



## ABSTRACT

In the present study, detoxification of wheat straw was carried out using various alkalis, acids or their combination for removal of phenolic compounds present in the biomass and to increase percentage saccharification eventually. Phosphoric acid used in combination with aqueous ammonia was selected as best method for removal of total phenolic content. Optimization of various parameters such as conc. of alkali solution, conc. of acid solution, temperature of incubation, and time of incubation was carried out to remove maximum phenolic content in biomass. The maximum reduction in phenolic content (48 mg GAE/g DW from 210 mg GAE/g DW of control sample) was observed when wheat straw was treated with 0.5% phosphoric acid and 5% ammonia at 110°C for 25 mins. The process of saccharification was then carried out using detoxified, wheat straw sample and it was scaled up using 20L saccharification vessel. Various external as well as internal parameters of saccharification were optimized for the recovery of maximum total reducing sugars as well as percentage saccharification. Detoxified and grinded wheat straw sample, with 2 % biomass loading, saccharified at 80°C and 125rpm for 4 hours gave best results. Percentage saccharification was increased from 18.96% to 40.5% under optimized conditions at lab scale and it was further increased to 55.55% using optimized scale up parameters. Saccharified hydrolysate was further detoxified using activated charcoal. Different conditions for treatment with charcoal were optimized i.e. incubation time, temperature, agitation and charcoal concentration. Minimum phenolic content (67.45 mg GAE/g DW reduced from 89.5 mg GAE/g DW of untreated sample) and maximum reducing sugar (139.9 g) was observed when sugar hydrolysate was detoxified with 2.5% activated charcoal at 30°C and 200rpm for 30 mins.