% through the vacuum bagging method. Bending testing of composite materials with each fiber volume fraction was carried out using the three point bending method according to the ASTM D7264 standard. The results of this study are the manufacturing process and the value of the bending strength of the composite material of oil palm empty fruit bunches with fiber volume fractions of 9%, 11%, and 13%. Through the results of the bending test, the average bending stress value on the composite material of oil palm empty fruit bunches fiber with a fiber volume fraction of 9% is 42,65 MPa, 11% is 72,81 MPa, and 13% is 94,27 MPa.

Keywords: ASTM D7264, bending strength, MEKPO catalyst, composite material, three point bending method, vacuum bagging method, Yukalac 157 BQTN-EX polyester resin, palm empty fruit bunch fiber