PENGARUH PRA-PEPRLAKUAN *ORGANOSOLV* TERHADAP KARAKTERISTIK KIMIA DAN GULA PEREDUKSI PADA BAGIAN DAN UMUR RUMPUT GAJAH GAMA UMAMI (*Pennisetum purpureum cv.* GU) YANG BERBEDA

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INTISARI

Silvopastura merupakan salah satu kegiatan agroforestri yang menggabungkan antara penanaman tanaman kehutanan dan pakan ternak pada satu lahan yang sama. Rumput gajah adalah salah satu jenis tanaman pakan ternak yang digunakan pada sistem ini. Guna meningkatkan produktivitas rumput gajah, Fakultas Peternakan UGM melakukan inovasi menggunakan iradiasi sinar gama dan membentuk varietas baru yakni rumput gajah gama umami. Selain dimanfaatkan sebagai pakan ternak, rumput gajah gama umami juga berpotensi menjadi bahan baku penghasil selulosa untuk produksi bioetanol. Perolehan selulosa pada biomassa dapat dioptimalkan melalui proses pra-perlakuan. Pra-perlakuan yang dipilih adalah *organosolv* karena efektif menghilangkan lignin serta ramah lingkungan. Tujuan dari penelitian ini adalah untuk mengetahui karakteristik kimia serta gula pereduksi dari rumput gajah gama umami pada variasi bagian tanaman dan umur panen.

Penelitian ini menggunakan bagian batang dan daun rumput gajah gama umami yang dipanen pada umur 60,100, dan 140 hari. Tiap bagian tersebut diberi perlakuan *organosolv* menggunakan pelarut etanol-aquades 60:40 (v/v) dengan perbandingan sampel:larutan 1:15 (w/v) pada suhu 175^{o} C selama 60 menit. Sampel yang telah diberi perlakuan *organosolv*, selanjutnya diuji kadar ekstraktif larut air panas, ekstraktif etanol toluena, holoselulosa, alfaselulosa, hemiselulosa, Klason-lignin, lignin terlarut asam, nilai pH, dan kadar abu. Selain itu sampel juga dihidrolisis menggunakan enzim meiselase dan diukur laju hidrolisis serta diuji kadar gula pereduksi menggunakan metode *Dinitrosalysilic acid* (DNS).

Hasil penelitian menunjukkan bahwa kadar ekstraktif larut air panas berkisar antara 13,45 - 14,38%, kadar ekstraktif etanol toluena berkisar antara 0,24 – 1,40%, kadar Klason lignin berkisar antara 10,73 – 11,27%, kadar lignin terlarut asam berkisar antara 0,24 – 0,29%, kadar holoselulosa berkisar antara 46,42 – 51,51%, kadar alfaselulosa berkisar antara 22,63 – 24,89%, kadar hemiselulosa berkisar antara 22,72 – 28,88%, nilai pH berkisar antara 6,13 – 6,86, kadar abu berkisar antara 1,56 – 10,76%, kadar gula pereduksi berkisar antara 9,62 – 16,43 mg/ml, dan laju hidrolisis berkisar antara 15,55 – 21,21%. Kadar gula pereduksi tertinggi (16,43 mg/ml) diperoleh dari bagian daun dengan umur panen 60 hari.

Kata kunci: rumput gajah gama umami, pra-perlakuan, *organosolv*, karakteristik kimia, gula pereduksi

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THE EFFECT OF ORGANOSOLV PRE-TREATMENT ON THE CHEMICAL PROPERTIES AND REDUCING SUGAR OF DIFFERENT PARTS AND AGES OF GAMA UMAMI ELEPHANT GRASS (*Pennisetum purpureum* cv. GU)

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ABSTRACT

Silvopastura is an agroforestry system that combines the planting of forestry plants and animal feed on the same land. Elephant grass is one type of fodder plant used in this system. To increase the productivity of elephant grass, the UGM Faculty of Animal Husbandry innovates using gamma irradiation and forms a new variety, namely gama umami elephant grass. Apart from being used as animal feed, gama umami elephant grass also has the potential to become a raw material for producing cellulose for bioethanol production. Cellulose recovery can be optimized through the pre-treatment process. The pre-treatment chosen was organosolv because it was considered more effective in removing lignin and environmentally friendly. The purpose of this study was to determine the chemical properties and reducing sugars of gama umami elephant grass on different parts and ages

This study used the stems and leaves of gama umami elephant grass which were harvested at the age of 60, 100 and 140 days. Each part was treated with organosolv using ethanol-aquadest 60:40 (v/v) with a sample:solvent ratio of 1:15 (w/v) at 175^{o}C for 60 minutes. Samples that had been treated with organosolv were then tested for the content of hot water-soluble extractives, ethanol-toluene extractives, holocellulose, alpha-cellulose, hemicellulose, Klason-lignin, acid-soluble lignin, pH value, and ash content. In addition, the sample was also hydrolyzed using the meiselase enzyme and the hydrolysis rate was measured and the reducing sugar content was tested using the Dinitrosalysilic acid (DNS) method.

The results showed that the hot water soluble extractive content ranged from 13.45 - 14.38%, the ethanol toluene extractive content ranged from 0.24 - 1.40%, Klason-llignin content ranged from 10.73 - 11.27%, the Acid soluble lignin ranged from 0.24 – 0.29%, holocellulose content ranged from 46.42 – 51.51%, alphacellulose content ranged from 22.63 – 24.89%, hemicellulose content ranged from 22,72 – 28,88%, pH values ranged from 6.13 – 6.86, ash content ranged from 1.56 – 10.76%, reducing sugar content ranged from 9.62 – 16.43 mg/ml, and hydrolysis rates ranged from 15.55 – 21.21%. The highest reducing sugar content (16.43 mg/ml) was obtained from the leaf at 60 days of harvest.

Key words: gama umami, pre-treatment, organosolv, chemical properties, reducing sugar

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