ABSTRACT

Non-edible lignocellulosic feedstocks could be potential substrates for bioethanol production due to there availability in abundance, high cellulose content, non competitiveness with food chain.

In the present study, *Ricinus communis* and *Lantana camara* were used for bioethanol production. Saccharification was carried out by using laccase pretreated substrates. Maximum reducing sugar production of 116.78 mg/mL and 107 mg/mL were obtained within 9 h of incubation using pretreated *Ricinus communis* and *Lantana camara*, respectively.

Using *Saccharomyces cerevisiae*, bioethanol fermentation was carried out in three ways: separate hydrolysis and fermentation (SHF), pre-simultaneous saccharification and fermentation (PSSF) and simultaneous saccharification and fermentation (SSF). SSF yielded higher bioethanol production compared to SHF and PSSF. In case of *Ricinus communis*, maximum bioethanol production of 5.72% (v/v) was achieved after 72 h of SSF, whereas, in case of *Lantana camara*, maximum bioethanol production of 5.14% (v/v) was achieved after 144 h of SSF. Under same process conditions, compared to wild type strain, chemically mutagenized strain of *Saccharomyces cerevisiae* yielded 9.08% and 16.93% higher ethanol production from *Ricinus communis* and *Lantana camara*, respectively. Further, bioethanol production from lignocellulosic substrates were carried out using carrageenan immobilized *S. cerevisiae* (mutant). The present study showed that using carrageenan immobilized *S. cerevisiae* (mutant), maximum bioethanol production of 5.61% (v/v), 5.45% (v/v) were achieved within 48 h of incubation at 37 °C from *Ricinus communis* and *Lantana camara*, respectively.

Keywords: *Ricinus communis*; *Lantana camara*; enzymatic pretreatment; enzymatic saccharification; simultaneous saccharification and fermentation; *S. cerevisiae*; chemical mutagenesis; immobilization.