# Abstract

Kallar grass (*Leptochloa fusca* L. Kunth), steam-pretreated under pre-defined conditions was used as a substrate for ethanol production in simultaneous saccharification and fermentation (SSF) process. A four-factor, full factorial, rotatable central composite design (CCD) of the response surface methodology (RSM) was used to develop a statistical model for the optimization of process variables e.g substrate concentration, enzyme concentration, temperature and time of SSF. Experimental data obtained from Response Surface Methodology (RSM) on ethanol production and substrate conversion efficiency (SCE) was analysed using a second order polynomial equation and interaction among variables of SSF process was studied by the analysis of surface and contour plots. Optimized variables obtained were 10% pretreated Kallar grass, 0.6mg/ml enzyme concentration, 40°C temperature and 48 hrs of SSF time. At optimum factor setting, predicted values of ethanol production and SCE were 19.76g/L and 82 % respectively. Experimental results of the validation experiment were consistent with the predictive model and were 19.57g/L and 83.74% for ethanol production and substrate conversion respectively.