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Sujitra Wongkasemjit

Chulalongkorn University, Thailand

Evaluation of monomeric sugar yield from various grasses grown in Thailand as biofuel feedstock by two-stage pretreatment process

Napier grass (*Pennisetum purpureum*), Tiger grass (*Thysanolaena maxima*), Mission grass (*Pennisetum polystachyon*), Kans grass (*Saccharum spontaneum*) and Giant reed (*Arundo donax*) were locally collected to test as bioethanol feedstock. All grasses, showing high cellulose and hemicellulose compositions, were treated by a two-stage microwave/ chemical pretreatment method. The optimum conditions of the pretreatment were investigated and the maximum monomeric sugar yields were compared. The microwave-assisted NaOH and H₂SO₄ with 15:1 liquid to solid ratio were studied by varying catalyst concentration, temperature, and time to maximize the amount of the obtained monomeric sugar. The maximum monomeric sugars released from microwave-assisted NaOH pretreatment were 5.57 g (at 60°C/10 min, 0.5%(w/v) NaOH for Napier grass), 6.45 g (at 140°C/15 min, 1%(w/v) NaOH for Tiger grass), 6.56 g (at 120°C/10 min, 3% (w/v) NaOH for Mission grass), 6.78 g (at 80°C/5 min, 5% (w/v) NaOH for Kans grass), and 6.84 g (at 120°C/5 min, 5% (w/v) NaOH for Giant reed) per 100 g biomass, while maximum monomeric sugars from microwave-assisted H₂SO₄ pretreatment were 42.03 g (at 160°C/15 min, 1% (w/v) H₂SO₄ for Napier grass), 30.37 g (at 200°C/5 min, 0.5% (w/v) H₂SO₄ for Tiger grass), 34.34 g (at 200°C/5 min, 1%(w/v) H₂SO₄ for Mission grass), 33.76 g (at 200°C/10 min, 0.5% (w/v) H₂SO₄ for Kans grass), and 31.91 g (at 180°C/30 min, 0.5% (w/v) H₂SO₄ for Giant reed) per 100 g biomass.

Biography

Sujitra Wongkasemjit has completed her PhD from West Virginia University and Post-doctoral studies from Food and Drug Administration, USA. She is a Professor of Petroleum and Petrochemical College, Chulalongkorn University. She has published more than 100 papers in reputed journals, 7 local patents, 2/3 books/book chapters, and more than 200 international presentations.

dsujitra@chula.ac.th