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Fermenter Design for Production of Ethanol from Napier Grass

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Abstract: *1000 ml of 0.1M sodium acetate buffer solution poured into 1000 ml (Erlenmeyer) conical flask, 20 g of Aspergillus Niger (crude enzyme), 5 g of brewer's yeast (Saccharomyces cerevisiae), 20 g of treated elephant grass added and 1 g of MgSO4, 2 g of (NH4) H2PO4 added as nutrient. The flask corked properly, sealed with aluminum foil paper and incubated at 30 OC for 48-72 hrs. in an incubator. We can increase the fermentation time 4-6 days for analysis of yield of ethanol from biomass. As per literature study optimum time of fermentation is 72 hrs. i. e. 3 days. As per analysis 1000 ml (1 L) of ferment yield of 110 ml of ethanol. 11 % of yield of ethanol from Napier grass with substrate concentration 140-160 gm/L. With help of yield we design fermenter (Reaction Vessel) for both continuous and batch operation. For batch operation, for fermentation of elephant grass required time is 72 hrs. i.e. is 3 days So, in case of batch operation we need to install 2 No. of fermenter. 2 fermenter for 4 days operation including one day cleaning and feeding. According to fermentation time we feed material in 1st and 2nd feed 1st and 2nd day will get output as 4th, and 5th with twice volume as continuous operation. For this system we design fermenter for 27.79 m3 volume get internal and outer diameter as 5and 5.06 m resp., Thickness and length 4 mm and 7.5 m resp. We need two fermenter of volume 27.79 cubic meter each.*

Keywords: Napiergrass, Ethanol, Batch operation, Fermenter Design

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