Pemanfaatan serat bagas sorgum sebagai reinforcement agent untuk meningkatkan sifat mekanis dan bidogradabilitas polylactid acid pla = effect of sorghum fiber as reinforcement agent on mechanical and biodegradable properties of polylactic acid pla / Yulianto

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Abstrak

[Konsumsi plastik di Indonesia sebesar 3,8 juta ton pertahun namun plastik yang ada sekarang ini terbuat dari minyak bumi sehingga tidak dapat diperbaharui dan terurai oleh alam. Pemanfaatan bahan alam pun gencar dilakukan maka dalam penelitian ini akan dibuat biokomposit dengan matriks PLA dan reinforcement agent serat bagas sorgum dimana serat bagas sorgum belum pernah digunakan dalam penelitian manapun serta gliserol sebagai plasticizer. Penelitian ini bertujuan untuk memperbaiki sifat getas dan biodegradability dari PLA. Serat selulosa dari bagas kering sorgum dihasilkan dari proses ekstraksi, menggunakan basa KOH untuk menghilangkan senyawa lignin dan hemiselulosa dan bleaching dengan natrium klorit. Selanjutnya, serat selulosa dibuat menjadi ukuran nano dengan proses hidrolisis. Biokomposit dibuat dari PLA dengan serat mikroselulosa dan serat nanoselulosa dibuat dengan metode casting film menggunakan pelarut aseton. Film biokomposit diuji kekuatan mekanisnya dengan menggunakan Universal Testing Machine (UTM) dan biodegradabilitas dengan soil burial test. Hasil uji mekanis pada film biokomposit menunjukkan bahwa ukuran yang lebih kecil menghasilkan biokomposit dengan kekuatan mekanis yang lebih baik dan seiring bertambahnya konsentrasi serat nanoselulosa modulus elastisitas dan biodegradability dari PLA juga meningkat. Penambahan serat nanoselulosa sebanyak 2,5% meningkatkan regangan maksimum dari 5,19% menjadi 11,59% dan sifat biodegradable meningkat dengan penambahan serat nanoselulosa sebanyak 15% menjadi 54%.;Plastic consumption has been reached 3.8 billion tons, however it made from crude oil which mean not renewable resources and degradable. Usage of natural resources has been studied for replace conventional plastic therefore this research made bicomposites from PLA as the matix, sorghum bagasse which never been used in other experiments as reinforcement agent and glycerol as plasticizer. Main objective of this study was to improve the brittleness and biodegradability from PLA. Cellulose fiber from sorghum bagasse is produced from extraction process, by using KOH for dissolving lignin and hemicellulose followed by bleaching with sodium chloride. Cellulose nanofiber is produced by hydrolysis using sulfuric acid 64%. Biocomposite from PLA and cellulose microfiber and cellulose nanofiber are made by casting film method using acetone as solvent. Mechanical properties of biocomposite film is tested using Universal Testing Machine (UTM) and the biodegradability is tested using soil burial method. Biocomposite?s mechanical testing result is shown smaller fiber size gives better mechanical properties of biocomposite and as long as the concentration of celluloses nanofiber are increased the tensile modulus and biodegradability of PLA are increased as well. The addition of 2,5% cellulose nanofiber improved strain at break from 5,19% to 11,59% and biodegradable properties becoming 54% by adding 15% cellulose nanofiber., Plastic consumption has been reached 3.8 billion tons, however it made from crude oil which mean not renewable resources and degradable. Usage of natural resources has been studied for replace conventional plastic therefore this research made bicomposites from PLA as the matix, sorghum bagasse which never been used in other experiments as reinforcement agent and glycerol as

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