Abstract
Milled pulp flour from spoilt Dioscorea rotundata tubers was investigated as potential feedstock for bioethanol production using a new isolate of Saccharomyces cerevisiae strain LC 269108 displaying both thermotolerant and acid-tolerant properties. Fermentation was implemented by simultaneous saccharification and fermentation (SSF) for 60 h at pH 5.5 and temperatures of 30 °C and 40 °C. The results showed that the isolate metabolized a narrow range of carbon compounds, showed capacity to ferment many sugars (with gas evolution) and exhibited tolerance to acidification (up to 70 mM of acetic acid) under high temperature conditions. The time course of fermentation showed that the peak ethanol concentrations were 7.15 ± 0.08% at 30 °C and 7.29 ± 0.53% at 40 °C after 12 h and 48 h, respectively. In batches spiked with 50 mM acetic acid, the final ethanol concentration decreased to 6.30 ± 0.10% at 30 °C and to 5.50 ± 0.26% at 40 °C. No significant difference ($P > .05$) was found between the concentrations of ethanol produced at 30 °C and 40 °C. However, the ethanol concentration obtained from a culture containing 50 mM acetic acid was significantly lower ($P < .05$) than the value obtained in the control experiment (no acetic acid). This new isolate has a great potential for fermentation of acid-pretreated substrate at high temperature thereby reducing the cooling costs and the risk of microbial contamination.